



ElAR Volume 6: Onshore Infrastructure Technical Appendices Appendix 6.5.1-2: Onshore Cable Route Selection Report

Kish Offshore Wind Ltd.

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APEM Group

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Dublin Array Offshore Wind Farm

Onshore Cable Route Selection Report

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Executive Summary

The purpose of this report is to select the best performing onshore cable route option for the Phase I Dublin Array Offshore Wind Farm Project (“Dublin Array”). An assessment of seven selected cable route options was carried out to identify the best performing cable route option(s) according to set criteria and sub-criteria. These included; technical factors, socio-economic factors, environmental factors and economic factors. The individual performance of each cable route option according to these combined criteria were compared against the other cable route options to rank them from best to worst performance.

The result identified cable route option 2 as the best performing route overall, the “**emerging preferred route**”. The emerging preferred route was further assessed through site investigations, landowner engagement and consultations with EirGrid and Dún-Laoghaire Rathdown County Council (DLRCC), the local authority and a subsequent variations were made to optimise the “**preferred route**” before progressing to the next phase of pre-planning design.

Key Points:

- The Dublin Array project is needed to assist Ireland in meeting it’s 2030 renewable energy targets under the Climate Action Plan (CAP);
- The assessment has been informed by a combination of desk-based and field based assessments in addition to consultation with various stakeholders;
- The best performing cable route option was identified as cable route option 2, the emerging preferred route;
- This option scored more favourably in terms of better Technical, Economic and Socio-Economic factors compared to the other route options. The lower Socio- Economic score means that there will be less impact on the surrounding communities. The lower technical score means the technically challenging sections along other routes (Commons road, Ferndale road) will be avoided;
- Commons road and Ferndale road were identified as sections along route options 3 and 6 respectively that scored as high risk technically;
- Engagement with Dún Laoghaire-Rathdown County Council (DLRCC) has identified a series of land-use and development constraints along routes 4, 5 and 7 (refer to section 7 of this report);
- The emerging preferred route was presented for public consultation and subject to further engagement with stakeholders and feasibility assessment, some variations to the emerging preferred route were made to identify the “**preferred route**”;
- Further design, survey, consultation and assessments will be undertaken to further reduce the potential risks identified along the preferred route;
- The preferred route will be further examined to inform a planning stage design which may result in further optimisation.

1 Project Overview

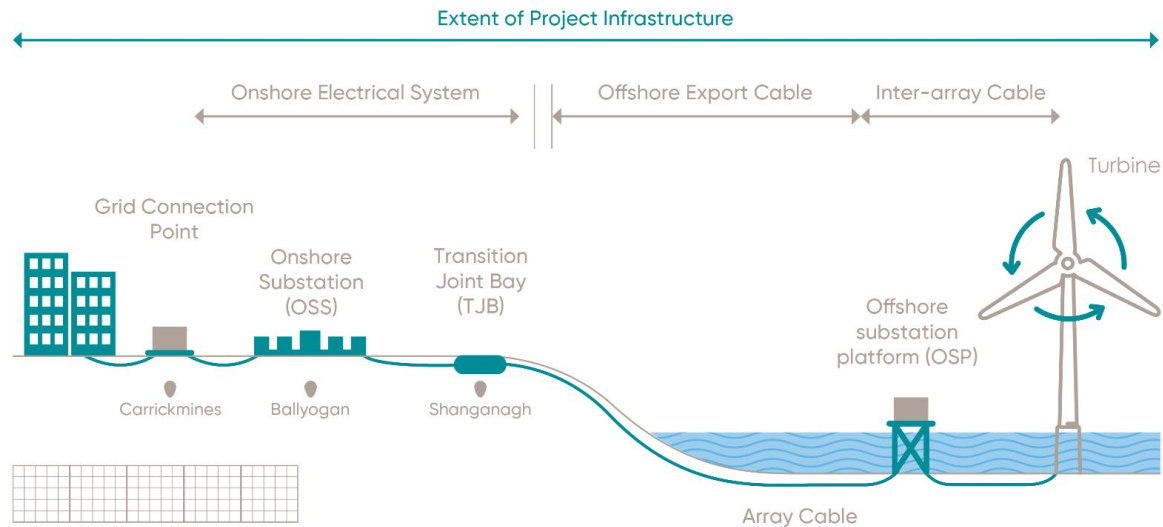


Figure 1-1-1: Taken from the project website dublinarray.com

1.1 Introduction

The onshore export cables are high voltage alternating current (HVAC) transmission circuits. Up to two no. 220kV circuits will be required to connect from the landfall site to the onshore substation ("OSS") at Jamestown. Figure 1-1 depicts the various transmission infrastructure components required to connect the offshore wind farm to the national electricity transmission system. The onshore cable route connects the Transition Joint Bay ("TJB") at the Landfall site to the onshore substation ("OSS") location.

The purpose of this report is to identify the emerging preferred onshore cable route to progress to the next phase of planning design. An assessment was undertaken to identify the potential cable route options between the TJB at the landfall Site and the OSS at the Ballyogan Recycling Park. A multi-criteria analysis was employed to rank the overall performance of each route in comparison with each other. The main criteria considered related to Technical criteria, Environmental criteria, socio-economic criteria and economic criteria. The combined performance of these criteria for each route identified the emerging preferred cable route.

1.2 Project Background

Dublin Array (Kish Offshore Wind Limited and Bray Offshore Wind Limited) is a 50/50 joint venture between RWE Renewables and Saorgus Energy who are developing the proposed offshore wind farm on the Kish and Bray Banks between Dún Laoghaire, County Dublin and Greystones, County Wicklow.

The Dublin Array project was awarded a Maritime Area Consent by the Department of the Environment, Climate and Communications in December 2022. This consent authorises the project to proceed to the next phase of development which includes a development consent ('planning application') to An Bord Pleanála.

1.3 Strategic Infrastructure

The Maritime Area Planning Act (MAPA), 2021 provides the legislative basis for a comprehensive and coherent planning system for the entire Maritime Area. The Act legislates for 'Phase 1' offshore wind projects to proceed through a Maritime Area Consent (MAC), the 'State Consent' and a development consent (with An Bord Pleanála as the consenting authority) process. The Act also includes the necessary amendments to the Planning and Development Act, 2000 as amended, to facilitate development consent applications for infrastructure in the maritime area.

Section 182A of the Planning and Development Act 2000, as amended, states that, where a person (the "undertaker") intends to carry out a "development comprising or for the purposes of electricity transmission", an application for approval of the development under Section 182B shall be made to An Bord Pleanála.

To this extent it is anticipated that the infrastructural requirements envisaged to connect the Dublin Array project to the electricity transmission network will be the subject of strategic infrastructure development consent application(s) to An Bord Pleanála for each project. The structure and number of such applications will be a matter to be determined by the Projects as part of their individual consent strategies. It is the intention to include the planning application for the onshore cable route associated with the Dublin Array project as part of the overall planning application to ABP.

1.4 Health and Safety

Dublin Array is committed to the protection of health, safety and welfare of its staff and the general public as core values. The Dublin Array project team are committed to safety in design, construction and operation and have appointed Project Supervisors for the Design Process in accordance with the Safety, Health and Welfare at Work (Construction) Regulations, 2013.

1.5 Scope of the Report

The purpose of this report is to identify cable route options between the Dublin Array TJB and OSS locations and assess their suitability based on technical, environmental, socio-economic and economic criteria. The cable route options will be assessed and ranked to provide a best to worst

performing cable route list. The emerging preferred route option will then be progressed to the next stage of planning stage design. The combined score derived from a multi-criteria analysis of the technical, environmental, socio-economic and economic factors along each route will identify the emerging preferred cable route. The secondary and tertiary preferred routes will not be progressed to planning design at this stage; however sections of these routes may be incorporated into the final cable route design as part of optimisations along the emerging preferred cable route. It is acknowledged that minor deviations may occur within and adjacent to the cable route as a result of detailed site investigations, surveys and engagement with utility providers, EirGrid, Transport Infrastructure Ireland (TII) and DLRCC. The emerging preferred cable route identified in this report will be submitted to EirGrid (the national Transmission Systems Operator) for feedback and acceptance.

1.6 Overview of the Study Area

The selection of the cable route study area was defined by the landfall location and the substation location. Two landfall options were identified for the purposes of onshore route selection, one at Shanganagh Cliffs and one at Shanganagh Park, based on proximity to the wind farm, proximity to the grid connection point, prevailing suitable geomorphology (avoidance of high cliffs/elevated terrain) and the existence of sufficient space for construction of transition joint bay infrastructure. A site selection report was completed in 2022, identifying a suitable location for the OSS location at the Ballyogan Recycling Park in Jamestown adjacent to the Carrickmines Retail Park. This assessment and findings are set out in, “004283496-02 Carrickmines Substation Site Selection Report Version 2.0”.

The proposed OSS site is located approximately 700m east of the existing Carrickmines 220kV substation on the Ballyogan road in lands at Jamestown. A cable route selection process was carried out to investigate viable cable routes from each landfall site to the proposed OSS site location at Ballyogan.

The route study area is shown in Figure 1-2 below. It is defined to the east by the coastline and the two viable landfall locations and to the west by Carrickmines ESB Substation. The northern extent is defined by the N11 and dense housing development and to the south by agricultural land & semi-urban ribbon development and the foothills of the Dublin Mountains.

1.6.1 220kV Carrickmines Substation

The Department for Environment, Climate and Communications (DECC)’s “Policy Statement on the Framework for Ireland’s Offshore Electricity System”¹ designated EirGrid as the Transmission System Operator (TSO) and asset owner for Ireland’s offshore transmission grid.

The initial processing of offshore wind generation applications was undertaken by EirGrid following the CRU’s direction (CRU/20/020). In October 2021, the CRU issued a Proposed Decision

¹<https://www.gov.ie/en/publication/5ec24-policy-statement-on-the-framework-for-irelands-offshore-electricity-transmission-system/> (accessed 29/12/22)

(CRU/21/112 – Offshore Grid Connection Assessment – Phase 1 Projects)² concerning the allocation of grid capacity to offshore wind projects.

EirGrid’s publication “Offshore Phase 1 Projects – Grid Connections Assessment” (published accompanying CRU/21/112a) identified a number of nodes with potential capacity available for the proposed Dublin Array project, including the existing 220kV Poolbeg substation and the existing 220kV Carrickmines substation.

In accordance with CRU’s Final Decision Paper (CRU/2022/14) EirGrid issued a Grid Connection Assessment (GCA) to each eligible Phase 1 applicant (including Dublin Array). The GCA detailed the method and cost of connecting a Phase 1 project to the transmission system at its onshore connection point.

The connection of 700 – 850 MW of electricity at the existing Carrickmines 220 kV substation would result in a need for the construction of two 220 kV subsea export cables from the offshore wind farm projects, two 220kV circuits onshore to a collector substation and an onward connection to the existing spare bays in the Carrickmines 220 kV substation.

Dublin Array received confirmation from EirGrid in October 2022 confirming connection to the 220kV Carrickmines substation. The study area for the onshore cable route has therefore been defined between the Landfall at Shanganagh and the Ballyogan Recycling Park, as shown in Figure 1-2.

1.7 Key Assumptions

This assessment was informed by a combination of desk-based research, utility information sourced from utility providers or site specific surveys and field inspections by a combination of technical and environmental specialists. The assessment was based on the development of two parallel 220 kV underground cable circuits and its associated joint bay infrastructure (approximately every 500 to 600 metres) to ensure that the full extent of the necessary infrastructure would be taken into consideration.

²<https://www.cru.ie/wp-content/uploads/2022/02/CRU202214-Decision-Offshore-Grid-Connection-Assessment-Phase-1-Projects2.pdf> (accessed 29/12/22)

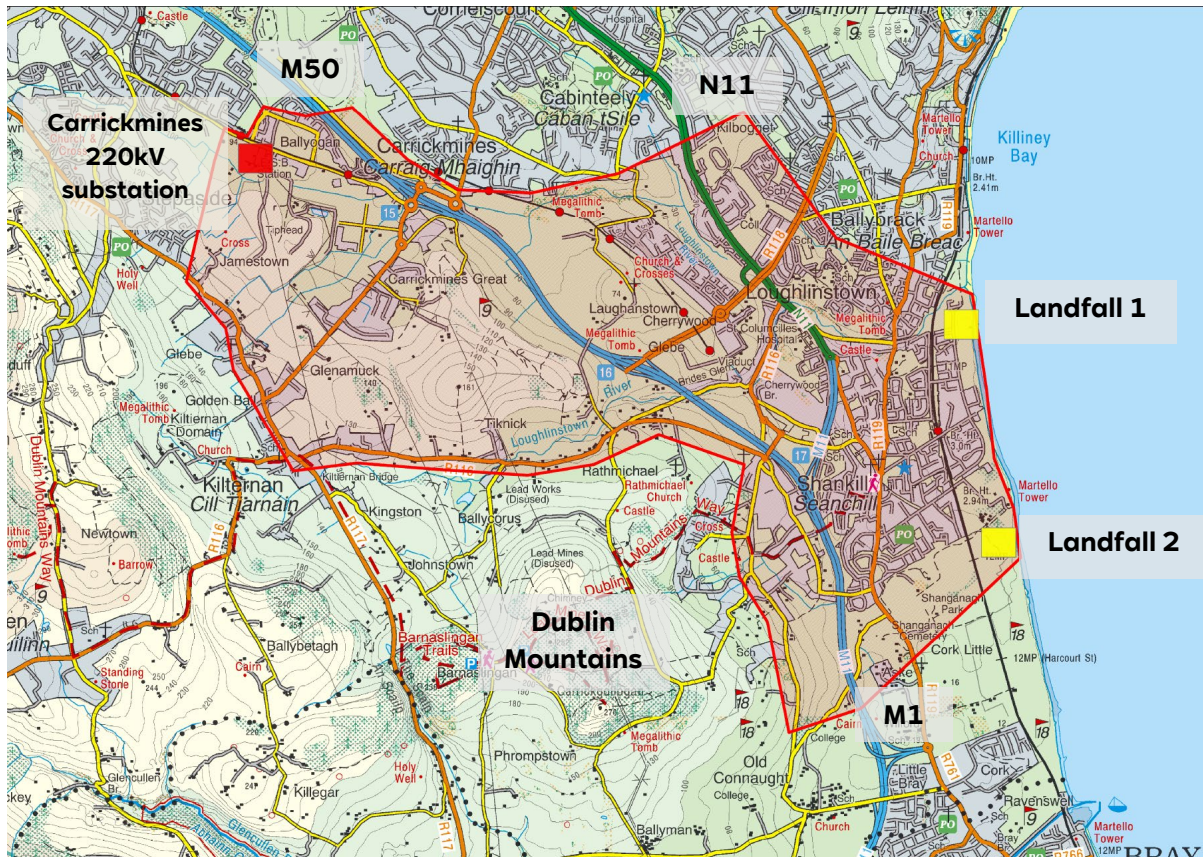


Figure 1-2. Route Study Area.

1.8 Structure of Report

The structure of this report is as follows;

Chapter 2 Purpose of the Dublin Array Project

This section of the report explains the need for the project and the project development process.

Chapter 3 Methodology and Approach

This section of the report outlines the methodology applied to the route selection report to assess all routes and to establish the 'best performing routes' by reference to certain criteria.

Chapter 4 Strategic Planning Context

This section of the report explains the strategic national, regional and local planning context for the project.

Chapter 5 Identification of Planning and Environmental Constraints

This section of the report explains the planning and environmental constraints identified for each option assessed in this route selection report.

Chapter 6 Identification of Technical and Construction Constraints

This section of the report explains the technical and construction constraints identified for this route selection report.

Chapter 7 Summary of Consultations with Stakeholders

This section of the report documents the consultation feedback received from stakeholders in the election of the preferred project configuration and location.

Chapter 8 Criteria for Identifying the Best Performing Route Option

This section of the report describes the criteria for assessing the project options.

Chapter 9 Evaluation of Onshore Cable Route Options

This section of the report evaluates the short-listed options using the criteria identified.

Chapter 10 Onshore Indicative Construction Sequence and Programme

This section outlines the anticipated onshore construction programme for the main construction activities.

Chapter 11 Summary of the Best Performing Route Option

This section of the report describes the best performing option of the project configuration.

2 Purpose of the Dublin Array Project

2.1 Justification and Need for Project

The Dublin Array offshore wind farm project has a targeted export capacity of 750 - 850 MW subject to further commercial, technical and environmental analysis. This figure equates to approx. 10% - 12% of the 2030 climate action target or 7,000MW (7GW) of offshore wind as set out in the Climate Action Plan 2021 (target increased from 5GW to 7GW in July 2022).

In March 2023, EirGrid confirmed Dublin Array's Grid Connection Assessment (GCA), confirming a connection of 824 MW from the Dublin Array Project to the Carrickmines 220kV substation. The delivery of 824 MW will require 2 no. 220kV circuits across the onshore and offshore export cable route.

2.2 Offshore Wind Farm Development Process

The Dublin Array project was designated in May 2020 as a 'Relevant Project' by the Department of Housing, Local Government and Heritage and the Department of Environment, Climate and Communications in the context of forthcoming Marine Planning and Development Management legislation (MPDM).

Having regard to the Maritime Area Planning Act, 2021, 'Relevant Projects' were invited by the Minister to apply for a Maritime Area Consent ('MAC'). In December 2022, the Minister for the Environment, Climate and Communications awarded a MAC in respect of the proposed Dublin Array project. The MAC permits the Dublin Array project to proceed with a development consent ('planning') application to An Bord Pleanála.

3 Methodology and Approach

The overall objective of this Onshore Cable Route Selection Report is to identify an emerging preferred cable route option from a technical, environmental, socio-economic and economic perspective. This report presents a multi-criteria analysis of the proposed route options which are proposed in Section 3.1. As noted in Section 1, the aim of this process is to identify the emerging preferred cable route option based on the overall performance. The following sections of the report outline how the proposed cable route options were identified and assessed.

3.1 Proposed Cable Route Options - Assessment Methodology

The Dublin Array project team defined a Study Area in which to identify suitable route options between the two Shanganagh landfall location options and the OSS at Jamestown.

The proposed cable route options have been designed using the Dublin Array Geographical Information System (GIS). Information gathered through consultations, sites surveys, and desktop information were used to inform the options. The selection of the proposed seven cable route options were based on the following routing principles:

- Maximise the use of the national, regional and local roads³;
- Avoid motorways where possible;
- Avoid town centres and industrial estates;
- Avoid going through private and agricultural land where possible;
- Avoid sensitive natural and built heritage locations;
- Minimise impact on communities; and
- Minimise the overall length of the route.

The above routing principles were developed into four key assessment criteria – Technical performance, Economic performance, Environmental performance, Socio- economic performance to give a balanced score of the overall deliverability of each cable route option.

The best performing cable route option will progress to the next phase of planning stage design. The next phase of design will seek to eliminate and mitigate the risks highlighted in this report.

³ This is based on Eirgrid's, " OCDS-GFS-00-001 Functional Specification 110/220/400kV Offshore Cables" which states a preference for cables to be located in public roads over private lands.

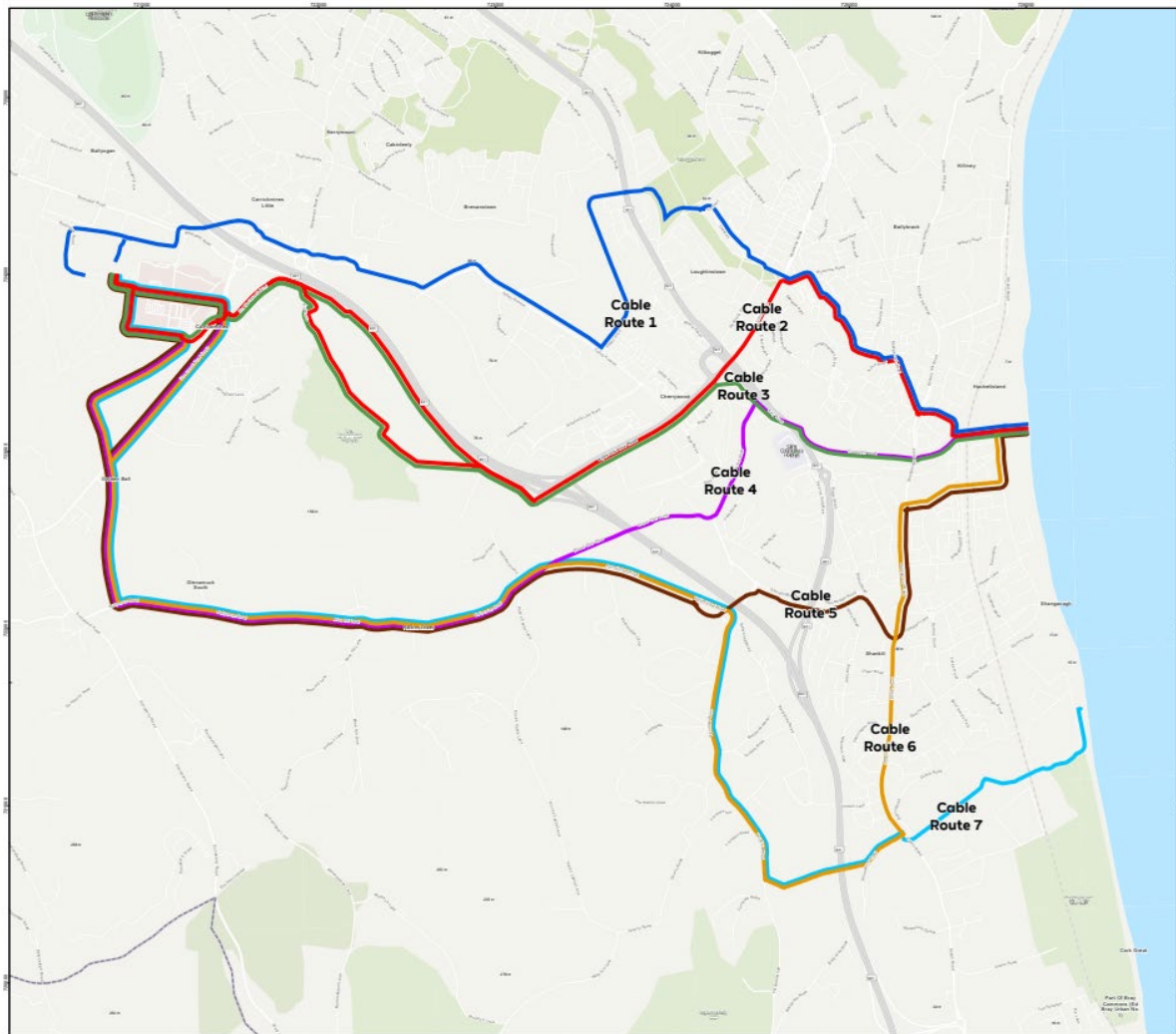


Figure 3-1 7 Route Options considered in this report (note some sections overlap)

The proposed route options are outlined as follows:

Option 1:

Description of route1

The proposed onshore route option #1 originates at the landfall site at Shanganagh Cliffs and initially heads directly inland west through the adjacent park and under the community gardens. The route then crosses under the DART track and heads north onto Bayview Crescent, through the roundabout and up along Shanganagh Road. From here it will continue for approx. 0.3km and turning left onto the Achill Road before continuing into the Glenavon Park and Glenavon Park road. The route joins onto the Wyattville Road and crosses the R118 into the Wyattville Park and into the Coolevin Lane before turning off and around the perimeter of the Cabinteely Athletic Running track. From here, the route crosses the N11 into Orchard Square and heads south along the park, routing west onto the Grand Parade and heading north and turning left onto the new section of road and through the next two roundabouts before diagonally crossing the M50. The route will pass through the Ballyogan Road routing directly behind the Ballyogan Recycling Park and into the substation.

Option 2:

Description of route 2

The proposed onshore route option #2 originates at the landfall site at Shanganagh Cliffs and initially heads directly west inland through the adjacent park and under the community gardens. The route then crosses under the DART line and heads north onto Bayview Close, through the roundabout and up along Shanganagh Road. From here it will continue for approx. 0.3km and turning left onto the Achill Road before continuing into the Glenavon Park and Glenavon Park road. The route joins onto the Wyattville Road and onto the R118 for 1.0 km before crossing the M50 (pending outcome of crossing assessment) and then running up parallel along the west side of the M50 and along the boundary of Jackson's Way land parcel as an option A and B. Both option A and B then turn off onto Golf Lane until the roundabout and connects in along the new Glenamuck Distributor Road, around the perimeter of the Carrickmines Retail Park and into substation.

Option 3:

Description of route 3

The proposed onshore route option #3 originates at the landfall site at Shanganagh Cliffs and initially heads directly inland west through the adjacent park and under the community gardens. The route crosses under the DART line and will run through Commons Road via HDD crossing of the N11. The route will run parallel to the N11 and turn left onto the R118, crossing the M50 (pending outcome of crossing assessment) and run north parallel with the M50. The route then turns off onto Golf Lane until the roundabout and connects in along the new Glenamuck Distributor Road, around the perimeter of The Carrickmines retail park and into substation.

Option 4:

Description of route 4

The proposed onshore route option #4 originates at the landfall site at Shanganagh Cliffs and initially heads directly inland west through the adjacent park and under the community gardens. The route then crosses under the DART line and following inland along Commons Road through to the N11. The route crosses the N11 and follows along Cherrywood Road. At the roundabout the route will continue along Brides Glen Road, crossing under the M50 and further onwards along Ballycorus Road. The route turns up north at the new Glenamuck Distributor Road and along the Glenamuck Road into the substation via The Carrickmines retail park.

Option 5:

Description of route 5

The proposed onshore route option #5 originates at the landfall site at Shanganagh Cliffs and initially heads directly inland west through the adjacent park and turning off down along the Shanganagh Cliffs roadway to the east of the residential area. The route then turns perpendicular onto the Shanganagh Cliffs residential road and under the DART line. This will route alongside the hedgerows until Shanganagh Road and continue further south along the R119. The route takes a 270 degree bend at the roundabout adjacent St. Anne's roman Catholic Church and back up along the Dublin Road. It then merges onto the Stonebridge Road. A trenchless crossing will be required from the carpark at St. Anne's National School under the M11. The receptor pit is proposed to be installed adjacent the Shankill GSS Stonebridge Road Pitch. The route will carry on along and follow Stonebridge road after the roundabout. The cable route will cross over the Stonebridge Rd bridge under the M50 before heading onto Rathmichael Road, then carrying onwards along Ballycorus

Road. The route turns up north at the new Glenamuck Distributor Road and along the Glenamuck Road into the substation via The Carrickmines retail park.

Option 6:

Description of route 6

The proposed onshore route option #6 originates at the landfall site at Shanganagh Cliffs and initially heads directly inland west through the adjacent park and turning off down along the Shanganagh Cliffs roadway to the east of the residential area. The route then turns perpendicular onto the Shanganagh Cliffs residential road and under the DART line. This will route alongside the hedgerows until Shanganagh Road and continue further south along the R119 until it crosses with Alley River Road. From here, the route will launch under the M11 continuing across the field until Ferndale Road. The route will continue up along Ferndale Road joining up with Rathmichael Road and Brides Glen Road, then carrying onwards along Ballycorus Road. The route turns up north at the new Glenamuck Distributor Road and along the Glenamuck Road into the substation via 'The Carrickmines retail park'.

Option 7:

Description of route 7

The proposed onshore route option #7 landfalls at Shanganagh Park routing down along the outskirts of the dog park and Shanganagh playing pitches. The route crosses the R119 and into Ally River Road and launching under the M11. The route crosses the green fields until Ferndale Road. The route aligns with Ferndale Road heading north until Rathmichael Road and Brides Glen Road, then carrying onwards along Ballycorus Road. The route turns up north at the new Glenamuck Distributor Road and along the Glenamuck Road into the substation via The Carrickmines retail park.

3.2 Criteria and Scale Used for Comparison of Route Options

A consistent multi- criteria analysis is applied to each of the proposed route options. These criteria are outlined below and described further in Chapter 9 herein:

- Technical;
- Environmental;
- Socio-economic and
- Economic

The effect on each criteria parameter is presented along a range from 'more significant/ difficult/ risk' to 'less significant/ difficult/ risk'. The following scale is used to illustrate the assessment range.



In the text, this scale is quantified by text for example moderate (Dark Green), moderate- high (Blue) or High (Dark blue), low- moderate (Green), low (Cream).

3.3 Data and other technical documents

This report has been informed by a mixture of desk-based publicly available datasets and on-site survey-based reviews.

- Dún Laoghaire - Rathdown County Council Planning schemes (<https://www.dlrcoco.ie/en/planning/public-consultations-part-8-schemes>)
- Resources for Landscape and Visual Assessments are noted in Section 5.5.1

4 Strategic Planning Context

4.1 Introduction

This section of the report addresses the Project in the context of relevant national, regional and local planning policies and objectives. Through the identification of key spatial, economic and social policies, subsequent analysis demonstrates how the project is consistent with, and will contribute towards, the achievement of national planning policies and objectives.

4.2 National Planning Context

Climate Action Plan 2021

The Climate Action Plan 2021 (CAP) is the Government plan for decisive action to reduce Ireland's greenhouse gas emissions by 51% (compared with 2018 levels) between 2021 and 2030 and to reach net zero by 2050. These legally binding objectives are set out in the Climate Action and Low Carbon Development (Amendment) Act, 2021. Specifically in the context of electricity the CAP includes a target of increasing the share of electricity demand generated from renewable sources to up to 80% (from 33.7% in 2018) by 2030. Action 115 from the CAP is to facilitate the development and connection of at least 7GW of offshore wind to the grid by 2030.

National Development Plan 2021-2030

Project Ireland 2040 is the government's long-term overarching strategy to make Ireland a better country for all and to build a more resilient and sustainable future. The strategy ensures the alignment of investment plans with the stated National Strategic Objectives for 2040 in a considered, cohesive and defined manner⁴. It consists of the National Planning Framework (hereafter referred to as "NPF") and the National Development Plan 2021-2030 (hereafter referred to as NDP). The plan recognises that meeting the ambitious goal of up to 80 per cent renewable electricity by 2030 and further future decarbonisation objectives will require development of significant Offshore Renewable Energy (ORE) and associated grid infrastructure over the coming decade. The Framework contains a series of National Strategic Outcomes which includes the Transition to a Low Carbon and Climate Resilient Society.

NSO Transition to a Low Carbon and Climate Resilient Society

This national strategic outcome identifies that new energy systems and transmission grids will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave and solar and connecting the richest sources of that energy to the major sources of demand. Specifically, the NPF includes the following as National Policy Objective 38. *Regional, metropolitan and local development plans will take account of and integrate relevant maritime spatial planning issues.* In the context of offshore renewable energy, the NPF identifies that the development of offshore renewable energy is critically dependent on the development of enabling infrastructure, including grid facilities to bring the energy ashore and connect to major sources of energy demand.

National Policy Objective 42 supports the progressive development of Ireland's Offshore renewable ("ORE") potential including the necessary domestic grid connectivity enhancements. The NPF sets out the key goals and objectives for the State, and an important element to the framework is the theme of integrating Ireland's land and maritime planning systems. European Directive 2014/89/EU establishing a framework for maritime spatial planning and the subsequent European Union Framework for Maritime Spatial Planning adopted in 2016 required that all Member States enact individual Marine Spatial Plans across the Eurozone. Adopted in 2021, the National Marine Planning Framework (NMPF) is the statutory plan for Ireland's marine area. Sector specific ORE policies support proposals which assist the State in meeting its target of

⁴ <https://www.gov.ie/en/campaigns/09022006-project-ireland-2040/>

achieving 7GW capacity of offshore wind, include a particular emphasis on the ‘Relevant’ Phase I Projects (including Dublin Array). Shaping our Electricity Future Roadmap (EirGrid, 2021) (“the Futures report”) provides an outline of the key developments from an electricity networks, engagement, operations and market perspective needed to support a secure transition to the integration of renewables on the electricity grid in line with the greenhouse gas emissions reduction targets for 2030 and 2050.

The roadmap includes 5GW of offshore renewable energy. The Futures report also states that ‘it is not expected that the technology for offshore wind will be developed maturely enough to facilitate large scale offshore wind on the west coast of Ireland in the short term. The East Coast of Ireland has shallower waters, making offshore a more viable option in the short term’. The Dublin Array project is located in the shallower waters off the East Coast of Ireland.

4.3 Regional Planning Policy Context

Regional Spatial and Economic Strategy, 2019-2031

The elected members of the Eastern and Midland Regional Assembly (EMRA) agreed to make the Regional Spatial and Economic Strategy (RSES) 2019-2031, on June 28th 2019. The EMRA Region covers nine counties containing twelve local authorities – Longford County Council (“CC”), Westmeath CC, Offaly CC, Laois CC, Louth CC, Meath CC, Kildare CC, Wicklow CC, Fingal CC, South Dublin CC, Dún Laoghaire-Rathdown CC and Dublin City CC. The strategy recognises that the EMRA Region will need to shift from its reliance on using fossil fuels and natural gas as its main energy source to a more diverse range of low and zero - carbon sources, including renewable energy and secondary heat sources. It recognises the importance of generating electricity supply from indigenous renewable sources and that this requires facilitating the provision of renewable energy infrastructure. The RSES Strategy supports an increase in the amount of new renewable energy sources in the EMRA Region which includes amongst other renewable technologies – offshore wind in accordance with national policy. The strategy identifies that local authorities should harness the potential of renewable energy in the Region and that the provision of infrastructure should be supported in order to facilitate a more distributed, renewables-focused energy generation system (including offshore wind) connecting sites of optimal energy production to the major sources of demand. Key policy objectives to which the Dublin Array Project will contribute to meeting include RPO 7.36 (local authorities adhering to guidance from the Departments on wind energy development) and 10.24 (Support for the sustainable development of Ireland’s offshore renewable energy resources in accordance with the Department of Communications, Energy and Natural Resources ‘Offshore Renewable Energy Development Plan’ and any successor thereof).

4.4 Local Planning Policy Context

The relevant Local Area Plans (“LAPS”) that were assessed were all within Dun Laoghaire - Rathdown County Council (DLRCC):

- Dun Laoghaire- Rathdown County Development Plan 2022-2028 (DLRCDP).

- Cherrywood SDZ Planning Scheme v. The Cherrywood SDZ area is excluded from the DLRCDP, having its own Planning Scheme.
- Woodbrook – Shanganagh Local Area Plan (LAP) 2017-2023. This area to the south of Shanganagh is a major development area with its own LAP.
- Ballyogan & Environs LAP vii. This LAP covers the Ballyogan area, including the Park development (“Carrickmines Retail Park”).
- Kiltarnan / Glenamuck LAP 2013-2019. This plan covers the development to the west of Ballyogan along the Glenamuck road and Kiltarnan.

Extracts from the relevant zoning plans are used in site selection chapters to illustrate land use planning issues. The zoning plans were used extensively with the objective of avoiding any contraventions of planning policy.

The site selection process aimed to avoid any route selection that would interfere with land such that it is would not be capable of conforming with its intended use in the relevant land-use plan. The search for a cable route was therefore focussed on existing roads and greenspaces, or those proposed for development.

5 Identification of Planning and Environmental Constraints

5.1 Introduction

The Wider Study Area of the cable route was identified as the area between the landfall location and the onshore substation location. As discussed in section 1.6, the emerging preferred landfall location is at Shanganagh Cliffs and the emerging preferred onshore substation location is at the Ballyogan Recycling Park.

For the purposes of this report, the wider study area was reduced to a 4km radius originating from Junction 16 of the M50 Motorway, which is roughly equidistant between the shoreline at Shanganagh (TJB location) to the Carrickmines substation (OSS location). Figure 5-1 depicts this 4-km landfall zone, which is referred to as the 'Wider Study Area' (WSA) and is depicted in a black hatched circle.

5.2 Wider Study Area

The main function of the proposed cable route option is to connect the electricity derived from the project to the national electricity transmission network at the confirmed 220kV Carrickmines substation. Longer cable routes can result in increased electrical losses and can create the need for additional electrical equipment at the substation site, which would require a larger land take for the substation site. Shorter cable routes support more efficient transmission of electricity from the wind farm to the national grid network and overall cable route length was a considered factor in identifying the cable route options between the TJB and OSS.

The Wider Study Area ("WSA") is shown in Figure 5-1 in black. The WSA is defined by the Dublin Mountains/High Amenity Area, this is generally located to the west/southwest, typically to the west of the R117 regional road between its junction with the R113 Blackglen Road/Hillcrest Road and the Scalp. The land-use zoning objectives from the DLRCDP 2022-2028 as set out below were not considered to be compatible with development of underground HV infrastructure:

- Objective F '*To preserve and provide for open space with ancillary active recreational amenities*' and
- Objective G '*To protect and improve high amenity areas*'.

The High-Density Suburban Area is generally located either in close proximity to the M50 national motorway or north of the motorway route from Carrickmines. This area includes several South Dublin suburbs including Stepaside, Loughlinstown, Sandyford, Foxrock Cabinteely and Deansgrange which have a high density of residential development and some urban centres with retail/commercial development concentrated therein. This area has been carefully considered in the context of its various zoning objectives on the creation of the 7 no. cable route options which are assessed in this chapter:

- Objective A '*To protect and improve residential amenity*',
- Objective A1 '*To provide for new residential communities in accordance with approved local area plans*' and

- Objective A2 'To provide for the creation of sustainable residential neighbourhoods and preserve and protect residential amenity',
- Objective F 'To preserve and provide for open space with ancillary active recreational amenities' and
- Objective NC 'To protect, provide for and-or improve mixed-use neighbourhood centre facilities'.

The remaining area is defined as Mixed Opportunity Area. This includes a combination of land-uses varying between residential, commercial, amenity, actively managed agricultural fields and utility with potential areas of opportunity being identified in the adjacent lands to the Cherrywood Strategic Development Zone and the Ballyogan/Carrickmines area. This area is shown in figure 5-1 and Figure 5-2 shows the zoning objectives of this area.

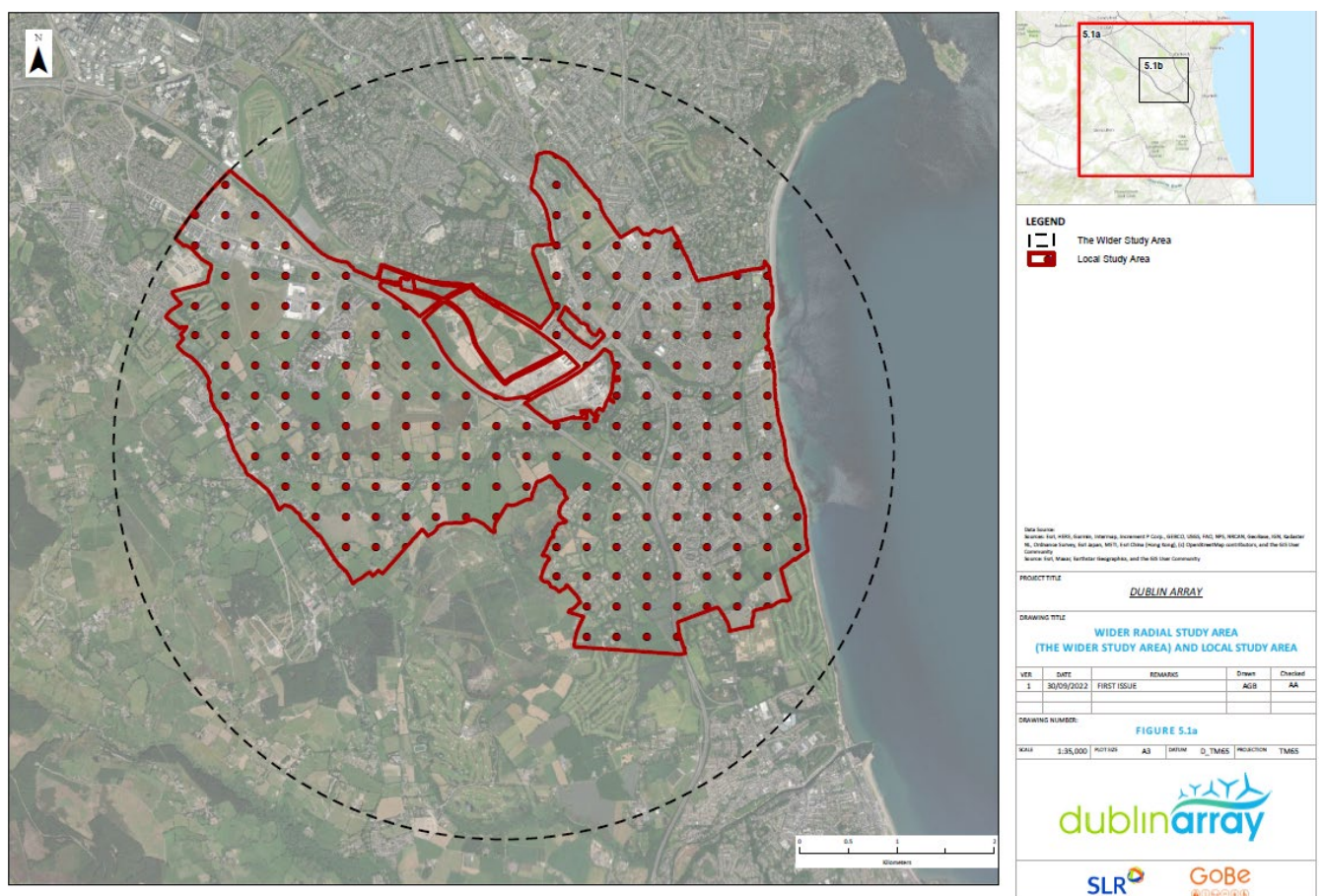


Figure 5-1 Wider Radial Search Area (the Wider Study Area) and Local Study Area from Carrickmines Substation to Landfall Area

Local Study Area (“LSA”) is area is outlined in red in Figure 5-1 and is shown in context with the black dashed 4km radial WSA on the same figure for reference.

With regard to the three core zones mentioned in Section 5.1.1, the following areas were scoped in or out of the Local Study Area (LSA):

5.2.1.1 Dublin Mountains/High Amenity Area

This area was scoped out of the LSA given the upland character and zoning objectives of this area and is comprised of the majority of the southern and western areas of the WSA (see Figure 5-1, black hatched circular area). This area is further west and south than the Carrickmines Substation and would necessitate considerable expense and additional length to the cable route due to the need to 'double back' north or eastwards to reach the substation.

5.2.1.2 High-Density Suburban Area

Careful consideration was given to this area in regard to the potential cable routes. This area would need to be crossed by the cable route in order to reach the Carrickmines 220kV substation while maintaining the shortest route possible, and was therefore scoped in. This area of the LSA makes up a large majority of the eastern extent from the shoreline to the M50. Particular regard to the zoning objectives of this area has been taken into account, with the intent to keep the cable routes within the road routes as much as possible to minimise effects to residential areas.

5.2.1.3 Mixed Opportunity Area

This area was scoped in largely because it would need to be crossed by the cable route in order to obtain the shortest distance between the landfall locations and the Carrickmines substation and would support more efficient electricity transmission from the Dublin Array. Additionally, to avoid this area, a very indirect cable route would be necessary, resulting in an overall longer cable route.

5.2.1.4 Further Refinement of the LSA

After taking into consideration the three particular areas as listed above, the LSA was further refined by the following exclusions:

- The exclusion of particular zoning objectives where possible have been removed, with the exception of existing parks and green spaces where a potential cable route may avoid a large residential area. The zoning objectives removed on the peripheries of the study area include:
 - G – High Amenity Area
 - B- Rural Amenity
 - GB- Greenbelt
 - F – Open Space (for areas on the periphery of the WSA)
- High density residential developments have been avoided as much as possible to minimise potential impacts on residential communities within the Wider Study Area.

With regard to the three areas mentioned above and these additional zoning exclusions, the LSA has become a roughly triangular area between the Carrickmines 220kV substation and the two potential landfall points from the Dublin Array offshore wind farm to the shore.

5.2.1.5 Existing Land-Uses within the Local Study Area

The land-use objectives set out in the Dun Laoghaire Rathdown County Development Plan 2022 - 2028 that apply to the LSA are set out below and shown on Figure 5-2:

- A – To protect and/or improve residential amenity;
- A1 – To provide for new residential communities in accordance with approved Local Area Plans;
- B – To protect and improve rural amenity and to provide for the development of agriculture;
- DC – To protect, provide for and/or improve mixed-use district centre facilities;
- E – To provide for economic development and employment;
- F – To preserve and provide for open space with ancillary active recreational amenities;
- G – To protect and improve high amenity areas;
- MH – To improve, encourage and facilitate the provision and expansion of medical-hospital uses and services; and
- NC – To protect, provide for and/or improve mixed-use neighbourhood centre facilities.

Taking into consideration all the above stated land-use objectives, the remaining area has been defined as the LSA for the purposes of examining the potential constraints of several cable route options. This area is outlined in red in Figure 5-1 and is shown in context with the black dashed 4km radial WSA on the same figure for reference.

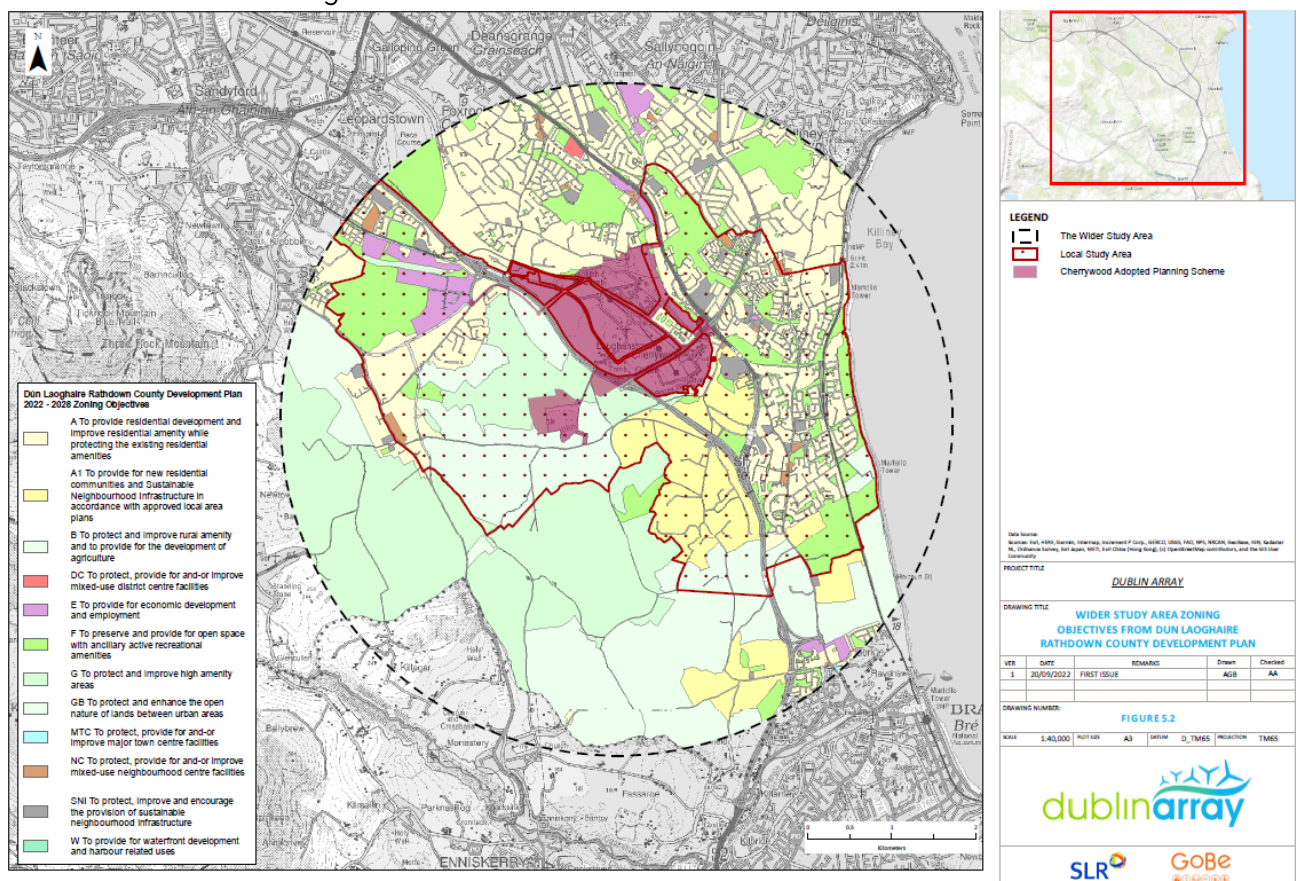


Figure 5-2 WSA Zoning Objectives from DLR County Development Plan 2022-2028

5.2.2 Methodology and Constraints Identification

Within the Local Study Area, a total of seven potential cable route options have been identified as most plausible (following the key assumptions set out in section 1.7) and will be carried forward into an environmental, socio-economic, technical and economic analysis in section 8. The connection between the seven cable route options and landfall points is as follows:

- The first landfall point is at Shanganagh-Bray Wastewater Treatment Plant where 6 out of the potential 7 route options will originate from. These route options are Options 1-6.
- The second landfall point is further south along the coast approximately 280m southeast of Rosedale Tennis Club and adjacent to Dun Laoghaire Bay Beach and Shankill Beach, where Option 7 will originate from.

The seven cable route options have the potential to impact upon the receiving natural and built environment within which they will be located, including the local population and communities. It is recognised that relevant land-use planning policy and known technical and environmental constraints relevant to the LSA need to be identified to inform the identification of potential cable route site locations. Information within the LSA was gathered via a combination of both desk-based research and site visits which documented constraints within all seven route options. The research has been characterised under the following key themes:

- **Socio Economic, Population, and Land Use**, including:
 - Planning applications, which are considered large scale (greater than 100 homes, such as Strategic Housing Developments (SHD) or Large-Scale Residential Developments (LSRD's);
 - Part 8 applications (such as Glenamuck Distributor Road) and parks – this information has been gathered from a desk-based local authority planning search;
 - Electoral division data covering all seven route options from the Central Statistics Office,
 - Corine land cover which shows the quantum of land which has been constructed upon and what types of construction are present, utilising Geohive Corine Landcover data,
 - Community facilities such as hospitals, healthcare facilities, community centres, and schools which have been searched via desktop study from GeoAddress data
 - Existing private residential properties and residential facilities such as creches and childcare facilities which have been searched via desktop study from GeoAddress data,
 - Tourism / recreation and amenities such as parks obtained through the Dun Laoghaire Rathdown County Development Plan 2022-2028 and Failte Ireland data,
 - Transportation routes and infrastructure, which includes LUAS, DART and BusConnects data,
 - Utilities and electrical infrastructure comprising overhead line data from EirGrid
- **Biodiversity Flora and Fauna**, including:
 - Invasive species and habitats documented through a habitat walkover and drive-over of each of the seven routes;
 - Natura 2000 sites protected under the Habitats and Birds Directives, and other designated sites documented within proximity to each route option from a desktop

study utilising the NPWS website and the Dun Laoghaire Rathdown County Development Plan 2022-2028.

- **Landscape and Visual**, including:
 - protected views obtained from the Dun Laoghaire Rathdown County Development Plan 2022-2028;
 - scenic routes obtained from the Dun Laoghaire Rathdown County Development Plan 2022-2028.
- **Archaeology, Architectural and Cultural Heritage** including:
 - Protected structures (both NIAH designated, and Dun Laoghaire Rathdown County Development Plan 2022-2028 designated);
 - Recorded monuments under the National Monuments Acts 1930-2014 (RMP, SMR and Dun Laoghaire Rathdown County Development Plan 2022-2028 designated);
 - Monuments in State Care
- **Water and Flood Risk**, including:
 - Water quality via environmental Protection Agency (“EPA”) data and the Water Framework Directive 2000/60/EC,
 - Hydrology via EPA data,
 - Surface water / Flood Risk via Catchment Based Flood Risk Assessment and Management (“CFRAMs”) and EPA data, and
 - Groundwater vulnerability via EPA data
- **Soils and Geology** – including:
 - Bedrock geology via GSI data,
 - Soils via GSI data,
 - Subsoils via GSI data,
 - Physical features via GSI data, EPA data,
 - Land use via GSI data and EPA data and
 - Geological heritage via GSI data
- **Noise and Air**, including:
 - Sensitive receptors via GeoDirectory data.

A summary of the baseline findings of each of the themes within the LSA is presented in Sections 5.2-5.8. Relevant constraints are mapped on the drawings which are listed in Table 5-1 and a full copy of these drawings is found in Appendix 01.

An assessment and ranking of each route option according to each environmental discipline as outlined above is contained in Section 8 of this report.

Table 5-1 Constraints Drawings

Drawing Table	Drawing Reference
Wider Radial Search Area and Local Study Area from Carrickmines Substation to Landfall Area	5-1
Wider Study Zoning Objectives	5-2
Socio-Economic Population and Land Use	5-3
Planning Applications	5-4
Corine Landcover	5-5
Community-Residential Facilities Tourism Recreation	5-6
Traffic and Transportation	5-7
Electricity Networks	5-8
Designated Sites	5-9
Landscape Character and Constraints	5-10
Archaeology Architectural and Cultural Heritage	5-11
Surface Water and CFRAM Constraints	5-12
Hydrogeology	5-13
Geology	5-14
Subsoils	5-15
Sensitive Noise Receptors	5-16

5.3 Socioeconomic, Population and Land-use

This section provides a consideration of population, settlement patterns and land use within the LSA. An understanding of these spatial and land use constraints allows feasible route options and site locations for the substation and high voltage transmission infrastructure to be fully considered. The key constraints are discussed in detail under the following broad headings:

- Population and Economics
- Planning applications
- Land Use Patterns
- Community and Residential Facilities
- Existing Utilities
- Tourism, Recreation and Amenities Resources

5.3.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Dún Laoghaire-Rathdown County Development Plan (DLRCDP) 2022-2028
- Cherrywood SDZ Local Area Plan
- Ballyogan and Environs Local Area Plan 2019-2025

- Kiltiernan / Glenamuck Local Area 2013-2019 (as extended)
- Woodbrook Shanganagh-Local Area Plan-2017-2023 (extended to 2027 in 2022)
- A review of large-scale planning applications related to permissions granted within the last five years within DLRCC
- An examination of Central Statistics Office 2016 Census data
- Geohive Corine Landcover data (2018)

5.3.2 Existing Constraints

5.3.2.1 Population and Economic Profile

The LSA primarily extends over the administrative area of Dun Laoghaire Rathdown (DLR), specifically the electoral divisions of Shankhill Shanganagh, Shankhill Rathsallagh, Killiney South, Killiney North, Ballybrack, Cabinteely Kilbogget, Cabinteely Loughlinstown, Glencullen, and Shankhill Rathmichael as shown on Figure 5-3..

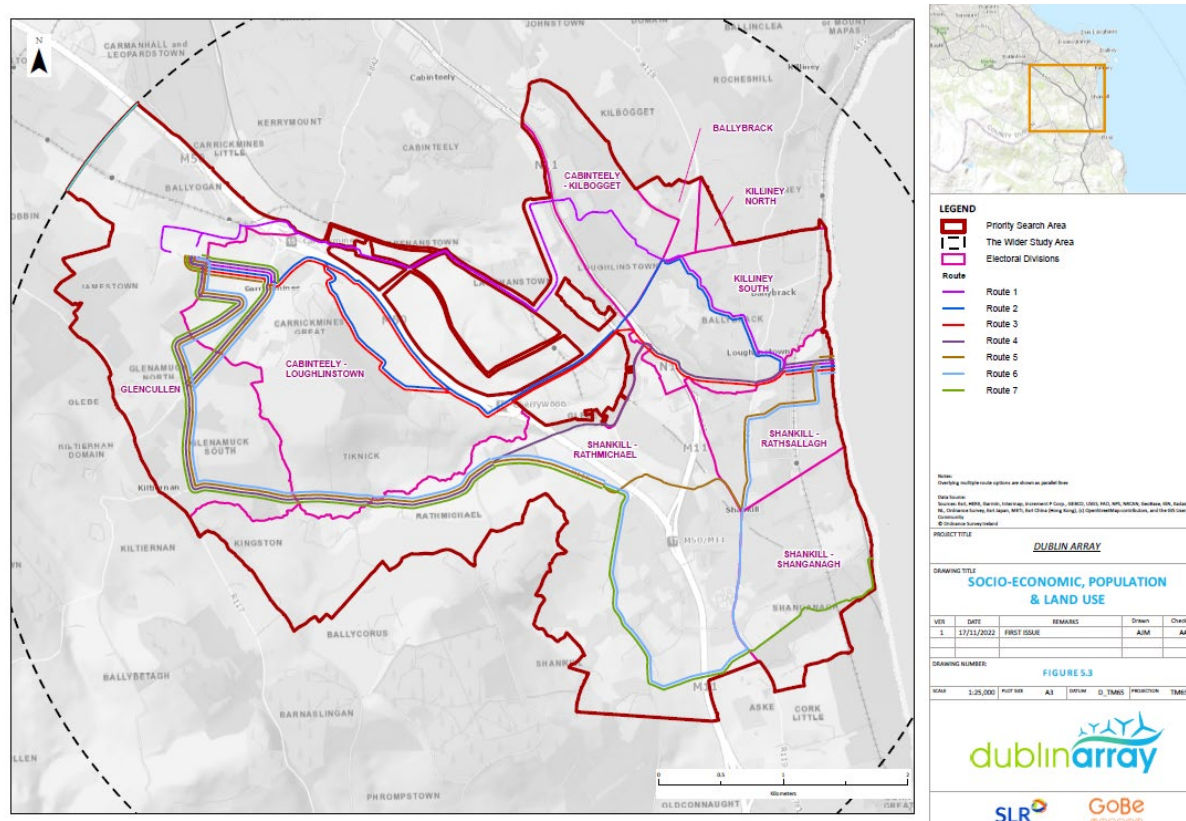


Figure 5-3 Electoral Divisions with the Administrative Area of Dun Laoghaire Rathdown and the LSA

The 2016 Census indicates that Dun Laoghaire Rathdown has a total population of 218,018. The electoral division of Glencullen has a population of 19,773 or 9% of the total population of DLRCC, though only a small portion of this ED is located within the LSA. Killiney South has a population of 6,386 (2.9%), followed by Shankhill Rathmichael (2.6%), Shankhill Shanganagh (2.5%), Cabinteely Loughlinstown (2.0%), Killiney North (1.5%), Shankhill Rathsallagh (1.5%), Ballybrack (1.4%), Cabinteely Kilbogget (1.2%). The relevant population figures for the Electoral Divisions found within the LSA are set out in Table 5-2.

Table 5-2 Electoral Divisions within the LSA

Electoral Division	Population Number
Shankhill Shanganagh	5,488
Shankhill Rathsallagh	3,268
Killiney South	6,386
Killiney North	3,330
Ballybrack	2,962
Cabinteely Kilbogget	2,686
Cabinteely Loughlinstown	4,280
Glencullen	19,773
Shankhill Rathmichael	5,623

The LSA is predominantly divided into three categories. To the east the area is characterised by existing built-up residential, commercial development and recreational spaces. The central portion is dominated by the Cherrywood Strategic Development Zone (SDZ) which is partially developed and other mixed-use areas. To the west, the area is characterised by industrial development and greenfield pasture type land.

Within the DLR County Development Plan 2022-2028, the county settlement hierarchy identifies the majority of the urban footprint of DLR (including Cabinteely – Loughlinstown and Shankill – Rathmichael) as Tier 1 – Dublin City and Suburbs. Tier 1 areas play a key role in supporting the wider local economy and are described as an *‘international business core with a highly concentrated and diversified employment base’*. Glencullen is identified as Tier 6 – Rural. According to the Census 2016, Dun Laoghaire has a labour force at work rate of 93.9% percent.

5.3.2.2 Planning Applications According to Route

A desktop search was undertaken of DLRCC’s online planning enquiry system to review valid planning applications within the LSA within the last five years (2017-2022). The majority of the planning applications within the LSA related to residential and agricultural development. The relevant findings of these are shown in Table 5-3.

Table 5-3 Summary of Planning Applications within the LSA

Route	DLRCC Application No.	Development Summary
1	2017031	927 no. residential units, (365 no. houses and 562 no. apartments) childcare facility and 2 no. retail units, associated section of Clay Farm Loop Road and all associated site works.
2/3	2020226	482 no. apartments, creche and associated site works.
2/3	2021271	Mixed use neighbourhood centre development, commercial offices, residential (including Build to Rent), recreational and leisure development and all associated and ancillary development.
6/7	2019036	Glenamuck District Roads Scheme which will connect the existing R117 Enniskerry Road with the Glenamuck Road and new link distributor road which will connect to the Ballycorus Road and R117 Enniskerry Road (alternative north-south route).
6/7	2022110	Strategic Housing Development consisting of 383 no. residential units, a Neighbourhood Centre, which will provide a creche, office, medical and, retail units.
6/7	2019159	Construction of a Public Park known as Ticknick Park (Phase 2) on lands c.42HA. The proposed development is an extension to the permitted public park (Ticknick Park Phase 1, Reg Ref: DZ16A/0570) which is currently under construction.
6/7	2019169	Construction of a Public Park known as Ticknick Park (Phase 2) on lands c.42HA. The proposed development is an extension to the permitted public park (Ticknick Park Phase 1, Reg Ref: DZ16A/0570) which is currently under construction.
7	2020012	A development of 597 no. residential units with ancillary commercial uses partially comprising a Build to Rent scheme. Includes demolition of a house and other buildings. The site is located within the curtilage of a protected structure, Shanganagh Castle.

The majority of other planning applications within the LSA are comprised of minor residential and commercial uses. At the time of writing this report, there are 36 no. planning applications not listed above within the LSA which are either granted permission, or currently in the planning system. Figure 5-44 notes the large planning applications of relevance to the study area.



5.3.2.3 Land Use Patterns

Corine Landcover data relating to existing land uses indicate that the LSA contains a number of different land uses as illustrated in Figure 5-5. The vast majority of the area comprises agricultural land (shown as 'pastures'), followed by a 'discontinuous urban fabric' and industrial areas. The M50 and N11 routes are also present.

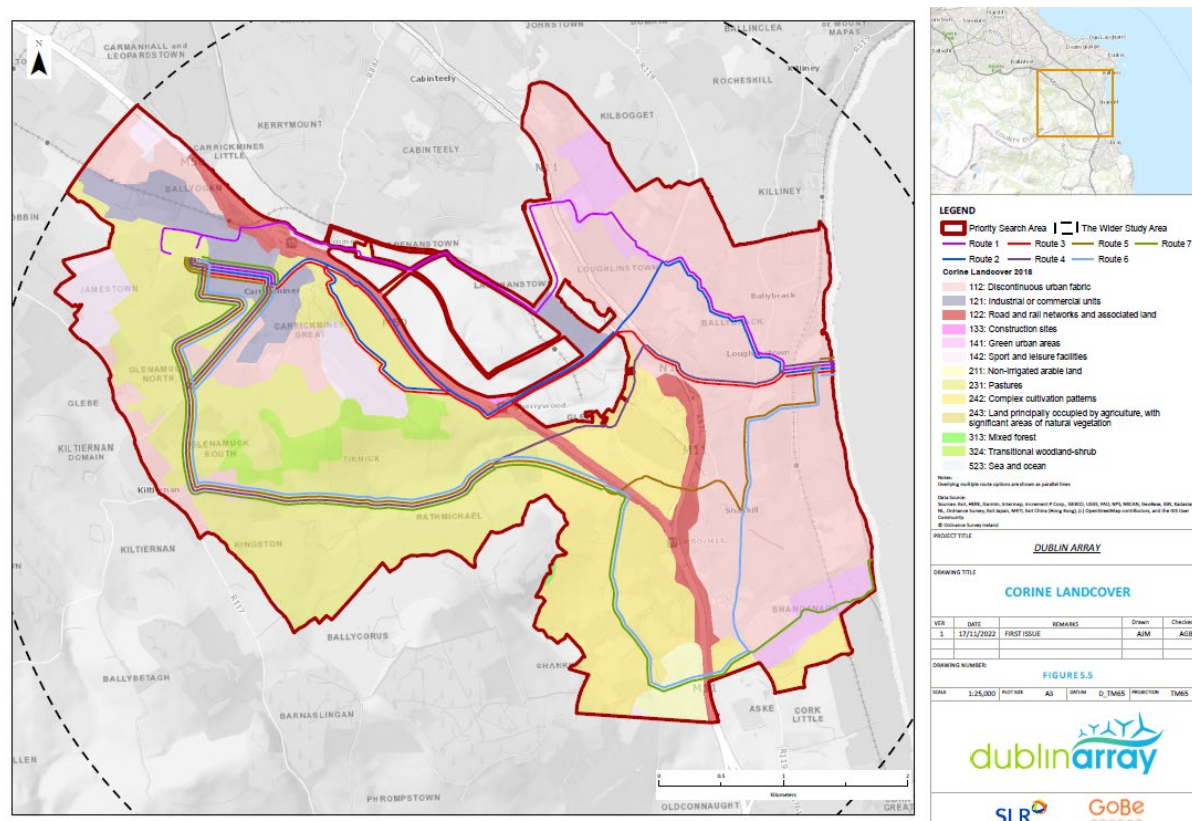


Figure 5-5 Corine Land Cover

As per the Ballyogan / Glenamuck Local Area Plan 2019-2027 (extended in 2024), this area is currently pasture but will significantly change over the lifetime of the LAP. Particularly since the development of the Glenamuck Districts Road Scheme is intended to facilitate further development in the area. This area is of direct relevance to this appraisal report given that a number of route options (4,5,6 & 7) will cross within the boundaries of this LAP and within the Glenamuck Districts Road Scheme.

The Glenamuck Districts roads scheme is currently the subject of a construction tender as per Dún Laoghaire-Rathdown County Council's website⁵. Of particular importance to this options appraisal report is the location of the proposed Glenamuck District Distributor Road – a Primary Link Road comprising a single carriageway “from tie-in at Enniskerry Road to the tie-in at the Glenamuck Road East/Golf Lane Roundabout”. This area will intersect Route options 4-7.

⁵ <https://www.dlrccoco.ie/en/capital-programme/glenamuck-district-roads-scheme>. (Date Accessed 22/9/2022)

5.3.2.4 Community and Residential Facilities

The LSA comprises a number of distinct communities which include Ballybrack to the east and north, Cabinteely to the north, Shankhill to the south, Loughlinstown within the central area, Ballyogan and Carrickmines to the west and Kilternan to the south.

A total of twenty healthcare facilities, two churches, fourteen schools, and twenty community facilities are within the LSA. These facilities are concentrated within the aforementioned communities but mostly centred around Ballybrack, Loughlinstown and Shankhill as illustrated on Figure 5-6.

- Route 1 contains 5 no. schools, 5 no. community facilities as well as 1 no. dog walking facility within 50m.
- Route 2 contains 2 no. schools, 3 no. community facilities, and 1 no. healthcare facility within 50m.
- Route 3 contains 3 no. community facilities and 1 no. healthcare facility within 50m.
- Route 4 contains 1 no. community facility, 4 no. healthcare facilities within 50m.
- Route 5 contains 3 no. schools, 5 no. healthcare facilities, 2 no. churches, 1 no. shop, 2 no. community facilities, 1 no. childcare facility within 50m.
- Route 6 appears to be the most constrained as it contains 2 no. schools, 8 no. shops, 3 no. pubs, 5 no. bus stops, 2 no. health facilities, 2 no. churches, two no. recreational/sports areas and three no. healthcare facilities within 50m.
- Route 7 contains 2 no. recreational / sports areas, 1 no. school, 1 no. church, and three no. healthcare facilities within 50m.

A review of tourism and recreation facilities within the LSA was also undertaken. There are 10 no. recreation/ sports/ play facilities within the LSA, however, it should be noted that the majority of these are concentrated in the Shankhill area. A summary of recreation and tourism facilities is shown in Figure 5-6.

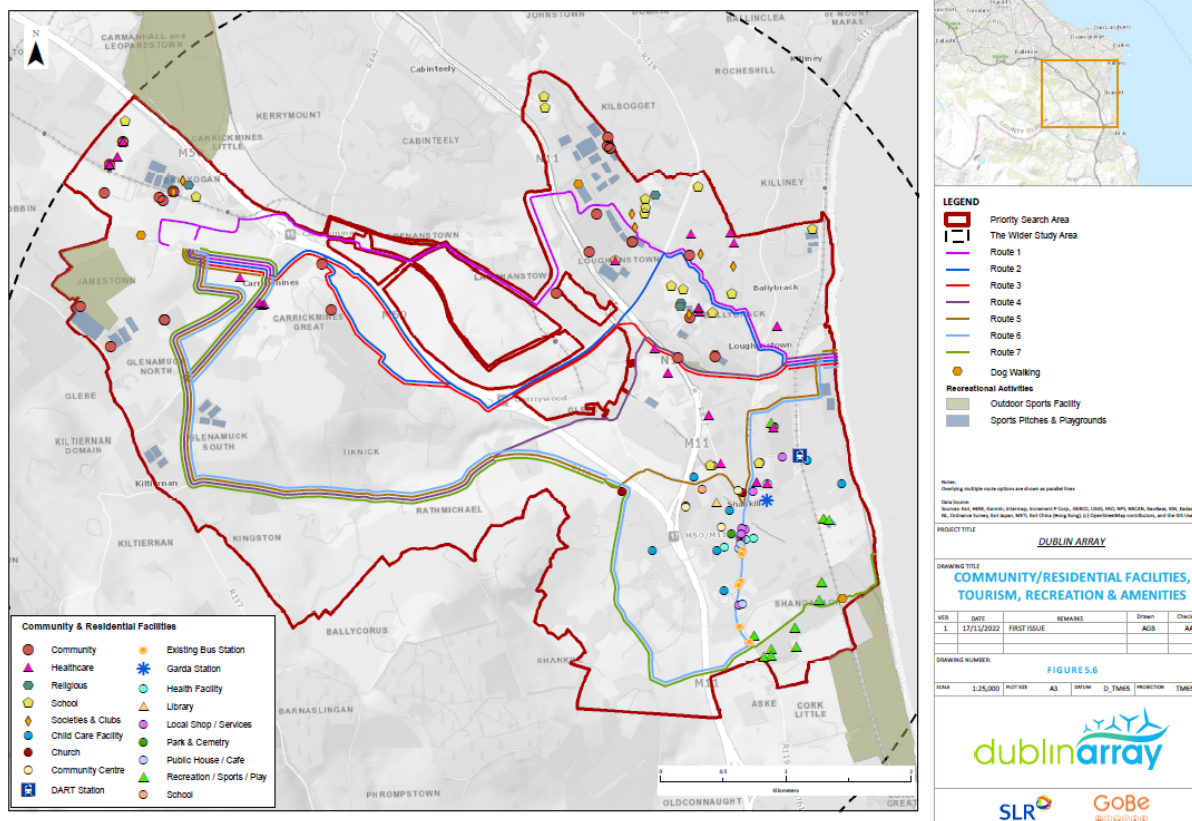


Figure 5-6 Community and Residential Facilities, Tourism, Recreation & Amenities within the LSA

5.3.2.5 Existing Utilities

Existing utilities and infrastructure in the LSA were considered within this constraint evaluation process. These were considered as a constraint as their presence can restrict the development capacity of sites. This is discussed in more detail in Chapter 6. Existing utilities are shown on 5-8. As illustrated, the majority of the existing electricity infrastructure in the LSA connects to the existing ESB high voltage substation at Carrickmines. One 220kV network runs north-south through the western part of the LSA and connects to the ESB Station at Ballyogan and onwards to the north. All cable route options intersect the existing 38kV overhead lines at different points from the landfall locations to the substation location.

The presence of existing high voltage transmission lines can affect the route; for example, where crossing of lines would be required or where diversion of an existing line might be necessary to facilitate a new line. However, any connections to and from the proposed substation at Ballyogan will be in the form of underground cable infrastructure and therefore rerouting is less likely to be necessary. Due to the number and extent of overhead line infrastructure of varying voltages around the ESB high voltage substation minor diversions or undergrounding of existing transmission assets may be necessary.

In relation to traffic and transportation routes, Figure 5-7 shows a number of DART stations and Luas lines, bus routes and road networks. All Route options will affect traffic and transportation users within the Local Study Area, however some route options will affect more than others see Table 5-4 for more details.

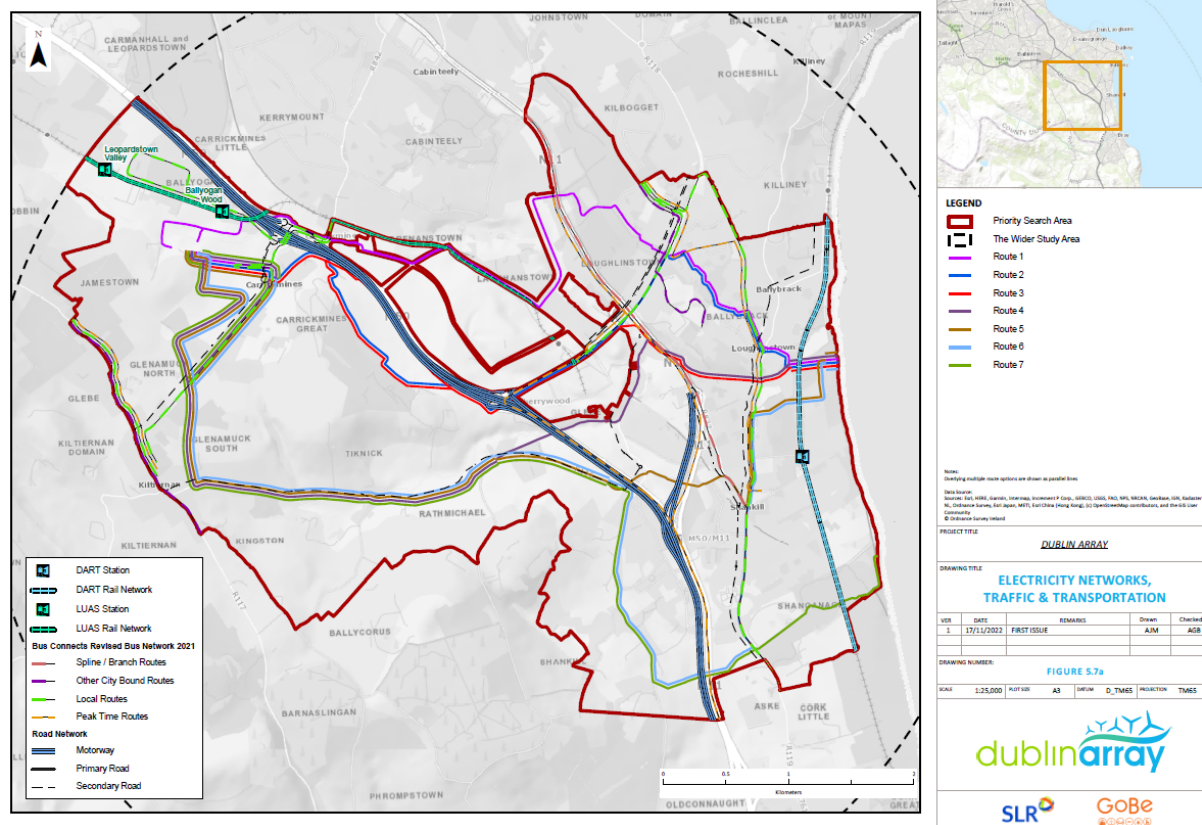
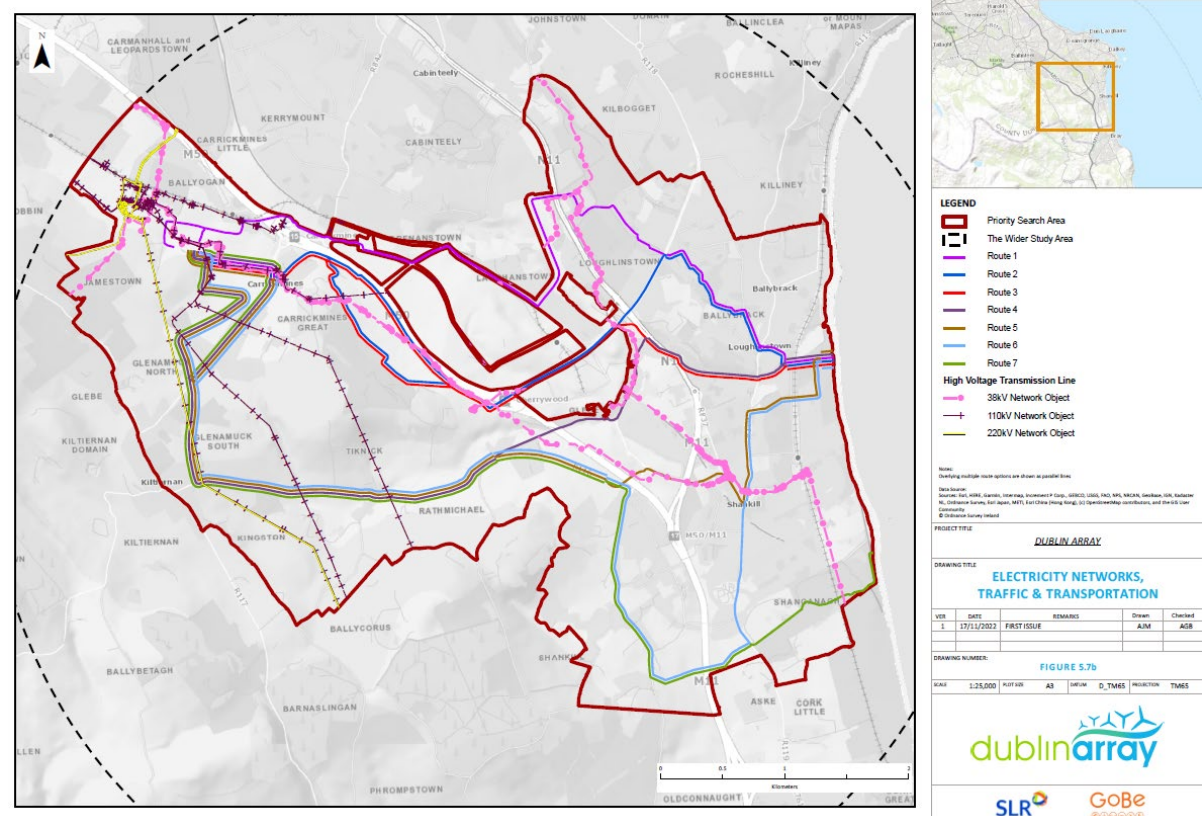


Figure 5-7 Existing Traffic/Transport & Utilities within the LSA



5.3.3 Key Constraints

The key constraints associated with the Project within the LSA in terms of impact on socio economic and land use are summarised below in Table 5-4.

Table 5-4 Socio-Economic, Population and Land Use Key Constraints

Key Constraints	
Constraint Type	Constraint Summary
Population and Economics	Proximity to communities and sensitive residential and commercial receptors present challenges for site selection. The project will have regard to the zoning objectives set out in the Dun Laoghaire Rathdown County Development Plan 2022 – 2028 and; the approved Cherrywood Strategic Development Zone Planning Scheme and the Local Area Plans for Ballyogan and Environs 2019-2025 and Kiltiernan /Glenamuck LAP 2013-2019 (as extended). The total population of the Electoral Divisions which the seven Route options cross is 28,400 people, or 7.7% of the 218,018 total Dun Laoghaire population. Crossing of large transportation routes such as the M50 will involve trenchless solutions, minimising the impact on those commuting for work.
Planning applications	The cumulative impact of surrounding development can prove a significant constraint to newly proposed development. The Kiltiernan /Glenamuck notes the development of the Glenamuck District Distributor Road which is currently out to tender for construction. Route options 4-7 will be within or adjacent to this road. Route options which are most impacted by surrounding existing, proposed development and development with the benefit of a planning permission (including the Glenamuck District Distributor Road) are route options 3 and 4. Routes 6 and 7 have a moderate impact by existing/proposed development. Route options 1 and 2 is also located proximate to proposed residential and mixed-use development but are less impacted as they will not be within or adjacent to the Glenamuck Distributor Road.
Land Use Patterns	The Project could potentially result in changes to land use and character in the LSA. Landcover types based on the Corine land cover dataset across the project LSA have been identified. There is potential for pasture lands in particular to be affected by the Project given that it is the dominant land use in the LSA. The route options most likely to affect the greatest number of land use types include: 3, 5, 6 and 7. Route options 1 and 2 are least likely.
Existing Utilities and Transportation	Any connections to and from the proposed substation will be in the form of underground cable infrastructure and therefore rerouting is less likely to be necessary due to conflict with overhead lines. Due to the number and extent of overhead line infrastructure of varying voltages around the ESB high voltage substation, minor diversions or undergrounding of existing transmission assets may be necessary. For Traffic and Transport all route options will impact multiple transportation uses. The most likely to affect the greatest number of transportation uses are Route options 1, 2, 3, 6 and 7), with route options 4 and 5 impacting the least. All route options are proximate to existing powerlines, however, Option 1 has the most exposure to powerlines.
Recreation and tourism	The development of the Project has the potential to impact known recreation sites, in particular the Project may cause temporarily disruption to the use and enjoyment of facilities which could result in adverse impacts to the area's recreational amenity with potential economic drawbacks. Route options which are most impacted by proximity to communities and sensitive residential and commercial receptors include: 1, 5 and 6.

	Route options which are least impacted by proximity to communities and sensitive residential and commercial receptors include: 2, 3, 4 and 7.
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5.4 Biodiversity, Flora and Fauna

5.4.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Dun Laoghaire Rathdown County Development Plan 2022 – 2028.
- SEA Environmental Report for the Dun Laoghaire Rathdown County development plan 2022 – 2028.
- Cherrywood SDZ Local Area Plan
- Ballyogan and Environs Local Area Plan 2019-2025
- Kiltiernan / Glenamuck Local Area Plan 2013-2019 (as extended)
- Woodbrook Shanganagh - Local Area Plan 2017-2023 (as extended 2022)
- EPA maps and NPWS website for information regarding designated (and candidate) sites for nature conservation.

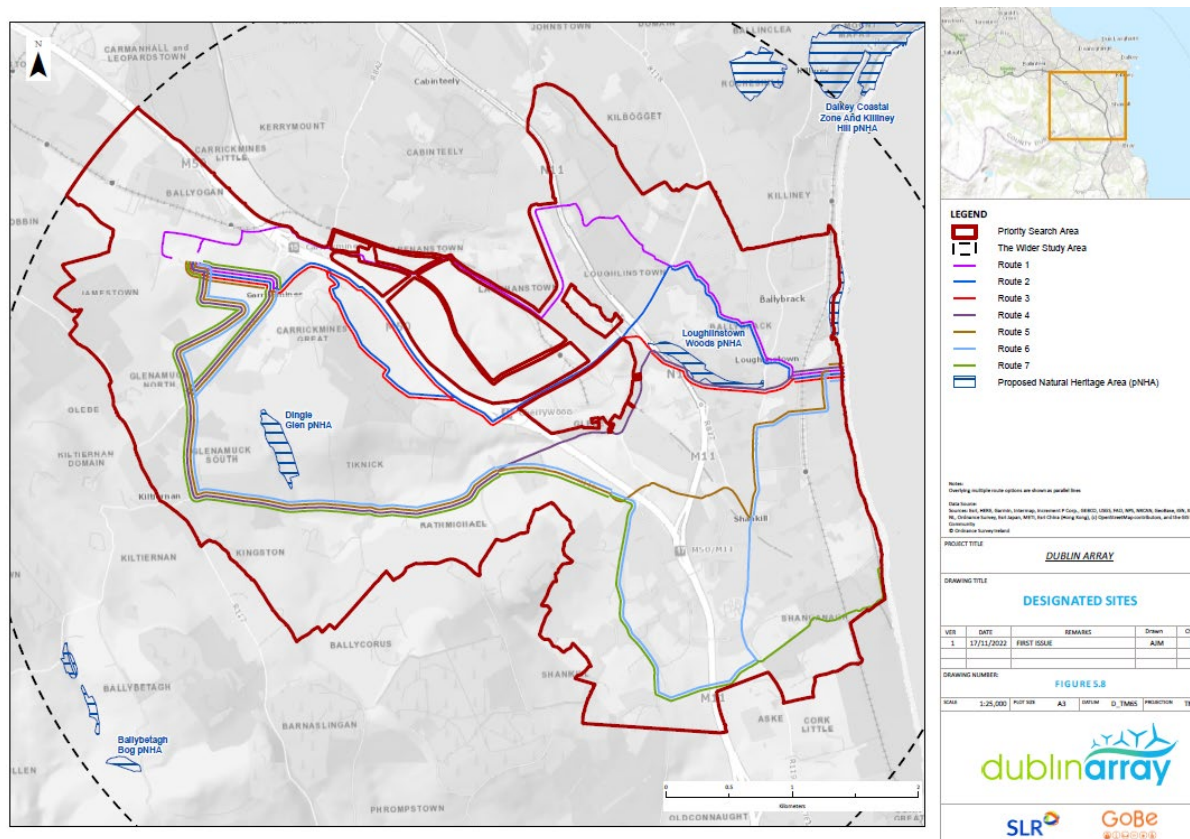
5.4.2 Existing Constraints

There are no SACs, SPAs⁶ or other statutory sites designated for nature conservation within the LSA. However, there are four SACs and SPAs that are within 10km of the LSA. These are the Knocksink Wood SAC, Ballyman Glen SAC, Wicklow Mountains SPA and Wicklow Mountains SAC.

There are two non-statutory designated sites, pNHAs, located within the LSA: Dingle Glen pNHA and Loughlinstown Wood pNHA⁷. These are shown on

⁷Synopses based on available information from the NPWS Natural Heritage Areas (NHA) | National Parks & Wildlife Service (npws.ie)

Figure 5-9.



Dingle Glen pNHA (site code: 1207): This is a dry valley formed as a glacial lake overflow channel. While this Glen was formerly cleared of vegetation, a woodland cover is now regenerating. The importance of this site lies in the variety of habitats contained within a relatively small area. The site is secluded and not subject to significant disturbance (Kiltiernan/Glenamuck Local Area Plan 2013).

Loughlinstown Wood pNHA (site code: 1211): This site is a good example of demesne-type mixed woodland⁸. It was originally planted but following substantial regeneration, has produced woodland of natural character in age, structure and form. It is on the north bank of the Shangannagh River and the introduced Giant Hogweed *Heracleum mantegazzianum* has spread along the banks of the river, having a negative impact on the pNHA. Areas of woodland, scrub and grassland together with a number of watercourses are also present. Some of these watercourses have previously been modified through canalisation, deepening and culverting.

⁸ Native woodland is typically confined to agriculturally less attractive areas, such as esker ridges, or to former demesnes where they were often planted for shelter, game cover or for landscaping the surrounds of the 'big house'

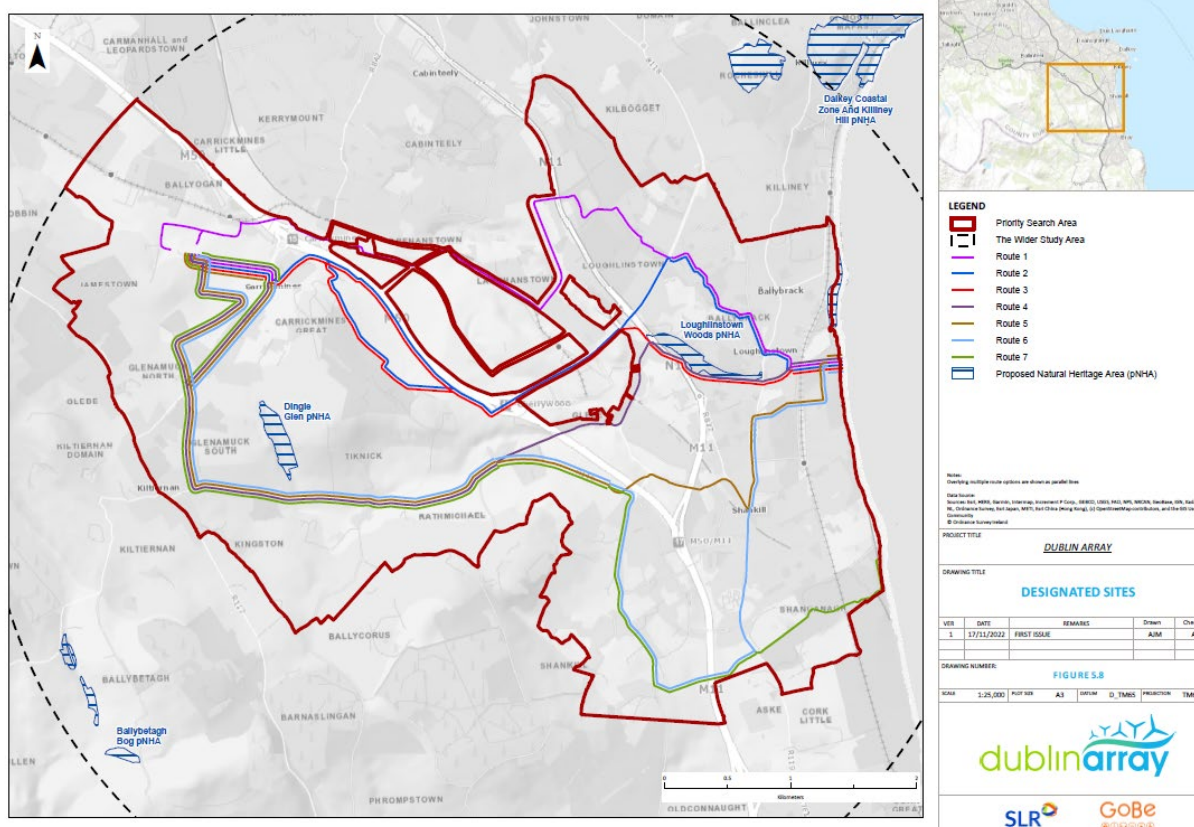


Figure 5-9 Designated Sites

The SEA Environmental Report for the Dun Laoghaire-Rathdown County Development Plan 2022-2028 highlights that there are three areas of High Ecological Value which include a number of high diversity habitats. One of these sits within the LSA and is referred to as the Kiltiernan / Loughlinstown Area of High Ecological Value.

The Kiltiernan / Loughlinstown Area of High Ecological Value is located to the east of Kiltiernan and is surrounded by an area dominated by agricultural grassland with a large pocket of dry meadows and grassy verges. This habitat is particularly rich in species diversity. Other habitats present include a large strip of wet grassland, mixed broadleaved woodland, wet pendulate oak-ash-hazel woodland and riparian woodland.

Ecological networks are composed of linear features, such as treelines, hedgerows, rivers and streams, which provide routes for wildlife moving within their normal range. They are particularly important for mammals, especially bats, and birds, particularly passerines. The SEA Report highlights that such ecological networks are present within the LSA including Loughlinstown River together with the Cabinteely, Ballyogan, and the Glenamuck Streams and their tributaries and banks. The SEA also notes that woodlands, parks, gardens and hedgerows are also species rich. These networks provide habitats for flora and fauna and facilitate linkages to the surrounding countryside.

Habitats Survey undertaken for the SEA show that the LSA is largely categorised as improved grassland with areas of non-native woodland, scrub, spoil and bare ground, recolonising bare ground and mixed deciduous woodland.

5.4.3 Key Constraints

The key constraints associated with the development of the Project within the LSA in terms of potential of biodiversity related impacts to sensitive receptors are summarised in Table 5-5.

Table 5-5 Biodiversity related Key Constraints

Key Constraints	
Constraint Type	Constraint Summary
Damage / Loss of pNHA Habitat	<p>There is potential for loss or damage and changes to hydrology to pNHA habitats and species within the project LSA.</p> <p><u>Route option 3, 4</u></p> <p>This is more likely to occur at Loughlinstown Wood pNHA, given the proximity of the boundary of the pNHA to the route options 3 and 4 along the Commons Road at Shankill.</p> <p><u>Route option 4, 5, 6, 7</u></p> <p>This is less likely to occur at Dingle Glen pNHA given the separation distance between the pNHA and the route options along the Ballycorus Road, Kiltarnan.</p>
Loss, Isolation and degradation of Habitats	<p><u>All Route options</u></p> <p>Where the route option follows the road, there is low risk of loss, fragmentation or degradation of ecologically important habitats. In several instances, the route option diverges from the road and crosses several habitats with ecological value. As a result, there is potential for loss, fragmentation and degradation of these habitats. These habitats are listed below, by route option;</p> <p><u>Route option 1</u>; Shingle & gravel banks, lowland depositing rivers, treelines, hedgerows, scrub, scattered trees & parkland, broadleaved woodland</p> <p><u>Route option 2</u>; Shingle & gravel banks, lowland depositing rivers, treelines, hedgerows, scrub, scattered trees & parkland</p> <p><u>Route option 3</u>; Shingle & gravel banks, lowland depositing rivers, treelines, hedgerows, scrub, scattered trees & parkland, broadleaved woodland</p> <p><u>Route option 4</u>; Shingle & gravel banks, lowland depositing rivers, treelines, hedgerows, scrub, broadleaved woodland, dry calcareous & neutral grassland</p> <p><u>Route option 5</u>; Shingle & gravel banks, treelines, scrub, wet grassland, immature woodland, lowland depositing rivers, dry calcareous & neutral grassland</p>

Key Constraints	
	<p><u>Route option 6</u>; Shingle & gravel banks, lowland depositing rivers, broadleaved woodland, dry calcareous & neutral grassland</p> <p><u>Route option 7</u>; Shingle & gravel banks, sedimentary sea cliffs, scattered trees & parkland, broadleaved woodland, treelines, lowland depositing rivers, dry calcareous & neutral grassland</p>
Disturbance to Protected Species	<p><u>Route option 1</u></p> <p>Habitat that could potentially support badger <i>Meles meles</i> was identified where the route option crosses from agricultural grassland to the Carrickmines Luas Park & Ride through an embankment supporting a dense treeline.</p> <p><u>Route option 7</u></p> <p>There is potential for disturbance to sand martin <i>Riparia riparia</i> nesting colonies at Shanganagh Cliffs.</p> <p><u>All Route options</u></p> <p>There is potential for disturbance to roosting bats where the route option traverses mature treelines and woodlands(as assessed in the EIAR).</p>
Invasive Species	<p><u>Route option 3, 4</u></p> <p>Only one invasive species listed on the Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011] was identified during the walkover surveys. Giant hogweed was identified in a scrub verge south of the Commons Road, Shankill. There is potential for the spread of this invasive species.</p> <p><u>All Route options</u></p> <p>Other invasive species not listed on the Third Schedule but ranging from low to high risk of impact are present along all route options. There is potential for the spread of these invasive species.</p>

5.5 Landscape and Visual

5.5.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Dún Laoghaire Rathdown County Council (2022) County Development Plan 2022 – 2028;
- Ordnance Survey of Ireland (2021). GeoHive Map Viewer⁹.
- Google (2022). Google Maps and Street View¹⁰.
- Cherrywood SDZ Local Area Plan
- Ballyogan and Environs Local Area Plan 2019-2025
- Kiltiernan / Glenamuck Local Area 2013-2019 (as extended)
- Woodbrook-Shanganagh Local Area Plan 2017-2023 (extended to October 2027)

5.5.2 Existing Landscape Constraints

5.5.2.1 Landscape Policies and Objectives

The relevant landscape policy objectives, as set out in the ‘Dun Laoghaire-Rathdown County Development Plan 2022-2028’, are summarised below:

- **Policy Objective GIB2 – Landscape Character Areas:** It is a Policy Objective to continue to protect, manage and plan to conserve, maintain or enhance the distinctive characteristics of the County’s landscapes, townscapes and seascapes in accordance with the recommended strategies as originally outlined in the Landscape Character Assessment (2002 and since updated), in accordance with the ‘Draft Guidelines for Landscape and Landscape Assessment’ (2000) as issued by the Department of Environment and Local Government, in accordance with the European Landscape Convention (Florence Convention) and in accordance with ‘A National Landscape Strategy for Ireland – 2015-2025’. The Council shall implement any relevant recommendations contained in the Department of Arts, Heritage, and the Gaeltacht’s National Landscape Strategy for Ireland, 2015 - 2025;
- **Policy Objective GIB4 – High Amenity Zones:** It is Policy Objective to conserve and enhance existing High Amenity Zones and to seek to manage these and other areas to absorb further recreational uses and activity without damaging their unique character.
- **Policy Objective OSR7 – Trees, Woodland and Forestry:** It is a Policy Objective to implement the objectives and policies of the Tree Policy and the forthcoming Tree Strategy for the County, to ensure that the tree cover in the County is managed, and developed to optimise the environmental, climatic and educational benefits, which derive from an ‘urban forest’, and include a holistic ‘urban forestry’ approach.

5.5.2.2 Dun Laoghaire-Rathdown County Council Landscape Assessment Study

The DLR County Development Plan 2022-2028 contains a Landscape Assessment Study (in Appendix 8) of the primarily rural areas of the county. It identifies 14 Landscape Character Areas (LCAs), numbered LCA 1 up to LCA 14 the majority of which are located to the south/west of the M50 motorway. The vast majority of the urban areas of DLR are not included in the Landscape

⁹ Available at: <http://map.geohive.ie/mapviewer.html>

¹⁰ Available at: <https://www.google.com/maps>

Character Assessment and a separate townscape character assessment or similar is not available.

The LSA traverses parts of the following LCAs, as indicated on Figure 5-10:

- LCA5 – Kiltiernan Plain,
- LCA6 – Ballycorus,
- LCA 10 – Rathmichael,
- LCA12 – Shanganagh,
- LCA 13 – Carrickmines, and
- LCA 14 – Cherrywood/Rathmichael.

(a) **LCA 5 – Kiltiernan Plain**

The description of LCA5 – Kiltiernan Plain includes:

'This is a large enclosure which comprises the hilly plain lying between Three Rock to the west, Newtown, Barnaslingan (The Scalp) and Carrickgollogan to the south, the disused lead mines and chimney to the east. The enclosure is curtailed to the north by the coniferous plantation on Three Rock.

This enclosure is characterised by a series of smaller hillocks within a plain. Roads run between the undulations most notably the main Enniskerry Road running north-south from Stepside and disappearing into the Scalp.

This large hilly plain which is part of the foothills of the Dublin Mountains accommodates much of the rural development in the County (Kiltiernan and Stepside). Given its terrain and the number of route options traversing this plain, it is likely to be subject to the most pressure for long-term development which would significantly alter the existing landscape.

The area has accommodated much change generated by the pressures of being adjacent to a large urban area.

New communities continue to be accommodated in accordance with adopted plans.'

The sensitivity/strategy information for LCA5 – Kiltiernan Plain includes (potential landscape constraints for each LCA are highlighted in bold, by the author):

- 'To have regard to the policies and objectives of Kiltiernan/Glenamuck Local Area Plan 2013. ...'
- 'To have regard to the policies and objectives of the Ballyogan and Environs LAP 2019.'
- 'Protect existing hedgerows particularly those identified as priority hedgerows in the Dun Laoghaire-Rathdown hedgerow survey.'
- 'To have regard to the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan.'

None of the policies/objectives in the Kiltiernan/Glenamuck Local Area Plan 2013 and Ballyogan and Environs LAP 2019, nor any of the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan were found to result in landscape constraints associated with this Route Option Selection Report.

While large parts of this LCA are zoned as 'High Amenity Areas' (i.e. Zoning Objective G – To protect and improve high amenity areas), these are located outside the LSA, except for a very small area in the southwestern corner of the LSA.

(b) LCA 6 – Ballycorus

The description of LCA 6 – Ballycorus includes:

'This enclosure encompasses the valley along which runs the Ballycorus Road and is bounded by the disused lead mines to the south and Ticknick and the Glenamuck Road to the north, Barnaslingan to the west with Three Rock in the background. This enclosure displays past and also present industrial/extractive works. The past is in the form of the old leadworks especially the lead mine's chimney. Quarrying/extraction has continued into the present with the activities of Cement Roadstone in the valley. The north western portion of this enclosure has altered considerably since the original Landscape Character Assessment. Considerable development has occurred along the Glenamuck Road in accordance with the Kiltiernan/Glenamuck Local Area Plan 2013.'

The sensitivity/strategy information for LCA 6 – Ballycorus includes (potential landscape constraints are highlighted in bold, by the author):

- 'Recognition of the important role of Ballycorus leadmines in the past.'
- **'Dingle Glen is a sensitive landscape** and shall be afforded protection due to its rarity.'
- **'Maintenance and restoration of field patterns and boundaries.'**
- 'To have regard to the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan.'
- 'To have regard to the policies and objectives of Kiltiernan/Glenamuck Local Area Plan 2013 (extended to 2023).'
- **'Protect existing hedgerows** particularly those identified as priority hedgerows in the Dun Laoghaire-Rathdown hedgerow survey.'

None of the policies/objectives in the Kiltiernan/Glenamuck Local Area Plan 2013, as well as none of the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan were found to result in landscape constraints associated with this Route Option Selection Report.

It should further be noted that **large section of this LCA are zoned as 'High Amenity Areas'** (i.e. Zoning Objective G – To protect and improve high amenity areas; refer to figure 5.2.

(c) LCA 10 – Rathmichael

The description of LCA 10 – Rathmichael includes:

'This enclosure encompasses the area between the Rathmichael Road and Carrickgollogan. At present the area slopes gently westwards up to Carrickgollogan. A number of roads with virtually intact hedgerows criss-cross the area giving a rural ambience, despite the fact that the area is dotted with enclaves of low density residential units – often 3 or 4 units, 17 in one case - all set in their own large sites. The area is zoned

objective A - to protect and or improve residential amenity and there is an SLO to prepare a Local Area plan'

The sensitivity/strategy information for LCA 10 – Rathmichael includes (potential landscape constraints are highlighted in bold, by the author):

- **'Protection of deciduous tree belts'**. 'To have regard to the recommendations and findings of the Historic Landscape Character Assessment for Rathmichael.'

Please note that the Historic Landscape Character Assessment for Rathmichael could not be obtained following an internet search.

(d) LCA 12 – Shanganagh

The description of LCA12 - Shanganagh includes:

'This enclosure is essentially the area between Shankill and Bray which takes in the cemetery at Shanganagh, Shanganagh Park and Woodbrook golf course. This enclosure also includes the land to the west between the Dublin Road and the N11. The Dublin Road from Shankill to Bray traverses this enclosure....'

When viewed from Killiney Hill and also from Carrickgollogan this area is effectively indistinguishable from the overall plain. The entire expanse appears to be dominated by low-density housing. When viewed from the Dublin Road, the trees prevent any sense of a vista but instead provide for a tree lined Avenue.'

The sensitivity/strategy information for LCA12 - Shanganagh includes (potential landscape constraints are highlighted in bold, by the author):

- **'The sylvan character of the Old Dublin Road shall be maintained** in accordance with approved plans.'
- 'To have regard to the policies and objectives of the Draft Woodbrook-Shanganagh Local Area Plan 2017-2023.'

The objectives of the Draft Woodbrook-Shanganagh Local Area Plan 2017-2023 include (potential landscape constraints are highlighted in bold, by the author):

- 'Objective OR4 - To **retain and/or enhance existing boundary treatments, tree belts and hedgerows where appropriate and feasible**. The retention and protection of existing trees / woodlands shall accord with the requirements of the County Development Plan 2022-2028.'

(e) LCA 13 – Carrickmines

The description of LCA 13 – Carrickmines includes:

'This enclosure encompasses the area east of the Stepside area and is bounded by the motorway to the north, the Glenamuck Road to the South and the Enniskerry Road to the west. The most dominant visual feature of this enclosure is the 50-acre retail and employment node at the Carrickmines intersection of the M50. The former Ballyogan landfill which is ear marked for future development as a park is located at the edge of the built up area of Dun Laoghaire-Rathdown and functions as a buffer and green linkage

between the built-up area of Leopardstown/Stepaside and the changing area of Kiltiernan.'

The impact of the multitude of urban uses – the tiphead, retail park, pylons and houses on the landscape is evident.'

The sensitivity/strategy information for LCA 13 – Carrickmines includes (potential landscape constraints are highlighted in bold, by the author):

- 'This enclosure sits between the urban and the rural landscapes and is one that is undergoing rapid change as to accommodates new communities.'
- 'The future vision for this area offers an opportunity to enhance and restore a portion of the landscape as Jamestown park. It is envisaged that this area will serve as an amenity/recreation area for new communities at Stepside and Carrickmines.'
- 'To have regard to the policies and objectives of Kiltiernan/Glenamuck Local Area Plan 2013. In June 2018 this plan was extended for a further period up to and including September 2023.'
- 'To have regard to the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan.'

None of the policies/objectives in the Kiltiernan/Glenamuck Local Area Plan 2013, as well as none of the recommendations and findings of the Historic Landscape Character Assessment for Kiltiernan were found to result in landscape constraints associated with this Route Option Selection Report.

(f) LCA 14 – Cherrywood/Rathmichael

The description of LCA 14 – Cherrywood/Rathmichael states that:

'This area was originally outlined in the Landscape Character Assessment Study as it was an area undergoing significant change with the introduction of the Luas B1 line and the development of the Cherrywood Science and Technology Park. This area is now subject to the Cherrywood Strategic Development Zone (SDZ) Planning Scheme which was adopted by An Bord Pleanála in April 2014.'

The Cherrywood SDZ site is described as follows in the Cherrywood Planning Scheme:

'The Strategic Development Zone lands, of approx. 360 hectares which are located in the administrative area of Dun Laoghaire-Rathdown, ... are the largest undeveloped land bank in the County and one of the most sizable undeveloped areas within the Dublin Metropolitan Area. ... There is an historical connection to the Dublin Mountains, with Cherrywood originally being part of their hinterland, which has been severed somewhat by the completion of the South Eastern Motorway (M50). ... The lands have a varied landscape and topography, flanked by three valleys: Druid's Glen, Bride's Glen and the Cherrywood/Loughlinstown River Valley, and the historical ruins of Tully Church identifying the high point of the Plan Area.'

'The boundaries of the area are characterised by housing along Cherrywood Road, the N11 and Brennanstown Road. The majority of the Plan Area is undeveloped and rural in context with dispersed housing along Lehaunstown Lane. There is some recent residential development in the form of housing and apartments and an emerging business park. ...'

The Cherrywood Planning Scheme does not contain policies or objectives resulting in landscape constraints associated with this Onshore Cable Route Selection Report.

5.5.2.3 Areas not included in Dun Laoghaire-Rathdown County Council Landscape Assessment Study

As mentioned previously the Landscape Assessment Study covers the primarily rural areas of the county only. Therefore, parts of the LSA are not covered by any of the Landscape Character Areas, i.e.

- the area to the east of the N11, including most of Shankhill, Loughlinstown and Ballybrack;
- the part of Shankhill/Loughlinstown between the R116 and the N/M11; and
- the area between Ballyogan Road and the M50.

The topography of these areas is generally flat, with levels at 70m OD along the M50. There are some local undulations, for instance along the section of the Loughlinstown River parallel to the N11, where the river is located in a distinct valley. However, these undulations do not influence the wider landscape in the same way as Dublin Mountains within the Mountain High Amenity area.

There are no designated and/or historic designed landscapes or townscapes within these areas.

5.5.3 Existing Visual Constraints

5.5.3.1 Visual Policy Objectives

The relevant visual policy objectives, as set out in the 'Dun Laoghaire-Rathdown County Development Plan 2022-2028' and are summarised below:

- **Policy Objective GIB6 – Views and Prospects:** is a Policy Objective to preserve, protect and encourage the enjoyment of views and prospects of special amenity value or special interests, and to prevent development, which would block or otherwise interfere with Views and/or Prospects.
- **Policy Objective EI19 – Overhead Cables:** It is a Policy Objective to seek the undergrounding of all electricity, telephone and television cables wherever possible, in the interests of visual amenity and public health.

The locations from which views are to be preserved, as shown on the Development Plan Maps, are replicated on Figure 5-10. Several of these viewing locations are located within the LSA and a number just outside with views over the LSA. A number of additional local viewpoints are indicated within the Draft Woodbrook-Shanganagh Local Area Plan 2017-2023 (note: these are not represented on Figure 5-10). These views are typically oriented towards Killiney Hill/the Irish Sea or the Dublin/Wicklow Mountains and therefore do not pose visual constraints at the route selection stage, considering the proposed undergrounding of and temporary disturbance due to the installation of the Dublin Array cable route.

5.5.3.2 Existing Visibility and Visual Receptors within the LSA

(a) Areas in the immediate vicinity of and to the East of the M50

Views within the urban section of the LSA are generally very restricted and of low scenic quality. This is due to a combination of the built-up environment, existing trees and hedgerows and the mostly flat topography. In the vicinity of public green spaces, slightly more open views are available, however these are still typically restricted to the nearest treeline or building line.

(b) Visibility on the north eastern slopes of the Dublin Mountains

Roadside vegetation, high ditches, walls or fencing restrict the views from many locations along the roads on the north- eastern slopes of the Dublin Mountains. There are however intermittent uphill views and views towards the Irish Sea (i.e. over the LSA) along the R117. While these intermittent views are publicly accessible, since they are located along public roads, formal viewing points are limited.

The Dublin Mountain Way long distance walking route starts within the LSA at Shankhill and proceeds in a western direction. The track soon leaves the LSA, however, there are intermittent views along its route up to Three Rock Mountain, where views over the LSA open up.

(c) Visual Receptors

Sensitive receptors within and in the vicinity of the LSA include residents and road users throughout the area and recreational visitors to nearby tourism facilities. However, similar to the designated views, these also do not pose visual constraints at the route option selection stage, considering the proposed undergrounding of and temporary disturbance due to the installation of the Dublin Array cable route. Key landscape character areas, protected views and prospects are shown in Figure 5-10.



The key constraints associated with the development of the Project within the LSA in terms of potential landscape and visual related impacts to sensitive receptors are shown above in Figure 5-10 and summarised in Table 5-5.

Table 5-5 Landscape and Visual Key Constraints

Key Constraints	
Constraint Type	Constraint Summary
Existing hedgerows / tree belts	Hedgerows / tree belts are protected by a number of policies/objectives within the DLRCDP and relevant Local Area Plans, as well as the Landscape Assessment Study. Mature hedgerows / tree belts (as identified in the biodiversity section of this report) therefore may pose a landscape constraint to the project during the construction phase.
High Amenity Zoning	Those areas zoned as High Amenity Areas (i.e. Zoning Objective G – To protect and improve high amenity areas, refer to Figure 5-2) pose a landscape constraint. However, this can be avoided by aligning the cable route option along existing roads or if full restoration of the existing ground cover can be achieved.
Protected Views	<ul style="list-style-type: none"> • For the purposes of this assessment: • Route option 1 crosses two protected views including the landfall option • Route option 2 crosses two protected views including the landfall option • Route option 3 crosses one protected view at the landfall option (Cream) • Route option 4 crosses three protected views including the landfall option – (see comment on Dingle Glen pNHA) • Route option 5 crosses six protected views including the northern landfall option • Route option 6 crosses seven protected views including the northern landfall option – (see comment on Dingle Glen pNHA) • Route option 7 crosses seven protected views – (see comment on Dingle Glen pNHA) <p>The grid connection however will be placed underground and therefore will not impact views during the operational phase of the project. Some visual impacts may be possible during the construction phase but these will be short term and temporary.</p>
Dingle Glen pNHA	The Dingle Glen (refer to Figure 5-9) is described as a sensitive landscape in the Landscape Assessment Study and therefore poses a key landscape constraint. Route options 4, 6 and 7 route within proximity to this pNHA, and are ranked higher impact due to this potential landscape constraint during the construction phase.

5.6 Archaeology, Architectural and Cultural Heritage

5.6.1 Resources

Data supplied by the National Inventory of Architectural Heritage (NIAH) and the National Monuments Service (NMS) was used to identify any key heritage constraints in relation to the seven cable route options proposed. The route options and heritage asset data were analysed using GIS software, taking into account the assets' condition, extent and significance. A 500m radius study area was applied to each cable route option for purposes of data collection and assessment.

5.6.2 Existing Constraints

There are several archaeological constraints within the LSA, shown on Figure 5-11 and listed in Table 5-6. These include:

- National Monuments
- Monuments in State Care
- Architectural Heritage Building / Recorded Protected Structures (and their curtilages/attendant grounds).
- SMR Zone of Notification (surrounding some National Monuments within an area of 'records of Monuments and Place').

Existing cultural heritage constraints are shown in Figure 5-11.

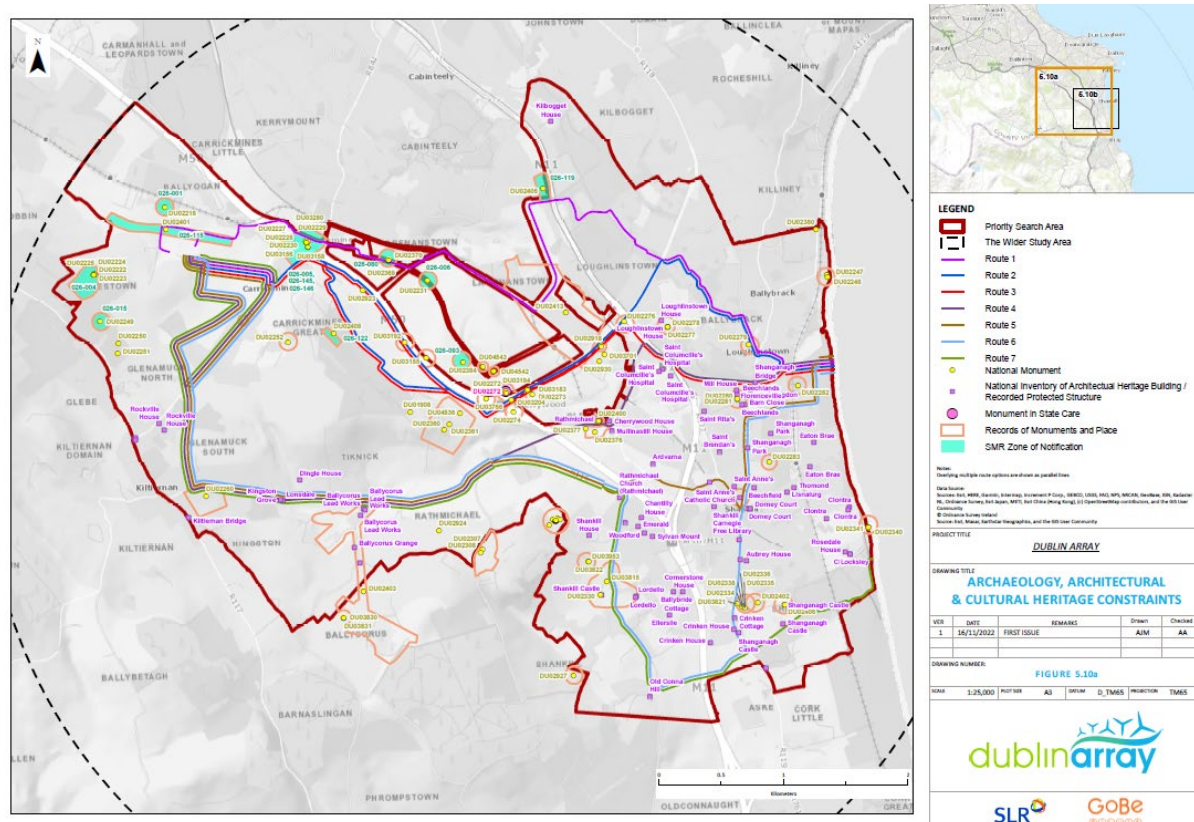


Figure 5-11 Archaeological, Architectural and Cultural Heritage Constraints within the LSA

Table 5-6 Key Archaeological Constraints

Type of Archaeological / Cultural Heritage Constraint	ID / Name		
National Monument	DU02218	DU02260	DU02923
	DU02401	DU02228	DU02369
	DU02224	DU02229	DU02231
	DU02225	DU03158	DU03192
	DU02222	DU03280	DU03155
	DU02223	DU03156	DU01908
	DU02249	DU02252	DU02360
	DU02250	DU02408	DU02361
	DU02251	DU02370	DU02924
	DU02319	DU02322	DU02276
	DU02930	DU02313	DU04542
	DU03701	DU03725	DU02272
	DU02413	DU02314	DU03766
	DU02265	DU02376	DU04536
	DU02269	DU02400	DU03183
	DU02263	DU02929	DU02273
	DU04103	DU02275	DU03204
	DU02270	DU02918	DU02274
	DU02384	DU04543	DU02279
	DU02370	DU02401	DU02260
	DU03815		
National Inventory of Architectural Heritage Building /	Waterfall Cottage	Glendruoid	Ballycorus Lead Works
	Saint Columcille's Hospital	Lehaunstown Park	Ballycorus Grange

Recorded Protected Structure	Rathmichael	Carrickmines Railway Station	Rusheen
	Cherrywood House	Priorsland	Rockville House
	Mullinastill House	Dingle House	Kiltiernan Abbey
	Ardvarna	Kingston Grove	Rock Villa
	Rathmichael Church	Lonsdale	Kiltiernan Bridge
	Shanganagh Bridge	Stonebridge Bridge	Kiltuc Church
Monuments in State Care	DU02272	DU02265	DU02266

5.6.3 Key Constraints

The key constraints associated with the development of the Project within the LSA in terms of potential of archaeological, architectural and cultural heritage constraints related impacts are summarised in Table 5-7.

Table 5-7 Archaeological, Architectural and Cultural Heritage Key Constraints

Key Constraints		
Constraint Type	Route Options Affected	Constraint Summary
Impacts on identified cultural heritage sites		
Water mill (DU02370)	1	Cable route option 1 passes through the Zones of Notification for this asset, the precise location of which is unknown. There is therefore the potential for them to be physically affected.
Enclosure (DU02369)	1	Cable route option 1 passes through the Zones of Notification for this asset, the precise location of which is unknown. There is therefore the potential for them to be physically affected.
Linear Earthwork (Pale Ditch) (DU02401)	1	Cable route option 1 passes through part of the course of the large linear earthwork known as the Pale Ditch. That section of the ditch would be physically affected (truncated).

Key Constraints		
Megalithic portal tomb (DU02279)	1 and 2	Cable route options 1 and 2 pass through the Zone of Notification for this asset. The cable routes are highly unlikely to have any physical impact upon the megalithic tomb itself (DU02279). They pass only a short distance into the Zone of Notification, and the monument's physical extent is clearly appreciable above ground and would evidently not be physically affected by either route. Safeguarding measures would be implemented during construction to mitigate the risk of any accidental/inadvertent damage, e.g., resulting from plant movements. The route options may affect any unrecorded associated buried remains that might be present within the Notification Zone, though none would be anticipated.
Beechgrove House (18th century onward) (DU02276)	2	Cable route option 2 passes close to the location of the posited remains of this 18th century house, which may thus be physically affected.
Shanganagh Bridge (60260118)	3, 4	Cable route options 3 and 4 cross this bridge along Stonebridge Road and have the potential to physically affect the bridge's fabric. Safeguarding measures would be implemented during construction to mitigate the risk of any accidental/inadvertent damage to above ground structural elements, e.g., resulting from plant movements.
House to the north of Brides Glen Road (DU02400)	4	Cable route option 4 would pass through the Monument Zone, surrounding the remains of a former 16th – 17th century house; these are thought primarily to be located beneath Rathmichael, a Regionally important house.
Bridge, Stonebridge Road (60260116)	5	Cable route option 5 crosses this bridge along Stonebridge Road and has the potential to physically affect the bridge's fabric. Safeguarding measures could be implemented during construction to mitigate the risk of any accidental/inadvertent damage to above ground structural elements, e.g., resulting from plant movements.
Kiltuc Church (DU02334)	6	The cable route option passes through the Monument Zone around the asset, wherein there may survive unrecorded remains associated with the church, potentially including foundations.
Impacts on previously unrecorded archaeological features		

Key Constraints		
Habitation Site (DU03766),	2, 3	Cable route options 2 and 3 pass c.100m to the south of the habitation area, this raises some slight potential for unrecorded associated buried remains to be affected.
Enclosure (DU04536)	2,3	Cable route options 2 and 3 pass 100m north of the enclosure (DU04536). This raises some slight potential for unrecorded associated buried remains to be affected.
Glenamuck South, Kingston, Enclosure (DU02260)	4, 5, 6, 7	Cable route options 4, 5, 6 and 7 pass c.80m north of the asset, raising some slight potential for unrecorded associated buried remains to be affected.
Shankill Deserted Medieval Settlement (DU03815). National Monument	6, 7	Located c.40m to the west of cable route options 6 and 7. The cable routes have the potential to affect unrecorded associated archaeological remains

5.7 Water and Flood Risk

This section provides a consideration of key constraints related to water and flood risk within the project LSA. An understanding of these constraints allows feasible route options and site locations for the high voltage transmission infrastructure to be fully considered.

5.7.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Ordnance Survey of Ireland (OSi) mapping to establish former channel courses and any diversion/culvert works in streams and rivers;
- Teagasc / Environmental Protection Agency (EPA) / GSI Soil and subsoils mapping for Ireland;
- Office of Public Works (OPW) stream flow, fluvial and tidal flood risk data and flood modelling information including proposals under the OPW Catchment Flood Risk Assessment and Management (CFRAM) for a flood relief scheme along the Shanganagh River at Loughlinstown;
- Dun Laoghaire-Rathdown County Council (DLRCC) County Development Plan (2022-2028) Appendix 13 Strategic Flood Risk Assessment (SFRA);
- Dun Laoghaire-Rathdown Flood Relief Scheme for Deansgrange (Kill-O-The-Grange) Stream
- Draft Dun Laoghaire Rathdown County Development Plan 2022 – 2028
- Geological Survey of Ireland (GSI) website groundwater information; geological information (accessed January 2022).
- EPA website to view consented abstractions, discharges and licences (accessed January 2022).;

- EPA website to view water quality results and WFD surface water and groundwater status (accessed January 2022);
- River Basin management Plans (RBMP) within the Cherrywood, Loughlinstown and Kiltiernan areas;
- Inland Fisheries Ireland (IFI) survey and water quality information; and
- Dun Laoghaire Rathdown monitoring results (surface water and groundwater) for Kilboggett Park (historic landfill) and Ballyogan (former local authority landfill).

5.7.2 Existing Constraints

5.7.2.1 Land Use

In addition to these existing land uses detailed in Section 5.2, there are two areas of former landfill within Ballyogan and Kilbogget both which sit inside the LSA. The former Ballyogan landfill and the current recycling centre (W0015-01) have an extensive clean and foul storm surface water management system with treatment measures in place. The treated water discharges to the Carrickmines Stream. There is one Integrated Pollution Prevention Control (IPPC) licenced facility (International Coatings Limited, P0122-01) located in the Shanganagh River catchment at Ballycorus.

5.7.2.2 Surface Water Features

There are a number of surface water courses, which have formed the valleys through the LSA. These river valleys are generally broad and flat, particularly along the upper section of the Carrickmines Stream from Carrickmines to Ballyogan. However, the section of the Carrickmines stream from Carrickmines to the Shanganagh River at Loughlinstown flows through a relatively steep sided valley, compared with the aforementioned broad and flat channels. At Cherrywood and Loughlinstown the valley opens out into a relatively wider section with a flat wide valley floor but with steep valley sides.

The LSA is located within the Dargle River sub catchment of WFD hydrometric Area No. 10, which includes the Avoca, Vartry and Dargle Rivers. The EPA Water maps show the following primary surface watercourses to run through the LSA:

- Shanganagh River (sections of which are also known locally as the Loughlinstown River);
- Carrickmines Stream; and
- Cabinteely Stream;

A number of smaller tributaries flow into these watercourses particularly around Jamestown and Glenamuck. These are shown in Figure 5-12.

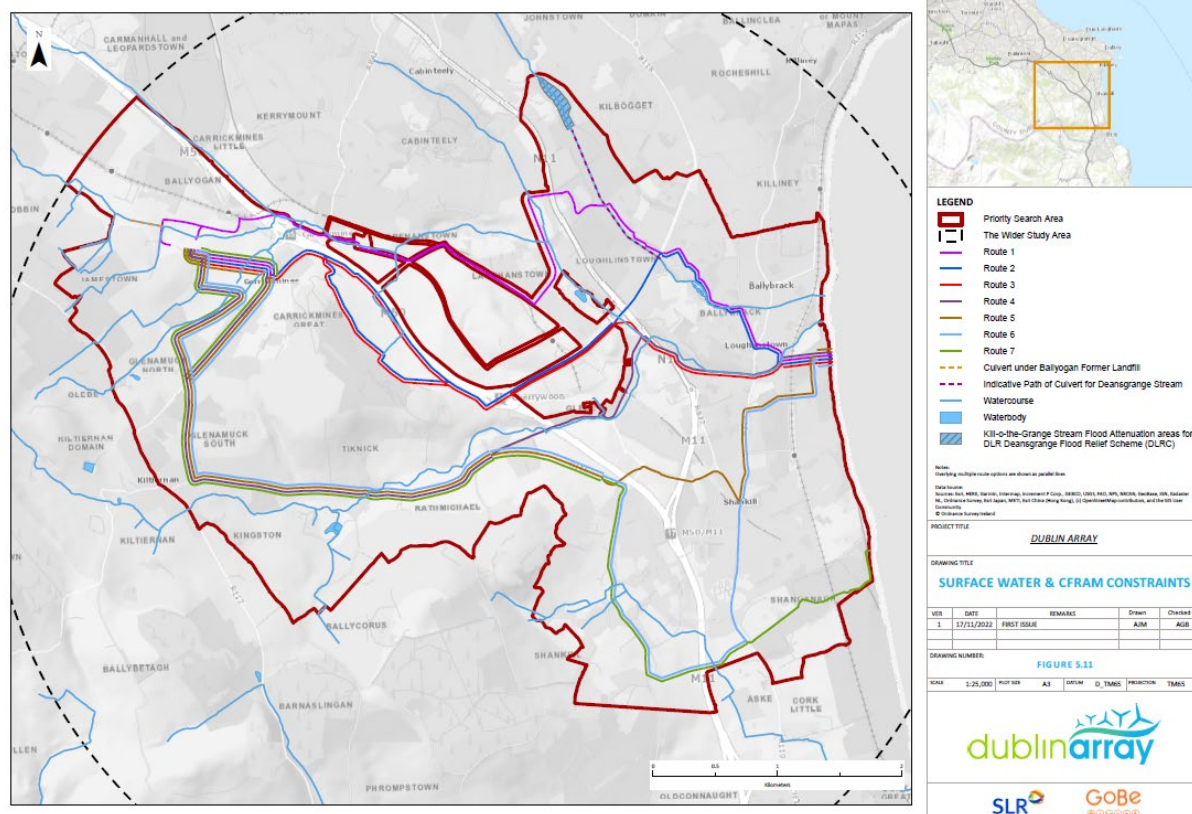


Figure 5-12 Surface Water Bodies and CFRAM Constraints

5.7.2.3 Surface Water Abstraction

The available EPA online maps do not indicate the presence of any surface water abstractions in the LSA or, either for drinking water purposes or any other uses.

Shanganagh River is designated as a drinking water river under Article 7 - Abstraction for Drinking Water, of the Water Framework Directive (WFD), and the river was delineated as a drinking water river in accordance with European Communities (Drinking Water) (No. 2) Regulations 2007 (SI no. 278/2007).

The Shanganagh River is also designated for drinking water abstraction under DLRCC Drinking Water Zones 3 & 5 which covers Ballyedmonduff and Kiltiernan Water Treatment Plants local supplies only; however, these treatment plants are understood to no longer be in use. Despite this, the Shanganagh River remains designated for drinking water abstraction.

5.7.2.4 Surface Water Quality

The EPA latest surface water quality (Q) monitoring at monitoring points along the rivers and streams in the LSA and the WSA date from 2018. The water quality monitoring indicates that the Shanganagh River in the vicinity of the LSA has a water quality of Low - Moderate status. There are no water quality monitoring points on the Carrickmines Stream near Ballyogan.

The EPA Water maps indicate that the Carrickmines has river urban runoff pressures. Urban runoff pressures are often due to combined sewer overflows between foul and surface water lines where

foul water can enter the surface water drainage system during extreme events and is discharged to surface watercourses.

EPA surface water quality data was obtained for the following locations on the Shanganagh River:

- Shanganagh River at Commons Road (sample location no. RS10S010600) and Brides Glen (sample location no. RS10S010460).

The surface water quality in the Shanganagh River is moderately hard (CaCO_3) while the ortho-phosphate, Ammonia, Conductivity and BOD¹¹ are good and reflecting the predominantly rural nature of the catchment at Brides Glen, and to a lesser extent at Commons Road which includes more flow from areas of built-up urban land use present in the catchment at this location.

5.7.2.5 Groundwater Vulnerability

The GSI has developed a groundwater vulnerability classification for Ireland. The groundwater vulnerability depends on the nature of the subsoils (i.e. their permeability characteristics), the type of recharge (point or diffuse) and the thickness of the unsaturated zone (depth to groundwater).

Areas surrounding Tiknick and Carrickmines are categorised as having extreme groundwater vulnerability. Ballyogan and Jamestown in the northwest, Ballycorus in the south and to the east of Cherrywood have moderate to high groundwater vulnerability, while around Loughlinstown the groundwater is categorised as having low vulnerability.

The potential impact on groundwater quality arising from human activities increases as the groundwater vulnerability rating decreases from Low to Extreme vulnerability.

5.7.2.6 Flooding

Flooding can occur at any time of year and can be caused by a range of factors. While flows are higher during the autumn and winter, flooding can also occur during summer months due to intense storm events.

The OPW is the government agency with statutory responsibility for surface water flooding in Ireland. The Catchment Flood Risk Assessment and Management (CFRAM) Programme produced a series of plans which identified the flood risk along the lower Shanganagh River in the vicinity of Loughlinstown and Ballybrack. The CFRAM constraints are shown on Figure 5-12..

The OPW have undertaken additional flood studies in the Ballybrack Area of further Assessment (AFA) which is liable to flooding and in addition DLR have an option for additional flood alleviation / mitigation along the Cabinteely Stream in this area.

The OPW website (www.floodinfo.ie) shows the modelled extent of land that might be flooded by rivers (fluvial flooding) during a range of floods. The OPW have modelled the following flood events along the Shanganagh River and the Carrickmines Stream: Low Probability flood events which have an indicative 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1%.

A Past Flood Event is defined by the OPW as the occurrence of recorded flooding at a given location

¹¹ BOD: Biological Oxygen Demand - a measure of the amount of oxygen required to remove waste organic matter from water.

on a given date or on a recurring basis. The flood event information was derived from available documentation including Flood Event Reports, news articles, archive information and photos and was compiled by the OPW. The OPW database does not however represent all Past Flood Events, but only those recorded, which were usually only when there was an impact of property or transport infrastructure.

OPW identified Past Flood Events for the Shanganagh River include flooding along Commons Road and at R119 Bridge (noted by OPW as recurring event near location, but not in the potential site location). Past Flood Events for the Carrickmines Stream include flooding at Carrickmines bridge on the 26/05/1993 (noted by OPW as single event at this location). Note that this event dated from 1993 and was pre the development of M50 road and current road alignments and drainage infrastructure.

5.7.2.7 Hydrogeology

The GSI classifies all aquifers in Ireland into three categories:

- Regionally important aquifers: good (100 to 400m³/day) to excellent (>400m³/day) productivity;
- Locally important aquifers: moderate (40 to 100m³/day) productivity; and
- Poor aquifers: poor (<40m³/day) productivity.

The LSA and the majority of the LSA is characterised as a poor aquifer with bedrock that is generally unproductive except for local zones. A small section along the coastline between Ballybrack, Loughlinstown and Shankill is categorised as a locally important aquifer where bedrock is moderately productive only in local zones.

Groundwater bedrock aquifers across the LSA are shown on Figure 5-13.

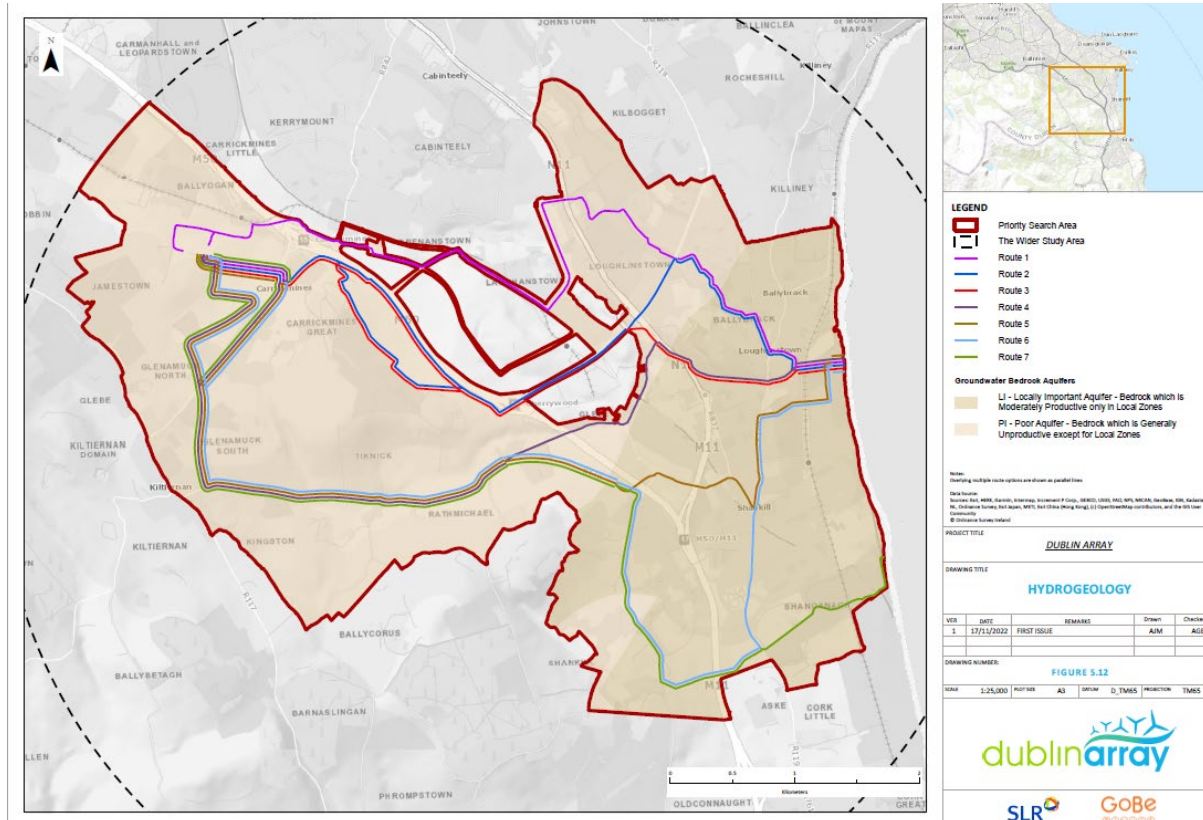


Figure 5-13 Groundwater Bedrock Aquifers

5.7.3 Key Constraints

The key constraints associated with the development of the Project within the LSA in terms of potential of water and flood risk related impacts to sensitive receptors are summarised in Table 5-8.

Table 5-8 Water Resource and Flood Risk Constraints

Key Constraints	
Constraint Type	Constraint Summary
Flooding: Proximity to CFRAM Area	Areas at risk of flooding can pose a risk to locating any structures, particularly during the construction phase of a project. The proposal is for the laying of cable within mostly public road route, with some areas which are open ground. The potential risk of flooding would occur during the open trench phase of construction as the cable is lain. In addition, repeated flooding could lead to erosion of material at the base of transmission structures. The CFRAM Loughlinstown Area for Further Assessment lies with the LSA. The potential flood risk arising from water resources will be fully considered throughout the project development process. Route options directly impacted by potential risk of flooding include Route options 1, 2, 3 and 4. Route options 5, 6 and

Key Constraints	
	7 may also be impacted due to the proximity to watercourses.
Water Quality: Pollution potential for accidental spillage of fuel, ingress of sediments, chemicals or sewage causing pollution to surface or groundwater during construction or maintenance activities	The groundwater vulnerability of the LSA has been identified as part of this constraints identification exercise. Best practice measures incorporated into the physical design and construction would manage any pollution risks to groundwater and surface water.

5.8 Soils and Geology

This section provides a consideration of key constraints related to soils and geology within the project LSA. An understanding of these constraints allows feasible route options and site locations for the high voltage transmission infrastructure to be fully considered.

5.8.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Ordnance Survey of Ireland (OSI) mapping;
- Teagasc / Environmental Protection Agency (EPA) / GSI soil and subsoils mapping for Ireland;
- Dun Laoghaire Rathdown County Council (2016). County Development Plan 2022-2028;
- Draft Dun Laoghaire Rathdown County Development Plan 2022 – 2028;
- Geological Survey of Ireland (GSI) geological information including borehole records;
- Cherrywood SDZ Local Area Plan;
- Ballyogan and Environs Local Area Plan 2019-2025;
- Draft Woodbrook Shanganagh-Local Area Plan-2017-2023
- Kiltiernan / Glenamuck Local Area 2013-2019 (as extended); and
- Previous ground investigations.

5.8.2 Existing Constraints

5.8.2.1 Bedrock geology

There are four types of bedrock that are present within the LSA moving from west to east and are shown on Figure 5-14:

- Type 3 muscovite porphyritic (granite);
- Type 2e equigranular (granite);
- Type 2p microcline porphyritic (granite); and
- Maulin Formation.

Type 2p Granite consists of Caledonian granite with microcline phenocrysts. Type 2p has in addition euhedral microcline phenocrysts up to 30mm. Accessory minerals are Fe-oxide, sphene, apatite, zircon, garnet and rutile. Type 2p Granite extends from the eastern side of Cherrywood down to Rathmichael in the south. Its eastern extent reaches where the R116 links the N11 and the M50.

Type 2e Granite consists of quartz, plagioclase, microcline, muscovite and biotite with grainsize 1-5mm. This can be found in the south at Ballycorus, around Cherrywood and up past the northern side of the M50.

Type 3 Granite is similar to Type 2e with muscovite phenocrysts in addition, and with accessory tourmaline and topaz. This is present across the majority of the LSA and can be found at Ballyogan in the north, in the west at Glenamuck and at Kingston in the south. This bedrock extends just east of the Carrickmines Golf Club.

Maulin Formation, which consists of Ordovician -grey slate, phyllite and schist. This is described by the GSI as penetratively cleaved high grey slates and phyllites which are commonly striped with pale siltstone laminae. Bands of garnetiferous quartzite that are 20m thick occur in the granite aureole. There are also thick lenses of orthoquartzite. The Maulin Formation is present in the very south eastern corner of the LSA towards Shankill.

The Bray head and in Bray head formations are relatively small areas within the LSA and only occur along Route options 6 & 7, and it is not considered to be a constraint as these route options follow a public road at this location.

Geological heritage areas are shown in Figure 5-14.

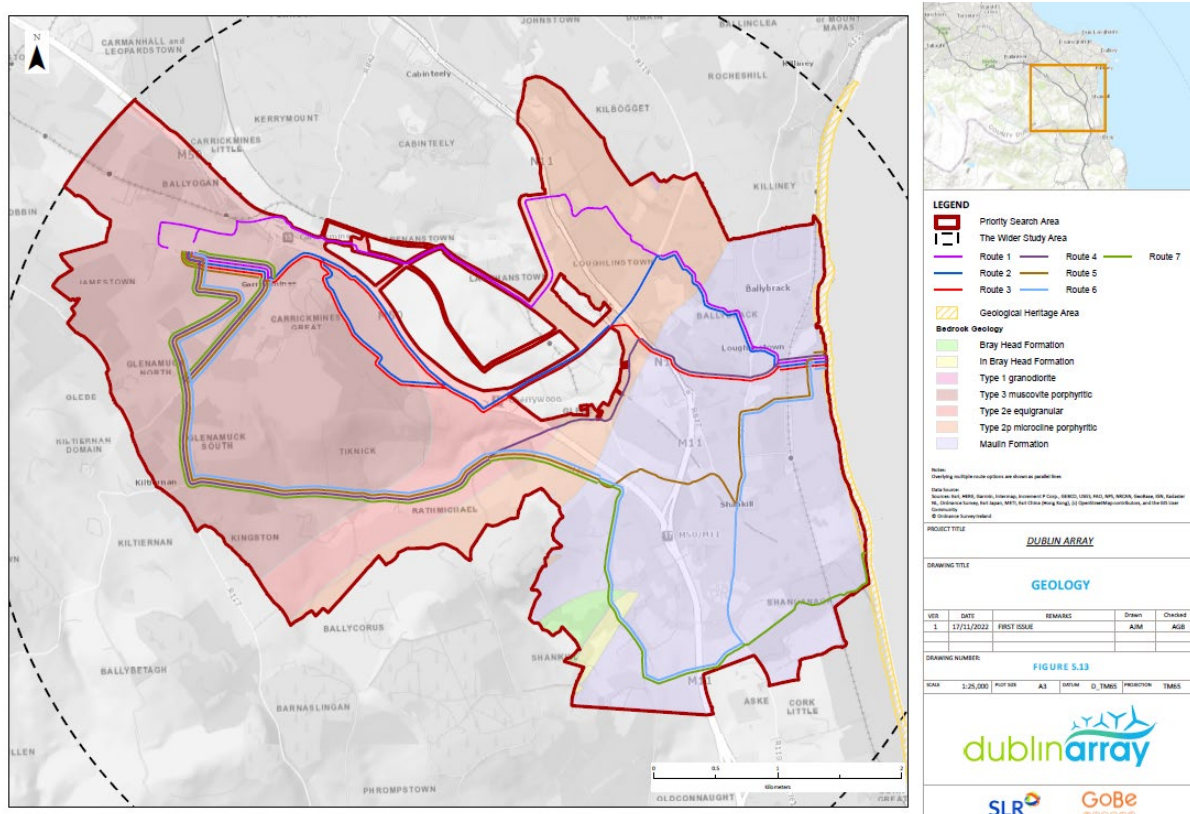


Figure 5-14 Bedrock Geology and GSI Geological Heritage Areas

5.8.2.2 Soils

The LSA is largely characterised by urban development underlain by three principal soil types, Alluvium along the watercourses, Clonroche Soil Association and Carrigvanagh Soil Association.

The urban areas within the LSA are classified as Urban Soils where the urban development has occurred, and the natural soils have been disturbed. Along the watercourses Alluvial soils occur which host the channel water flows.

The remainder of the LSA to the north and the east is underlain by soils from the Clonroche Soil Association which is a Brown Earth soil comprised from a predominantly fine loamy glacial till parent material primarily composed of sedimentary siliceous stones / geology.

The areas of Clonroche soils within the LSA comprise open space or land designated for development and none of the areas are in active agricultural production.

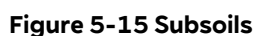
Areas of Carrigavanagh soils are found in the southwest of the LSA at Ballycorus and the south of Glenamuck.

5.8.2.3 Subsoils

The LSA comprises of a number of subsoils. The Subsoil (Quaternary) deposits were laid down during the last 2 million years, and essentially comprise the unconsolidated materials overlying bedrock. The two main types of quaternary subsoils in Ireland are glacial till, deposited at the base of ice sheets and sand & gravel deposits associated with the melting of the ice sheets which are generally termed glaciofluvial outwash sands and gravels.

The EPA online mapping website shows the LSA to be underlain six types of subsoil and are shown on Figure 5-15:

- Gravels Derived from Chert, Granite and Limestones;
- Alluvium;
- Bedrock Outcrop or Subcrop;
- Till Derived from Granites;
- Till derived from Limestones; and
- Marine Beach Sands



The Marine Beach Sands are located along Killiney Bay where the Shanganagh River flows into the sea. The beach sand deposits form a narrow liner feature which is obscured on the mapping by the LSA outline.

There are several surface water courses which have formed the valleys through the LSA. These

river valleys are generally broad and flat, particularly along the upper section of the Carrickmines Stream from Carrickmines to Ballyogan. However, the section of the Carrickmines stream from Carrickmines to the Shanganagh River at Loughlinstown flows through a relatively steep sided valley, compared with the aforementioned broad and flat channels. At Cherrywood and Loughlinstown the valley opens out into a relatively wider section with a flat wide valley floor but with steep valley sides.

5.8.2.5 Land Use

The land in the area is characterised urban land use and open areas of countryside including some Coillte forestry. There are two areas of former landfill within Ballyogan and Kilbogget both which sit inside the LSA. The former landfill at Ballyogan has been extensively studied as part of previous ground investigations at the site. In addition, there is an ongoing monitoring regime of landfill gas, groundwater and ground gas monitoring at the site which is required as part of the site's waste licence Reg. No. W0015-01.

5.8.2.6 Geological Heritage

There is one GSI Geological Heritage sites within the LSA and number of further Geological Heritage Sites within the wider LSA. The coastline at Killiney Bay and Shanganagh is designated as a geological heritage site under IGH Theme No. 7 (Site Code DLR007), see Figure 513 above. The site is described as 'A 5 kilometres long coastal section exposes a succession of several units of glacial till', with 'A particularly impressive exposure into deep till with many sedimentological characteristics exposed'. The Killiney bay heritage site is a constraint.

The other Geological Heritage Sites within the Wider Study Area are not close to any of the route options and are therefore not considered to be constraints.

Consultations will be undertaken with the Geological Survey of Ireland in relation to the Killiney bay Geological Heritage Site and any potential impacts of the proposed development on the site.

5.8.3 Key Constraints

The key constraints associated with the development of the Project within the LSA and Wider Study Area in terms of potential of soils and geology related impacts to sensitive receptors are summarised in Table 5-9.

Table 5-9 Soils and Geology Key Constraints

Key Constraints	
Constraint Type	Constraint Summary
Geological Heritage:	The Killiney Bay Geological Heritage Site is a constraint, and it is noted that all seven route options must traverse this site at their respective landfall locations.

Key Constraints	
	Consultation with the GSI will be undertaken once the preferred route has emerged and construction options for the cable route at the heritage site have been assessed to find a feasible solution to construction within or under the site.
Ground Conditions: Unknown ground conditions including soft soils and shallow groundwater:	<p>There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface.</p> <p>Ground investigation will be carried out to confirm the ground conditions along the preferred route in advance of design and construction works.</p>
Removal of soils and bedrock:	Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.
Geology and Groundwater: Changes to local hydrogeology	<p>Local hydrogeology flow paths may be altered due to excavation and construction, particularly where groundwater is at or near the ground surface.</p> <p>There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route.</p>
Contamination of soils, geology:	<p>There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA.</p> <p>All route options therefore have the same classification of Low (Green) impact.</p>

5.9 Noise and Air

5.9.1 Resources

The material sources consulted as part of this desktop study are as follows:

- Dun Laoghaire Rathdown County Development Plan 2022 – 2028;
- Review of current land use in the Dun Laoghaire Rathdown County Development Plan 2022-2028
- Review of EPA air monitoring stations at Station 34, Dun Laoghaire
- Cherrywood SDZ Local Area Plan
- Ballyogan and Environs Local Area Plan 2019-2025
- Draft Woodbrook Shanganagh-Local Area Plan-2017-2023
- Kiltiernan / Glenamuck Local Area 2013-2019 (as extended)

5.9.2 Existing Constraints

5.9.2.1 Existing Noise and Air Constraints

The LSA is predominantly divided into three land use categories. To the east and north, the area is characterised by existing built-up residential and commercial development. To the west and south, the area is characterised by upland areas which are largely undeveloped but do contain residential receptors and ribbon development. The south and east is characterised by the Cherrywood SDZ which is partially developed. Existing noise levels are likely to be typical of these developed residential and upland areas. The M50 crosses the LSA and is likely to represent an elevated noise level.

The EPA's Air Quality Index for Health (AQIH) is a number from one to ten that the current air quality in a region or at a particular station. A reading of ten means the air quality is 'very poor' and a reading of one to three inclusive means that the air quality is 'good'.

The nearest air quality station to the LSA is in Dun Laoghaire (station 34). This station monitors PM₁₀, PM_{2.5} and NO₂. Dun Laoghaire station updates every 60 minutes with the calculated Air Quality Index for Health (AQIH). As of 18 January 2022, the air quality index characterised by this station was classified as 2 – Good.

5.9.2.2 Existing Noise and Air Sensitive Receptors

An understanding of the land use constraints will inform the site selection for the Project in terms of potential noise impacts to sensitive receptors. Land use characteristics are discussed in detail in Section 5.2. A number of residential dwellings sit within the LSA along all seven cable route options, particularly from the landfall locations to the M50. For the purpose of this constraints review, a buffer of 100m (50m each side of each route option) has been applied to potential site selection locations within the LSA as shown on Figure 5-16. Each route option will traverse residential areas from their landfall locations to the Carrickmines substation. Noise sensitive receptors are shown in Table 5-10.



A review of tourism and recreation facilities within the LSA was also undertaken as described earlier. Facilities consist of several sports pitches, open space and an area used for dog walking. These facilities are shown on Figure 5-6.

The key constraints associated with the development of the Project within the LSA in terms of potential of noise and air related impacts to sensitive receptors are summarised in Table 5-10.

Table 5-10 Noise and Air Key Constraints

Key Constraints	
Constraint Type	Constraint Summary
Noise/dust impacts associated with the construction phase	<p>The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.</p> <p>In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the routes as follows:</p> <ul style="list-style-type: none"> Route option 1 contains 5 no. schools, 5 no. community facilities within 50m. Route option 2 contains 2 no. schools, 3 no. community facilities, and 1 no. healthcare facility within 50m. Route option 3 contains 3 no. community facilities and 1 no. healthcare facility within 50m. Route option 4 contains 1 no. community facility, 4 no. healthcare facilities within 50m. Route option 5 contains 3 no. schools, 5 no. healthcare facilities, 2 no. churches, 1 no. shop, 2 no. community facilities, 1 no childcare facility within 50m. Route option 6 contains 2 no schools, 8 no. shops, 3 no. pubs, no. bus stops, 2 no. health facilities, 2 no. churches, 2 no. recreational/sports areas and 3 no healthcare facilities within 50m. Route option 7 contains 2 no recreational / sports areas, 1 no. school, 1 no. church, and 3 no. healthcare facilities within 50m.
Increase in traffic construction	<p>The construction works will result in a temporary increase in construction traffic within the LSA for the duration of the works. The potential construction traffic noise and air quality impacts on the sensitive receptors will be considered further at the next stage of the evaluation process.</p>
Noise impacts associated with the operational phase	<p>As the chosen route would be underground, it is considered that noise impacts associated with the operational phase would be non-significant.</p>

6 Identification of Technical and Construction Constraints

6.1 Railways

The seven routes cross two railways/tramways: the Dublin – Rosslare Main Line, including the DART services, and the Luas light rail line. An open cut trench method across the tracks is not permitted by railway owners due to the significant risk, which could have serious consequences for railway traffic. The railway owners' preferred method is to adopt a trenchless methodology and drill below the railway. There are strict regulations^{12, 13, 14} for this alternative and Irish Rail states that “undertrack crossings constructed using trenchless techniques must have a minimum depth of 4,500mm below top of rail level to crown of pipe to ensure that appropriate clearances are maintained”¹³. In certain instances, such as if there is a risk of electromagnetic interference with the railway services, a deeper position may be required.

The Luas light rail system has separate guidelines from Irish Rail, with restrictions related to vibration and settlement¹⁵. These include, but are not limited to:

- Trigger levels 1-3 for vibration: 10mm/s, 12mm/s and 15mm/s for peak particle velocity (PPV) above 50Hz, 10mm/s for all trigger levels for PPV of 50Hz and below
 - o **Up to level 1:** Work can continue as applied
 - o **Level 1-2:** Review of techniques and propose alterations to reduce vibrations
 - o **Level 2-3:** Cease works and review techniques. Detail proposed modifications to limit vibrations to below trigger level 1
 - o **Above level 3:** As for level 2-3
- Amber and red trigger levels for settlement: 4mm and 6mm per 20m, respectively
 - o **Amber:** Maintain Luas operations with reduced speed
 - o **Red:** Halt operations until corrective measures are in place

As well as the structural considerations above crossing of both the Irish Rail and Luas light rail systems has the potential for electromagnetic interference. A high-level assessment of this will be considered as part of the technical assessment of each route.

6.2 Roads

There are several major road crossings included in the seven cable route options. For the N11 and M50 crossings, a trenchless solution is the favourable option, as traffic cannot be re- routed for the duration of a traditional open cut trench installation.

For larger roads, trenchless crossings are the favourable option as disruption to traffic is to be minimised, however, open cut trench techniques may be considered.

¹² Irish Rail, “CCE-TRK-SPN-010 Specification for Movement Monitoring of Railway Track,” 2011.

¹³ Irish Rail, “CCE-TMS-344 Requirements for Undertrack Crossings and Pressure Pipelines 2013.

¹⁴ Irish Rail, “CCE-TMS-310 Guidance on Third Party Works,” 2018.

¹⁵ TII, “Code of engineering practice for works on, near, or adjacent the Luas light rail system,” 2016.

Guidelines from Transport Infrastructure Ireland (TII) state that when trenchless installations take place beneath a motorway or national road “no heave or settlement should be allowable”¹⁶. However, should this be considered too onerous, values of acceptable limits may be suggested by the designer for approval by TII. Acceptable limits for regional roads and smaller roads must also be approved.

6.3 Joint Bay Placement and Locations

Based on typical lengths of cable available and likely transport and installation constraints it is estimated that joint bays will be required approximately every 500-600m. The suggested joint bay size will be 8m long and 2m deep. The transition joint bay size, at the offshore / onshore cable interface, is anticipated to be specified to be 10 long by 3m wide (pending confirmation from EirGrid).

The joint bay width will depend on a number of electrical circuits on the cable route. At the time of writing, there are two circuit options (Single and Double). A double circuit is being assumed in this assessment.

These widths are indicative only and should be refined at the detailed design stage. These widths will likely be increased for the joint bays at trenchless crossings but will be refined following confirmation of final layout.

The joint bay options overview map is shown below and this was used in the technical assessment.

¹⁶ TII, “Notes for Guidance on the Specification for Road Works Series NG 2800 - Trenchless Installation of Road Drainage and Service Ducts,” 2009.

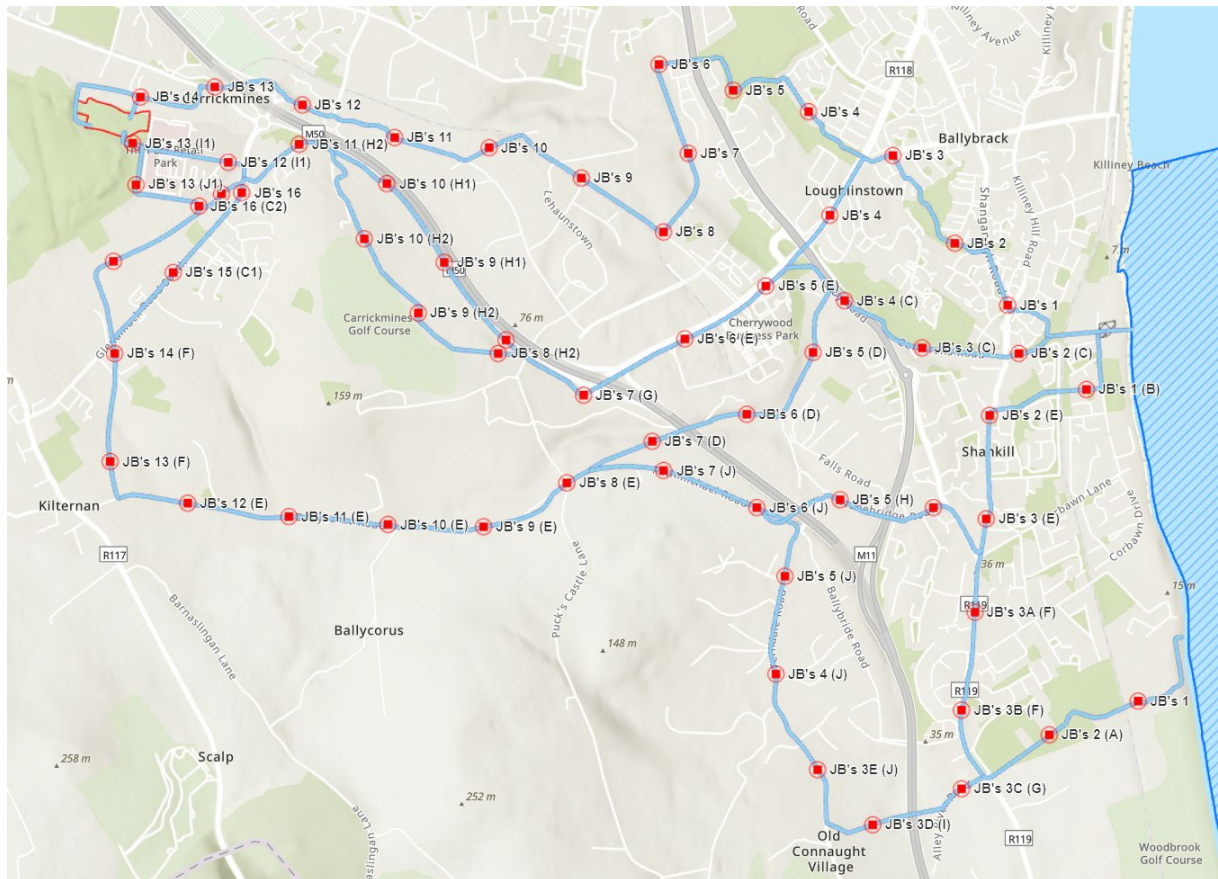


Figure 6-1 Proposed Joint Bay Locations for all 7 routes

The anticipated number of joint bays per cable route option are listed in the Table below:

Route Option	Number of Joint Bays
1	14
2	18
3	17
4	17
5	21
6	23
7	22

The cable joint bay mapping has been completed as a preliminary exercise in order to assist in understanding the likely number of joint bays and their locations along each of the cable routes. The location and size of the joint bays are likely to be amended at the detailed design stage, however, the current information provides a good indication of the number and approximate location. This information will be used to carry out an assessment of each route.

7 Summary of Project Consultations

In identifying prospective cable route options, the project team engaged in a range of consultation activities with various site owners across private and public landowners.

It is the intention of the Project Team to engage in the public consultation process upon clear understanding and full assessment of the routes from this report.

The purpose of the public consultation process will be to provide the following to the public and interested parties:

- Understand the key characteristics of the route areas which have guided the identifications of the options;
- Gain an awareness of the key differentiating criteria when comparing the short- listed options;
- Provide an opportunity to identify any further considerations when considering the identification of the Emerging Preferred Route;
- To provide a method of participation into the planning stage design and environmental assessment processes in advance of the preparation of a development consent application.

As DLRCC are a key stakeholder across all seven routes, early engagement was sought with the relevant departments. Information gathered from these meetings informed a greater understanding of complex sections of some of the cable route options. Key points are summarised below.

Meeting 14th April 2022 – Wind Farm Onshore Grid Connection Routes

A meeting between the Dublin Array and Codling Wind Park project teams and Dún Laoghaire Rathdown Co Council (DLRCC) held on the 14th April 2022. A number of discussion points were covered in this meeting and are outlined below:

- Routes from Shanganagh Park were highlighted as more complex considering development plans in the area.
- List of DLRCC plans highlighted to the project team:
 - Parks Masterplan Phase 1 at Shanganagh Park to be considered
 - Kilternan and Ballyogan Local Area Plans to be considered
 - Carrickmines developments to be considered
- It was proposed for a number of reasons that having the two circuits running side by side would be beneficial from a construction management and disruption minimisation perspective. the DLR Parks Department. noted that it would be beneficial to have one TJB location to prevent causing disruption to multiple areas which might occur by having the two circuits landfall at separate locations.

Cherrywood and surrounding infrastructure update from DLRCC

DLRCC noted that it was advised previously that planning was progressing at pace and significant road infrastructure has been built since initial discussions in 2018. Updates on the construction of these road networks were provided by DLRCC. DLRCC suggested a tri-partite meeting with TII to discuss the R118 route further.

Beckett Road

DLRCC highlighted that the Beckett Road construction may allow an opportunity for alignment with this project. This planning application was anticipated to be lodged in the coming weeks. One section of the Cherrywood Beckett Road section near Jackson's Way is not advancing as quickly. No movement on planning for this at this point. Link under Wyattville should hopefully secure planning in coming months.

There is a live planning application in Cherrywood and this is progressing – Ref DZ21A/1017.¹⁷

Bridge over M50 timeline/ Kilternan link

DLRCC identified that the Kilternan Link Road is at the early stages of development and should be considered in the route assessment process.

Meeting held on the 13th October 2022 – Tripartite meeting with TII & DLRCC

- DLRCC's concern is to ensure the unimpeded availability of development lands in the south west of the constituency i.e. the southern cable route options could potentially restrict future development plans, particularly south of Ferndale road & Rathmichael Road (relevant to cable routes 5, 6 & 7).
- The proposed Glenamuck District Distributor Road (GDDR) was identified as a potential opportunity to situate the cable route joining via Ballycorus Road (relevant to cable routes 4 & 5).
- DLRCC confirmed the M50 extension (3rd lane) to the west of junction 15 and 16 forms part of the adopted County Development Plan 2022-28. The existence of the Gas Networks Ireland (GNI) high-pressure transmission gas pipeline presents a technical risk for option b along routes 2 and 3 and limits the potential of a cable running close to the M50 road carriage, as a separation distance is required from transmission infrastructure.
- It was noted that considerable development was occurring within Cherrywood at pace, with delivery timelines and visibility of design limiting options for cable route 1.

¹⁷ Reference to the Beckett road since granted 11th November 2022
(<https://planning.agileapplications.ie/dunlaoghaire/application-details/91425>)

8 Criteria for Identifying the Best Performing Route Option

The Dublin Array team have identified 7 potential underground cable route options and have consulted with various parties (Section 7). The approach taken facilitated engagement and consultation with stakeholders and the public which helps to explore route options fully and informed decisions. As part of the approach, a comprehensive and consistent multi criteria analysis is applied to the decision making. The multi- criteria analysis facilitates a balanced consideration of the following key assessment criteria relating to the Dublin Array onshore route selection process:

- Technical performance;
- Economic performance;
- Environmental Performance; and
- Socio- economic performance

8.1.1 Cable Route Appraisal

To inform the cable route selection report, Dublin Array prepared a Cable Route Appraisal.

The cable route appraisal comprised a detailed desktop study and site walkovers, to determine the optimum cable route, from a technical and environmental perspective. The constraints and potential impacts of the various routes and routes combinations were compared in the assessment.

All potential cable routes were assessed against number of criteria to firstly determine which options were preferred.

The assessment criteria were as follows and described in more detail below:

- **Technical¹⁸:**
 - Construction disruption;
 - Joint Bay Location suitability;
 - Constructability; and
 - Utility interference and congestion in existing routes
- **Environment¹⁹:**
 - Biodiversity;
 - Soil and Water;
 - Planning Policy and Land Use;
 - Landscape and Visual; and
 - Archaeology, Architectural Heritage and Cultural Heritage
- **Socio- economic:**
 - Population, Land Use and Communities
 - Recreation and Tourism
- **Economic:**
 - Length of installed cable; and
 - Number of construction joint bays (CJBs)

¹⁸ Assessment is supported by the technical assessment carried out by Mott Macdonald. Please see report in Appendix 02.

¹⁹ Environmental and Socio-economic assessment carried out by SLR and included in this assessment

The assessment criteria are explained in further detail in the next sections.

8.2 Technical Criteria

8.2.1 Construction disruption

This criterion is in place to identify and assess the differences in traffic management requirements between routes during the installation phase. It is anticipated that road and lane closures will be required where the existing road does not have sufficient width to accommodate both live traffic and the construction works associated with the cable installation. An assessment will be undertaken for each route to determine the extent of the traffic management, road closures and to consider the potential challenges faced around critical access points. This assessment criterion can be broken into 2 areas of assessment as outlined below:

1. Assess the extent of the anticipated construction works along any given section road / including the temporary traffic management requirements, temporary works and potential road closures on each route
2. Assess the high-level extent of disruption to residents. Identify the critical services along the immediate vicinity of the cable route in terms of:
 - RA - Residential Access
 - CAP - Critical Access Points
 - VA - Vulnerable Access- local health care, care homes
 - Critical assess points- hospitals, nursing home, schools, vulnerable/ sensitive land use

8.2.2 Joint Bay Location Suitability

The Eirgrid functional specifications²⁰ has been followed for the assessment of the suitability of the joint bay locations along each of the seven routes. The criteria will include the selection of joint bays, link boxes and C2 Communication Chambers. Indicative spacings of 500-650m between joint bay locations along each route has been adopted.

The high-level assessment of each route considers:

- Whether the joint bay locations are routed in public roads as per the Eirgrid specification;
- Joint bays, link boxes and C2 chambers are to be kept clear of public access points e.g. vehicle entrances, driveways etc.;
- Whether there is adequate room provided for each proposed joint bay location to accommodate maintenance vehicles or if road upgrade projects are required; and
- The number of joint bays to be installed along each route, thereby adding to the technical complexity of the route.

²⁰ Eirgrid, CDS-GFS-00-001-R1: 110kV, 220kV and 400kV Underground Cable Functional Specification

8.2.3 Constructability

The exact technical delivery solution for all of these routes will be confirmed through further studies and detailed design. For this assessment two 220 kV cable circuits, each circuit consist of 3 x single phase cable either 2000mm² or 2500mm², 6 x HV cables in total. A crossing is defined as the point at which the cable route must traverse an obstruction such as a railway, waterway, motorway or major road.

A high- level assessment of the crossings has been undertaken and these have been categorized into minor and major crossings. The major crossings above that will necessitate a trenchless solution and potentially deep excavations will have an impact on the overall circuit transmissible power and will likely be more challenging to construct. The number of crossings is therefore a primary consideration in this assessment.

The categories for the crossings are summarised in Table 8-1 below. The crossings and interaction with the existing utilities are addressed in the next section.

Table 8-1: Crossing Categories and Solution Descriptions

Crossing category	Challenge Description	Solution Description
Minor Crossing	Shallow land obstacle such as utilities, road drainage ducts, telecoms. Shallow water crossings such as small streams, roadside water ditch.	Typical trench or open cut solution.
Major Crossing	Large land obstacles or large water crossings.	Solutions will depend on ground conditions and impact to surrounding environment. Examples are Horizontal Direction Drilling, Auger Bore or micro tunnels solutions. Cable bridges, cable culverts or micro tunnels.

8.2.4 Utility congestion and interference in existing routes

Utilities provide a range of services that communities and people rely upon. There are many distinct types of utility infrastructure which may be located overhead (such as electricity or telephone lines) or underground such as water services, sewers, gas, fibre optic cables and electricity cables).

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure. The location of utility services was sought through engagement with relevant service providers where possible. This was to ensure accurate and up to date information was used and to be aware of any potential future developments during the project development timeline.

The assessment of this criterion will consider:

- Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: currently compiling utilities data, high level look at this stage). This could impact to lay a double or single circuit along certain sections of the cable routes.
 - Electricity
 - Water
 - Gas
 - Telecoms
- Utility Interference: While there may be physical space to install the proposed infrastructure, the proximity to other utilities could cause a negative interaction and yield unacceptable results. Prior to detailed design on the preferred route(s) a high-level assessment will be carried out on each route considering the below:
 - Luas line electrical interference
 - Gas transmissions pipelines induced voltages
 - ESB utilities de-rating impacts
 - Irish Rail
 - Irish Water

8.3 Environmental Performance

The criteria assessment areas considered to assist with determining Emerging Best Performing Option are as follows:

- **Biodiversity (Flora and Fauna);**
Assessment of the potential impacts on the protected sites for nature conservation, habitats and protected species.
- **Landscape and Visual:**
Assessment of landscape constraints and designations and potential impact on visual amenity.
- **Archaeology, Architectural Heritage, and Cultural Heritage:**
Assessment of the potential impacts on archaeology, architecture and cultural heritage resources.
- **Water and Flood Risk:**
Assessment of the potential impacts on water resources and flood risk.
- **Soils and Geology:**
Assessment of the potential impacts on soils, geology and hydrogeology within the project study area.
- **Noise and Air:**
Potential for nuisance impacts of the cable transition joint chambers taking into account sensitive receptors.

8.4 Socio- economic Performance

Socio- economic performance sub-criteria are:

- **Population, Land use and Communities**

Assessment of the potential impact on population, land-use and sensitive receptors in the project study area; and

- **Recreation and Tourism**

Potential impact on recreational activities and tourism that are not included in other sub criteria.

8.5 Economic Performance

The overall equipment, construction and traffic management required across the routes are relatively similar, therefore the following have been the most economic distinguishing factors for these routes:

- Length of installed cable (km); and
- Quantity of Construction Joint Bays.

The economic evaluation involved counting the occurrences of each type of crossing solution for each of the seven route options. The crossings were matched to a solution type in Table 8-1.

8.6 Scale used to Assess Performance

The effect on each criteria parameter is presented in the following performance matrix, along with a range from “more significant”/”more difficult” / “more risk” to “less significant” / “less difficult” / “less risk”. The following scale is used to illustrate each criteria parameter:

(Dark Blue) High	(Blue) Moderate - High	Moderate (Dark Green) impact.	Low (Green) impact.	Negligible impact. (Cream)
More significant / difficult/risk			Less significant / difficult	

In this text the scale is quantified by text for example high impact (Dark Blue). Moderate-high impact (Blue) mid-level moderate (Dark Green) impact, low-moderate (Green) impact or low impact (Cream).

The scale is based on the potential significant effects associated with each Criteria assessed. The identification and assessment of potential significant effects is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements where possible and professional judgement to determine the significance

of environmental impacts associated with a proposed project. Impacts have been identified by environmental and social assessment practitioners, from both desk based and site visit data.

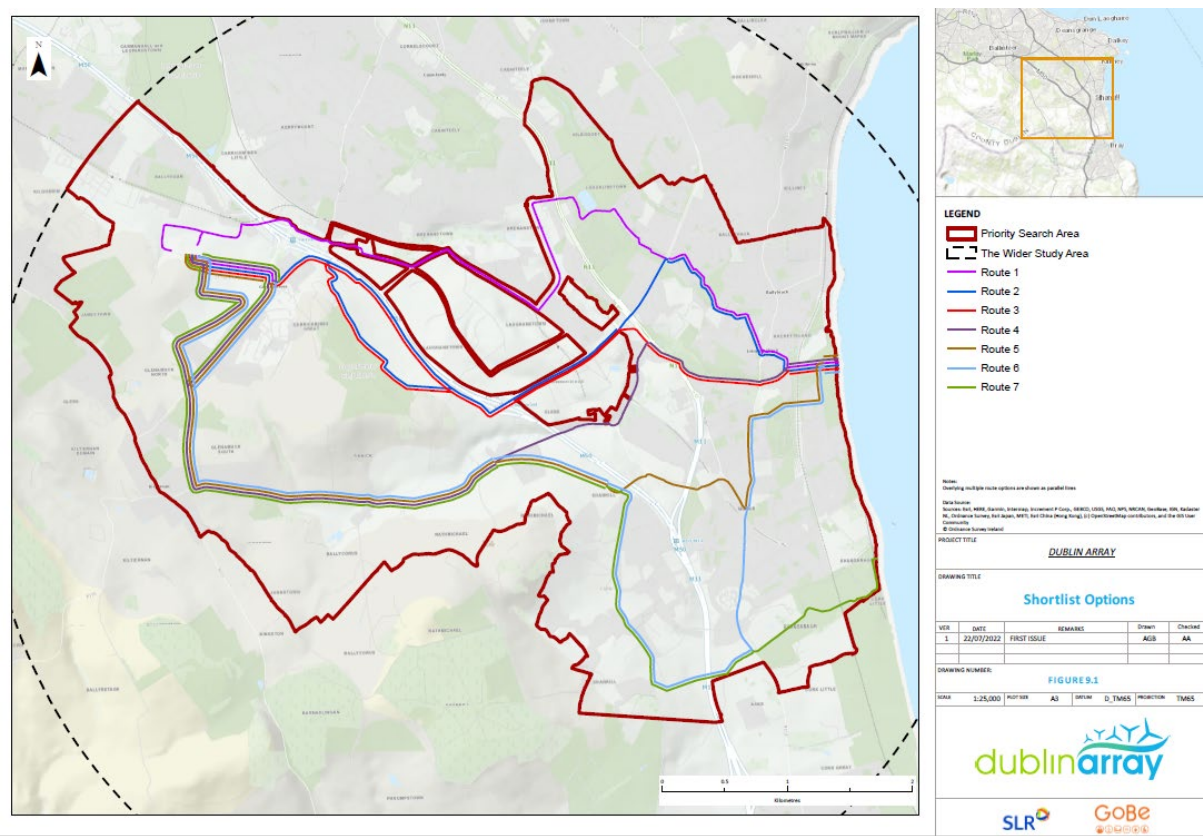


Figure 8-1 Shortlist Options

9 Evaluation of Onshore Cable Routes

9.1 Option 1

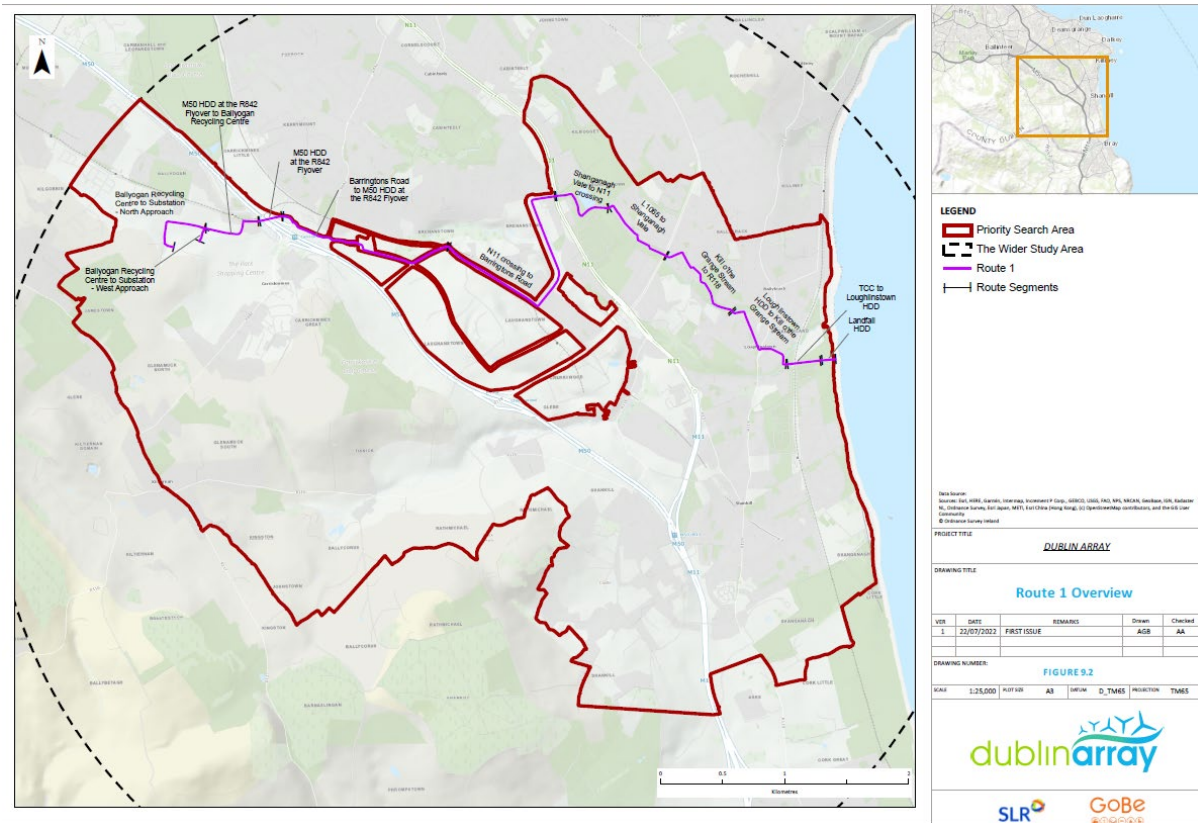


Figure 9-2 Route 1 Overview

Route Option 1 will be assessed in detail against each of the performance criteria outlined in Section 8.

9.1.1 Technical Performance

As set out in Section 8.2, the technical performance areas under consideration to assist with determining the best route option are as follow:

1. Construction disruption
2. Joint Bay Location Suitability
3. Constructability (major and minor crossings)
4. Congestion and utility interference

9.1.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes in order to accommodate simultaneous traffic movement and construction works associated with the HV cable circuit. This criterion assesses the extent of the anticipated construction works along any given section of road / including the temporary traffic management requirements and temporary works.

In Route Option 1, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management including Stop & Go and temporary traffic lights. It is not anticipated that any complete road closure is required, however should there be a requirement for a temporary road closure the necessary permissions and road diversions for all traffic vehicles will be implemented.

Approximately half of the cable route is through public parks or private lands and will therefore avoid street work type traffic management set ups and disruption. It is not anticipated that a full road closure along any part of cable route option 1 is required.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will be installed with the aim to minimise disruption in as far as possible.

Based on the high- level assessment of temporary Traffic Management requirements anticipated for this route, it has been assigned a Low-Moderate impact (Green).

Moderate-Low (Green)

Public access assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route. However, the figure is comparably low compared with the other 6 route options as >50% of the cable route is through public parks or private lands. This route has therefore been assigned a Moderate-Low impact (Green). Public access to the LUAS line will not be disrupted by the construction works.

Moderate - Low (Green)

9.1.1.2 Construction Joint Bay location suitability

There are a total of 28 cable joint bays at 14 separate locations along route option 1.

The cable joint bay will be accurately located along the cable route length during the detailed design phase.

The suitability of individual cable joint bay locations will be determined upon assessment of the following criteria.

1. Maximum liner distance between cable joint bays
2. Feasible to install a cable joint bay in the road rather than in private land
3. Feasible to install a cable joint bay without further requirement for road improvements/widening
4. Feasible to install a cable joint bay without requirement to divert existing buried services that are causing an obstruction.
5. Feasible to install a cable joint bay that provides access for maintenance vehicles

From a high level assessment, 10 of the 14 joint bay locations do not require any road improvement/widening.

8 of the 14 joint bays are anticipated to be situated in public roads.

Based on this high level assessment route option 1 has been assigned Moderate-Low Impact (Green).

Moderate-Low (Green)

9.1.1.3 Constructability (Ease of Construction)

As outlined in Section 8.2.3, the main assessment here is the number of major crossings per route. The major crossings above that will necessitate trenchless crossing technology will have an impact on the overall circuit transmissible power and present specific challenging construction risk and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.1.1.4 below.

There are four locations which have been identified as potentially major crossing points of a total of 10 trenchless crossings. These include crossings beneath the DART, Wyattville Rd M50, Ballyogan Road and other minor inland streams. While these are major crossings, they are anticipated to be less challenging than the crossings along Routes 2,3,4 and 5. Comparatively, Route 1 has a much higher number of total crossings compared with routes 5,6 &7.

Based on this high- level assessment of the major crossings points along Route 1, this route has been assigned a score of Moderate- High (Light Blue).

Moderate - High (Light Blue)

9.1.1.4 Utility congestion and interference

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

The assessment of Option 1, based on the mapping provided by utility owners, has found that it crosses existing electricity cables (at least five times), existing medium pressure gas (at least 4 times), a large number of existing water network supplies and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed cable infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route at detailed design.

All 7 routes cross the Irish Rail DART line. A detailed under track crossing (UTX) assessment has been carried out and Irish Rail Engineering have issued a technical approval to cross underneath the DART Line with the cable circuits. Along Route Option 1, there are several other locations which cross and run parallel to existing medium and high voltage cables which would require analysis and potential mitigation against de-rating effects. There is a 700m section of the route considered a high risk due to it running parallel to the cable infrastructure associated with the LUAS tram line. This poses a significant interference risk. Initial engagement with Transport Infrastructure Ireland indicated a material impact to the project programme to identify an adequate mitigation strategy. Also along Route Option 1, there are potential interferences with existing cast iron water pipes at Shanganagh and Wyattville Roads to be considered.

Given the number and types of utility interfaces and potential interferences along Route Option 1, this route has been assigned a score of High impact (Dark Blue) due to the interface with the LUAS tram line existing electrical and signal cable infrastructure.

High (Dark Blue)

Combined Technical Performance scores:

Table 9-1 Summary of Technical Assessment for Route Option 1

Route Option	1
Construction Disruption -Traffic	
Construction Disruption-Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.1.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 1 traverses treelines in six places, with at least three of these areas having bat roosting potential. Habitat that could potentially support badger was identified where the route crosses from agricultural grassland to the Carrickmines Luas Park & Ride through an embankment supporting a dense treeline. The route option crosses one small section each of broadleaved woodland and dry meadows & grassy verges. One area of scrub where the route traverses to the west of Bray Road and an area of spoil & bare ground to the north-west of Tullyvale comprises a high density of the invasive butterfly bush *Buddleia davidii*. This is considered a high impact species. Route option 1 is considered to have moderate ecological impact (**Dark Green**).

(b) Landscape and Visual

While the western end of Route option 1 traverses an area zoned as a High Amenity Area, it would be largely routed along an existing road within this area and through grassed areas, which can be fully reinstated from a landscape perspective. No other sections of High Amenity Area zoning would be crossed.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

As a result, Route option 1 is considered to have potential low (**Green**) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 1 would require archaeological investigations in order to establish the significance of assets which the cable trench would truncate. This cable route passes through the Zones of Notification for an Enclosure (DU02369) a watermill (DU02370) and a portal tomb (DU02279) but will pass through the linear earthwork (Pale Ditch DU02401). Of particular concern is the Pale Ditch which would be physically truncated by one of the route entry options; however the second option proposes to sit within existing road infrastructure. Other archaeology in the area is in close proximity to this route option but is not affected directly by it.

Route option 1 is considered to have a low (**Green**) impact.

(d) Water Resources and Flooding

Route option 1 crosses watercourses a total of nine times and runs parallel to existing watercourses within Loughlinstown and Carrickmines in proximity to the substation, approximately 25% of its entire length. Route option 1 does not cross any of the flood relief schemes such as Kill-o-the-Grange flood attenuation areas. Route option 1 runs parallel to the indicative path of the proposed culvert²¹ for the Deansgrange Stream and within a proposed attenuation pond north of the R118 at the northern extent of Kilbogget Park and an attenuation pond located in an open green space c. 400m south of the R118 which are immediately downstream of the Kill-o-the-Grange flood attenuation area.

Potential construction effects include the potential of flooding at open trenches in combination with AEP 1:1000 events which may cause downstream siltation from runoff and a displaced flood

²¹ Construction is anticipated to be completed by 2023, however, several iterations of this scheme have been proposed since 2014 and there is no data available confirming if this project is close to delivery or has been delayed. Date Accessed: 9/11/2022. [https://www.dlrco.ie/sites/default/files/atoms/files/19110-jbb-00-xx-pp-c-00336_pcd_1_presentation_p05.pdf]

risk whereby construction works would flood rather than displace water into adjacent properties. Cumulative impacts of construction phases would also need to be carefully considered if this route is chosen as the preferred route option. The risk of flooding and CFRAM impacts on this route option during construction however remains significant and is considered to have a (Blue) impact.

(e) Soil, Geology and Hydrogeology

Route option 1 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints identified. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 1 is considered to have a low (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 1 contains 5 no. schools, 5 no. community facilities within 50m. There is a risk here for the schools regarding disturbance for noise, however with adequate mitigation, significant effects aren't expected. Route option 1 is considered to have moderate-high (Blue) impact.

9.1.2.1 Combined Environmental Performance

Route option 1	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental							

9.1.3 Socio- Economic Performance

A number of sensitive residential and commercial receptors are proximate to this route option, particularly in the Ballybrack area. However, limited impact to land use is foreseen and significantly

less constraints with respect to proximate planned development and existing utilities. Therefore, this route option is considered to have a low (Green) impact.

With respect to planning applications, Route option 1 is in proximity to 4 no. large scale planning applications and is therefore considered to have a moderate (Dark Green) impact.

With respect to land use patterns, Route option 1 is considered to have a low (Green) impact due to it being one of the route option least likely to affect a significant number of land use types.

With respect to utilities, Route option 1 is proximate to a number of overhead utility lines low (Green) impact. but has the strongest potential to impact multiple transportation uses which is considered to be a high (Dark Blue) impact. The overall classification for Route option 1 is considered to be a moderate-high (Blue) impact when utilities (Green) and transportation (Dark Blue) risks are factored in.

(a) Recreation and Tourism

A number of sensitive recreation and tourism receptors proximate to this route option, particularly in the Ballybrack area. option 1 contains 5 no. schools, 5 no. community facilities as well as 1 no. dog walking facility within 50m. For the purposes of recreation and tourism and with adequate mitigation measures, Route option 1 is considered to have moderate-high (Dark Green) impact due to the large number of sensitive receptors in proximity.

9.1.3.1 Combined Socio-economic Performance

Route option 1						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.1.3.2 Combined Environmental and Socio-economic Performance for Route Option 1

Overall Performance	Route option 1
Environmental	
Socio-Economic	
Overall Performance	

9.1.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.1.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. For Route 1, the length is estimated at 7.7km. This is one of three routes that is less than 8km in length (also routes 2 and 3) and considered the lower economic impact that the other longer routes (4,5,6 and 7).

For this reason, Route Option 1 has been assigned an impact score of Low (Cream).

(Cream) Low

9.1.4.2 Quantity of Joint Bays

This assessment found that Route Option 1 has the least number of Joint bays along the route and has been assigned a score of Low (Cream).

(Cream) Low

9.1.5 Summary of Option 1 Assessment

Table 9-2 Assessment Summary for Route Option 1

Option no.	Technical Score	Environmental & Socio-economic score	Economic	Combined Score
1				

Route Option 1 has performed relatively well with an overall moderate-low impact across the set criteria, meaning it could be considered in the Emerging Cable Route. The key risk identified is the 700m section of the route running linear to the LUAS line which presents technical challenges. Engagement with DLRCC has further indicated that the development within Cherrywood SDZ is progressing at a greater pace than the timeline of this project, reducing the opportunity for location within Cherrywood. This effects a considerable length of route 1 and must be considered in the final decision of identifying an emerging preferred route.

9.2 Option 2

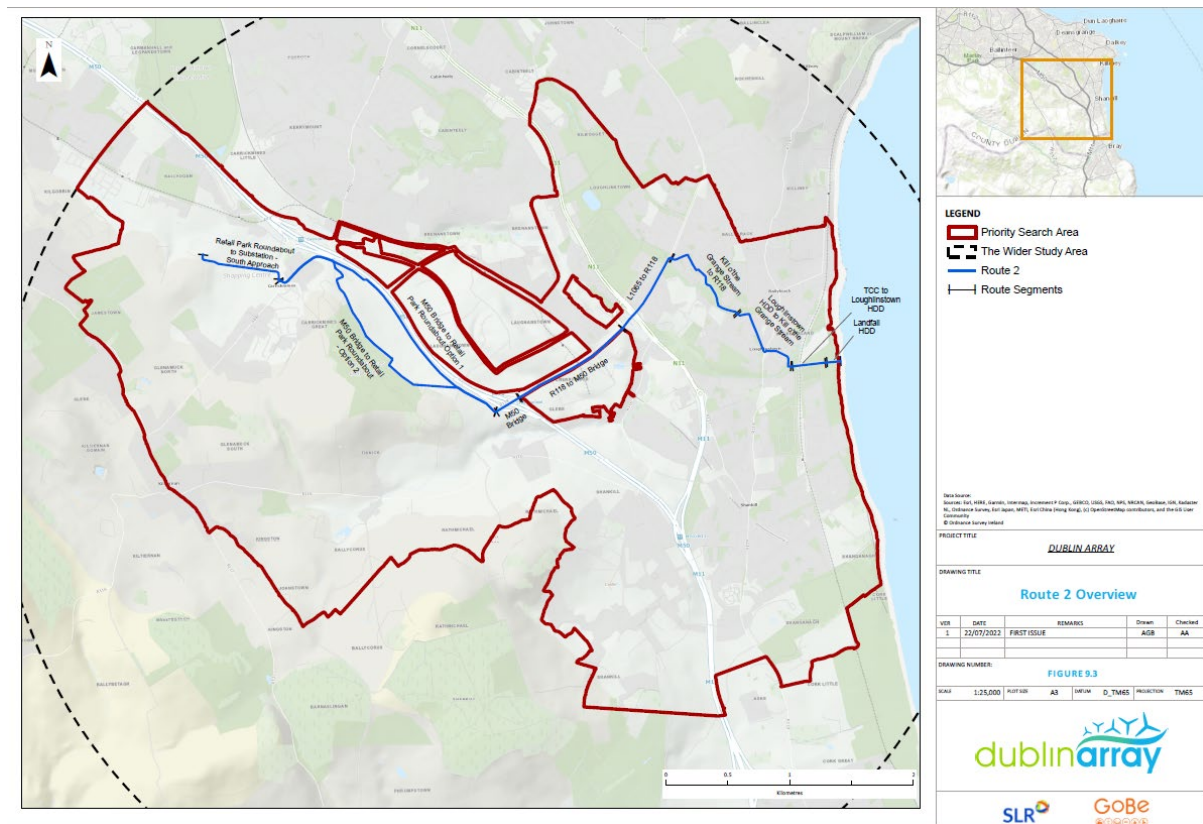


Figure 9-3 Route option 2 Overview

Route Option 2 will be assessed in detail against each of the performance criteria outlined in Section 8.

9.2.1 Technical Performance

As set out in Section 8.2, the technical performance areas under consideration to assist with determining the best route option are as follow:

1. Construction disruption (installation phase)
2. Joint Bay Location Suitability
3. Constructability (major and minor crossings)
4. Utility congestion and utility interference

9.2.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes to accommodate vehicle traffic and the construction works associated with the HV cable circuit. This

criterion assesses the extent of the anticipated construction works along any given section of road including the temporary traffic management requirements and temporary works.

In Route Option 2, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management included 'Stop & Go' type temporary traffic lights. It is anticipated that a road closure will be required along Golf Lane to facilitate construction of that section of the cable route. The requirement for a temporary road closure will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Over half of the cable route is through public parks or private lands and will therefore avoid street work traffic management safe systems of work and disruption.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation, and assessments. Consultations with the local authorities will help to define where the cable trench will be installed with the aim to minimise disruption as much as possible.

Based on the high-level assessment of temporary Traffic Management requirements anticipated for this route, it has been assigned a Moderate impact (Dark Green).

Moderate (Dark Green)

Public access assessment

Based on a high-level assessment of impacts within 50m of the cable route to public accessways/vulnerable access points, there are several schools and community facilities that will be impacted by this route. This route has therefore been assigned a Moderate impact (Dark Green).

Moderate (Dark Green)

9.2.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 2, there are a total of 26 cable joint bays proposed at 13 separate locations along route option 2. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the same design principles such as minimum amount of cable joint bays, separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, 9 of the 13 of the joint bay locations do not require any major alterations or further road widening to install. 8 of the 13 of the joint bays are anticipated to be situated in public roads.

Route 2 has 5 cable joint bay locations situated on private land.

Based on this high- level assessment of the technical suitability and the number of Joint Bays along Route Option 2, this route has been assigned a Low- Moderate Impact (Green).

Low- Moderate (Green)

9.2.1.3 Constructability

As outlined in Section 8.2.3, the main assessment here is the number of major crossings per route. The major crossings above that will necessitate trenchless crossing technology will have an impact on the overall circuit transmissible power and present specific challenging construction risk and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.2.1.4 below and is not considered under 'Constructability'.

There are three trenchless crossing locations which have been identified as potentially major crossing points. These include crossings beneath the DART, N11 Bray Road and M50/Junction 16. These major crossings are among the most technically challenging along all 6 routes and are shared with Route 3. Route option 2 also has a lower total number of crossings compared with routes 1 and 3.

Based on this high- level assessment of the major crossing points along Route 2, this route has been assigned a score of High impact (Blue).

High (Blue)

9.2.1.4 Utility congestion and interference

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

The assessment of Option 2, based on the mapping provided by utility owners, has found that it crosses existing electricity cables (at least 6 times), existing medium pressure gas (at least 5 times), many existing wastewater network supplies.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A detailed under track crossing (UTX) assessment has been carried out and Irish Rail Engineering have issued a technical approval to cross underneath the DART Line with the cable circuits. Along Route Option 2, there are several other locations which cross and run parallel to existing medium & high voltage cables which would require analysis and potential mitigation against de-rating effects. There is a 1km section of route that potentially may run along the western side of the M50 which will require further optioneering, potential mitigation and cathodic protection. Along Route Option 2, there are also potential interferences with cast iron water pipes at R118, Shanganagh and Wyattville Roads to be considered.

Given the number and types of utility interfaces and potential interferences along Route Option 2, this route has been assigned a score of a Moderate impact (Dark Green).

Moderate (Dark Green)

Combined Technical Performance scores:

Table 9-3 Summary of Technical Assessment for Route Option 2

Route Option	2
Construction Disruption -Traffic	
Construction Disruption-Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.2.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 2 traverses treelines in four places, with at least two of these having bat roosting potential. A high density of invasive species including butterfly bush, winter heliotrope *Petasites fragrans*, cotoneaster spp., snow berry *Symphoricarpos albus* and cherry laurel *Prunus laurocerasus* are present curb-side of the Old Glenamuck Road at Carrickmines. Route option 2 is considered to have low ecological impact (Green).

(b) Landscape and Visual

While a section of Route option 2 traverses an area zoned as a High Amenity Area, i.e. west of the R118/M50 interchange it would be largely routed through grassed areas, which can be fully reinstated from a landscape perspective. No other sections of High Amenity Area zoning would be crossed.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Route option 2 is considered to have potential low (Green) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 2 would require archaeological assessment and potentially investigations in order to establish the significance of assets which the cable trench would truncate. In particular, this is in relation to the linear earthwork (Pale Ditch DU02401) which the cable route would physically affect by truncating the ditch. This route is considered to be low (Green) impact.

(d) Water Resources and Flooding

Route option 2 crosses eight watercourses along its length. Route option 2 also intersects the indicative path of the proposed culvert for the Deansgrange Stream, a proposed attenuation pond north of the R118 at the northern extent of Kilbogget Park and an attenuation pond located in an open green space c. 400m south of the R118 which are immediately downstream of the Kill-o-the-Grange flood attenuation area. Potential construction effects include the potential of flooding at open trenches in combination with AEP 1:1000 events which may cause downstream siltation from runoff and a displaced flood risk whereby construction works would flood rather than displace water into adjacent properties. Route option 2 also follows a watercourse in Loughlinstown briefly before breaking away. It is largely untouched by watercourses from the R118 to the Carrickmines substation. However, Route option 2 does not cross any of the flood relief schemes such as Kill-o-the-Grange flood attenuation areas. This route option therefore is considered to have a moderate (Dark Green) impact.

(e) Soil, Geology and Hydrogeology

Route option 2 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 2 is considered to have a low (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 2 contains 2 no. schools, 3 no. community facilities, and 1 no. healthcare facility within 50m. Route option 2 is considered to have a moderate-high (Blue) impact.

9.2.2.2 Combined Environmental Performance

Route option 2	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental							

9.2.3 Socio- Economic Performance

(a) Population Land use and Communities

A number of sensitive residential and commercial receptors are proximate to this route option. However, limited impact to land use is foreseen. Therefore, Route option 2 is considered to have a low (Green) impact.

With respect to planning applications, Route option 2 is in proximity to 4 no. large scale planning applications and is considered to have a moderate (Dark Green) impact.

With respect to land use patterns, Route option 2 is considered to have a low (Green) impact due to it being one of the route least likely to affect a significant number of land use types.

With respect to utilities, Route option 2 is proximate to overhead utility lines low (Green) impact. but has a strong potential to impact multiple transportation uses (Blue) and therefore is considered to have an overall moderate (Dark Green) impact when utilities (Green) and transportation (Blue) risks are factored in.

(b) Recreation and Tourism

Route option 2 has a number of sensitive residential and commercial receptors proximate to route. Route 2 contains 2 no. schools, 3 no. community facilities, and 1 no. healthcare facility within 50m. However, there are fewer receptors than other route options. Therefore, Route option 2 is considered to have a low (Green) impact.

9.2.3.1 Combined socio-economic Performance

Route option 2						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.2.4 Combined Environmental & Socio-economic Performance

Overall Performance	Route option 2
Environmental	
Socio-Economic	
Overall Performance	

9.2.5 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.2.5.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. The length of this route is one of the shortest. This is one of three routes that is less than 8km in length (also routes 2 and 3) and considered the lower economic impact that the other longer routes (4,5,6 and 7).

For this reason, Route Option 2 has been assigned an impact score of Low (Cream).

(Cream) Low

9.2.5.2 Quantity of Joint Bays

This assessment found that Route Option 2 has the second least number of Joint bays along the route and has been assigned a score of Low- Moderate impact (Green).

Low- Moderate (Green) impact.

9.2.6 Summary of Option 2 Assessment

Table 9-4 Assessment Summary for Route Option 2

Option no.	Technical	Environmental & Socio-economic	Economic	Combined Performance
2				

Route Option 2 has performed relatively well with an overall moderate-low impact across the set criteria. Route Option 2 can be considered in the Emerging Cable Route.

9.3 Option 3

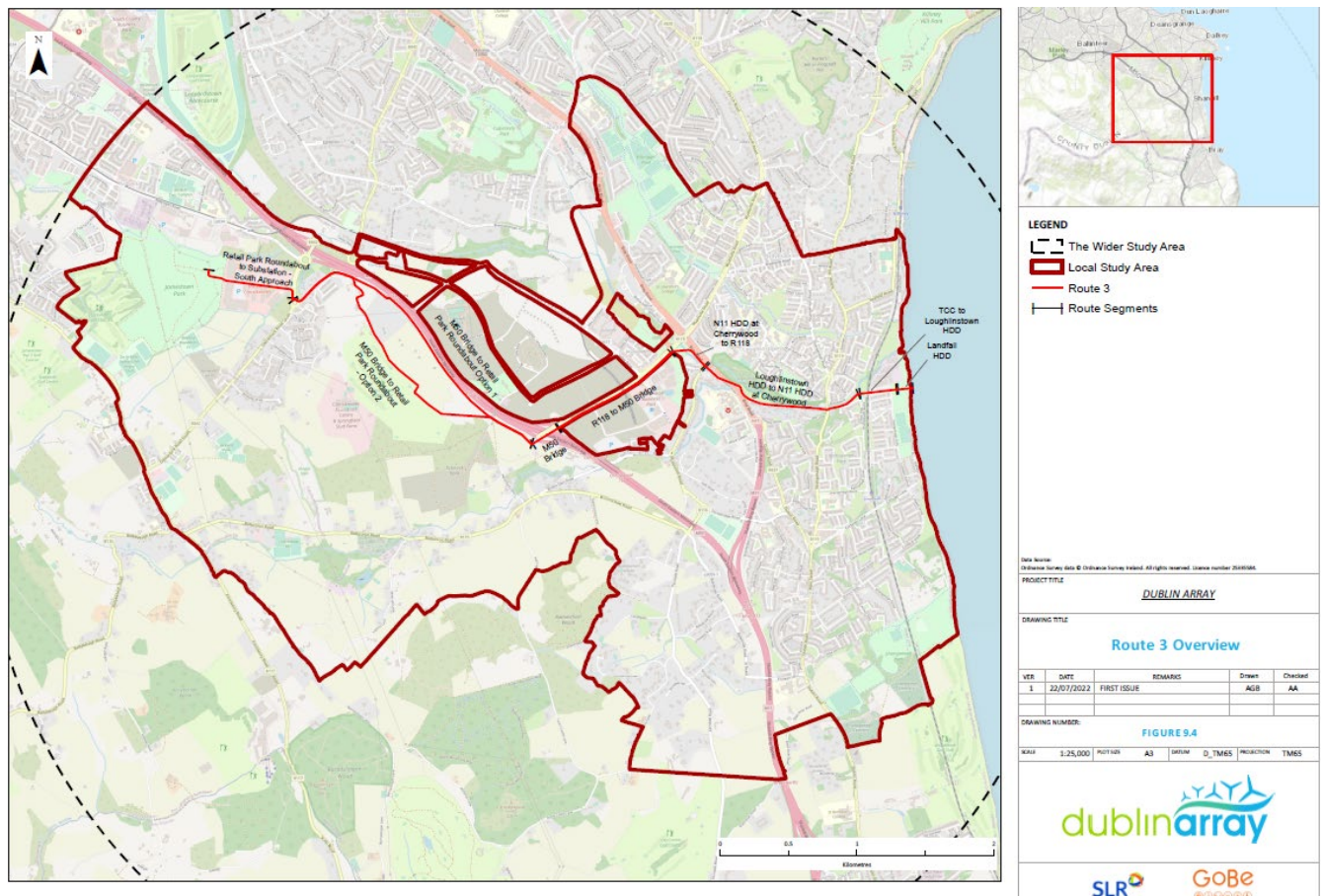


Figure 9-4 Route option 3 Overview

Route Option 3 will be assessed in detail against each of the performance criteria outlined in Section 8.

9.3.1 Technical Performance

1. Construction disruption (installation phase)
2. Joint Bay Location Suitability
3. Constructability (major and minor crossings)
4. Utility Congestion and Utility Interference

9.3.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes to accommodate vehicle traffic and the construction works associated with the HV cable circuit. This criterion assesses the extent of the anticipated construction works along any given section of road / including the temporary traffic management requirements and temporary works.

In Route Option 3, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management including 'Stop & Go' type temporary traffic lights. It is anticipated that a road closure is required along Golf Lane to facilitate construction of that section of the cable route. The requirement for a temporary road closure will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Over half of the cable route is through public parks or private lands and will therefore avoid street work type traffic management set ups and disruption. A full road closure is anticipated along the planned cable route, this road closure would be required on Commons Road for the duration of the trench excavation, duct installation and road reinstatement.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will go in the road to minimise disruption.

Based on the high- level assessment of temporary Traffic Management anticipated to be required for this route, this route has been assigned a Moderate High (Light Blue).

Moderate – High (Blue)

Public access assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route. Cable Route Option 3 reduces access to a greater number of commercial and residential areas than routes 1 & 2. This route has therefore been assigned a Moderate impact (Dark Green).

Moderate (Dark Green)

9.3.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 3, there are a total of 26 cable joint bays proposed at 13 separate locations along route option 3. This is a similar number of joint bays to route options 1,2 & 4. Route options 5,6 & 7 require a greater number. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the same design principles such as minimum amount of cable joint bays, separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, 9 of the 13 of the joint bay locations do not require any major alterations or further road widening to install. 7 of the 13 of the joint bays are anticipated to be situated in public roads.

Route 3 has 4 cable joint bay locations situated on private land. Currently Commons Road would require a minimum of 1 and maximum of 2 cable joint bays. Commons road has been identified as a major pinch point.

Commons Road is a heavily congested section of the route, with a large 1050mm diameter combined sewer, 6" cast iron distribution potable main, 225mm diameter concrete foul and surface water pipes running the length of the road. Given the narrow width of the road it will be challenging to install the proposed double circuit 220kV cables in this area.

Based on this high- level assessment of the technical suitability and the number of Joint Bays along Route Option 3, this route has been assigned a High impact (Dark Blue).

High (Dark Blue)

9.3.1.3 Constructability

As outlined in Section 8.2.3, the main assessment here is the number of the major crossings per route. The major crossings above that will necessitate deep HDD excavations will have an impact on the overall circuit transmissible power and will likely be more challenging to construct and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.3.1.4 below.

There are four locations which have been identified as potentially major crossing points. These include crossings through the DART Railway line, Commons Road, N11/ Bray Road and M50/ Junction 16. Along with Routes 2 and 5, these are anticipated to include the most technically challenging crossings in comparison to the other routes.

Based on this high- level assessment of the major crossing points along Route 3, this route has been assigned a score of High (Dark Blue).

High (Dark Blue)**9.3.1.4 Utility congestion and interference**

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

As per the other routes, the assessment of Option 3, based on the mapping provided by utility owners, has found that the route crosses a several existing LV and MV electricity cables, existing medium pressure gas distribution pipes, several existing water network supplies, and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

An assessment of Commons road has concluded that a double circuit cannot be accommodated along the length from Clifton Park to the N11 Bray Road junction. The existing utilities, including a large water main, eliminates any capacity for a double circuit. There is potentially capacity to run a single 220kV circuit beneath Commons road and run the second circuit via River Close (along route option 2).

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A detailed under track crossing (UTX) assessment has been carried out and Irish Rail Engineering have issued a technical approval to cross underneath the DART Line with the cable circuits. Along Route Option 2, there are several other locations which cross and run parallel to existing medium & high voltage cables which would require analysis and potential mitigation against de- rating effects. There is a 1km section of route that potentially may run along the western side of the M50 which will require further optioneering, potential mitigation and cathodic protection. Along Route Option 3, there are also potential interferences with cast iron water pipes on Commons Roads to be considered.

Given the number and types of utility interfaces primarily in Commons Road and potential interferences along Route Option 3, this route has been assigned a score of a High impact (Dark Blue).

High (Dark Blue)

Combined Technical Performance scores:

Table 9-5 Summary of Technical Assessment for Route Option 3

Route Option	3
Construction Disruption -Traffic	
Construction Disruption-Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.3.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 3 is in close proximity to the Loughlinstown Wood pNHA along the Commons Road at Shankill. The invasive species giant hogweed (listed on the Third Schedule) is also present here, but under treatment. Along this road, a high density of invasive species including butterfly bush, cotoneaster spp., pheasant berry *Leycesteria Formosa*, snowberry, cherry laurel and winter heliotrope are also present. However, it is worth remembering that this option will be running nearly exclusively within the public road route. For these reasons, this route option is considered to have moderate-high ecological impact (Dark Green).

(b) Landscape and Visual

While a section of Route option 3 traverses an area zoned as a High Amenity Area, i.e. west of the R118/M50 interchange it would be largely routed through grassed areas, which can be fully reinstated from a landscape perspective. No other sections of High Amenity Area zoning would be crossed.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Route option 3 is considered to have potential low-moderate low (Green) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 3 would pass over a regionally significant asset (Shanganagh Bridge 60260118), causing potential direct harm to the asset and therefore may risk harming the significance of the asset. In the consideration of the significance of the asset both construction and the implications

upon the assets setting, from surrounding environs, which contributes to its significance must be considered.

Safeguarding measures could be implemented during construction to mitigate the risk of any accidental or inadvertent damage to all above ground structural elements. Specific consideration to the duration of the construction and the level of impact that the construction will have (for example, direct effects on the structure's integrity) would need to be included in a Construction Environmental Management Plan. For this reason, Route option 3 is considered to have a moderate (Dark Green) impact

(d) Water Resources and Flooding

Route option 3 crosses six watercourses and runs a small distance along an existing watercourse shortly after the landfall location. It generally steers clear of watercourses from the R118 through the M50 route before crossing 2 no watercourses. In terms of impact from flooding, this route option largely avoids the flood risk areas and does not cross any of the flood relief schemes such as Kill-o-the-Grange flood attenuation areas. This route is considered to have potential low-moderate (Green) impact.

(e) Soil, Geology and Hydrogeology

Route option 3 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 3 is considered to have potential low-moderate (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. It is worth noting that this option avoids all residential areas of Ballybrack and has significantly less receptors than options 1 or 2.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 3 contains 3 no. community facilities and 1 no. healthcare facility within 50m. Therefore, route option 3 considered to have potential low-moderate (Green) impact.

Combined Environmental Performance

Route option 3	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental							

9.3.3 Socio- Economic Performance

(a) Population Land-use and Communities

A limited number of sensitive residential and commercial receptors are proximate to this route option. However, limited impact to land use is foreseen. Those most affected are within the Loughlinstown area. Therefore, this area is considered to have potential low-moderate (Green) impact.

With respect to planning applications, Route option 3 is in proximity to 4 no. large scale planning applications and is therefore considered to have potential moderate (Dark Green) impact.

With respect to land use patterns, Route option 3 is considered to have moderate-high (Dark Green) impact due to it being one of the route most likely to affect a significant number of land use types, however, this route option will largely be within the public road route.

With respect to utilities, Route option 3 is proximate to overhead utility lines low (Green) impact but has a very strong potential to impact multiple transportation uses, a high (Dark Blue) impact. The overall combined impact is considered to have moderate-high (Blue) impact when utilities (Green) and transportation (Dark Blue) risks are factored in.

(b) Recreation and Tourism

There are significantly less constraints with respect to sensitive recreation and tourism receptors proximate to this route option. Route option 3 contains 3 no. community facilities and 1 no. healthcare facility within 50m. Adequate mitigation measures will further reduce any further impact on sensitive receptors along this option. Therefore, Route option 3 is classified as negligible (Cream) impact.

Combined Socio-Economic Performance

Route option 3						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.3.3.2 Overall Performance for option 3

Overall Performance	Route option 3
Environmental	
Socio-Economic	
Overall Performance	

9.3.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.3.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. The length of this route is one of the shortest. This is one of three routes that is less than 8km in length (also routes 1 and 2) and considered the lower economic impact that the other longer routes (4,5,6 and 7).

For this reason, Route Option 3 has been assigned an impact score of Low (Cream).

(Cream) Low

9.3.4.2 Quantity of Joint Bays

This assessment found that Route Option 3 has the joint second least number of Joint bays along the route and has been assigned a score of Low- Moderate impact (Green).

Low- Moderate (Green) impact.

9.3.5 Summary of Option 3 Assessment

Table 9-6 Assessment Summary for Route Option 3

Option no.	Technical Score	Environmental & socio-economic	Economic	Combined Performance
3				

Route Option 3 performs relatively well overall across the criteria and has a moderate risk rating. Technically the route is high risk. This is due to the section of the route traversing Commons road where there is no capacity to locate a joint bay; a full road closure would be required during construction; the width of the road cannot accommodate a double circuit in conjunction with the existing utilities and therefore only a single circuit could be accommodated. This is the only section of road that differs between routes 2 & 3.

The likelihood of progressing route option 3 is therefore highly unlikely. Splitting the two circuits will increase the level of traffic disruption during construction, road closures, cost, duration of programme and potential environmental & socio-economic impact.

9.4 Option 4

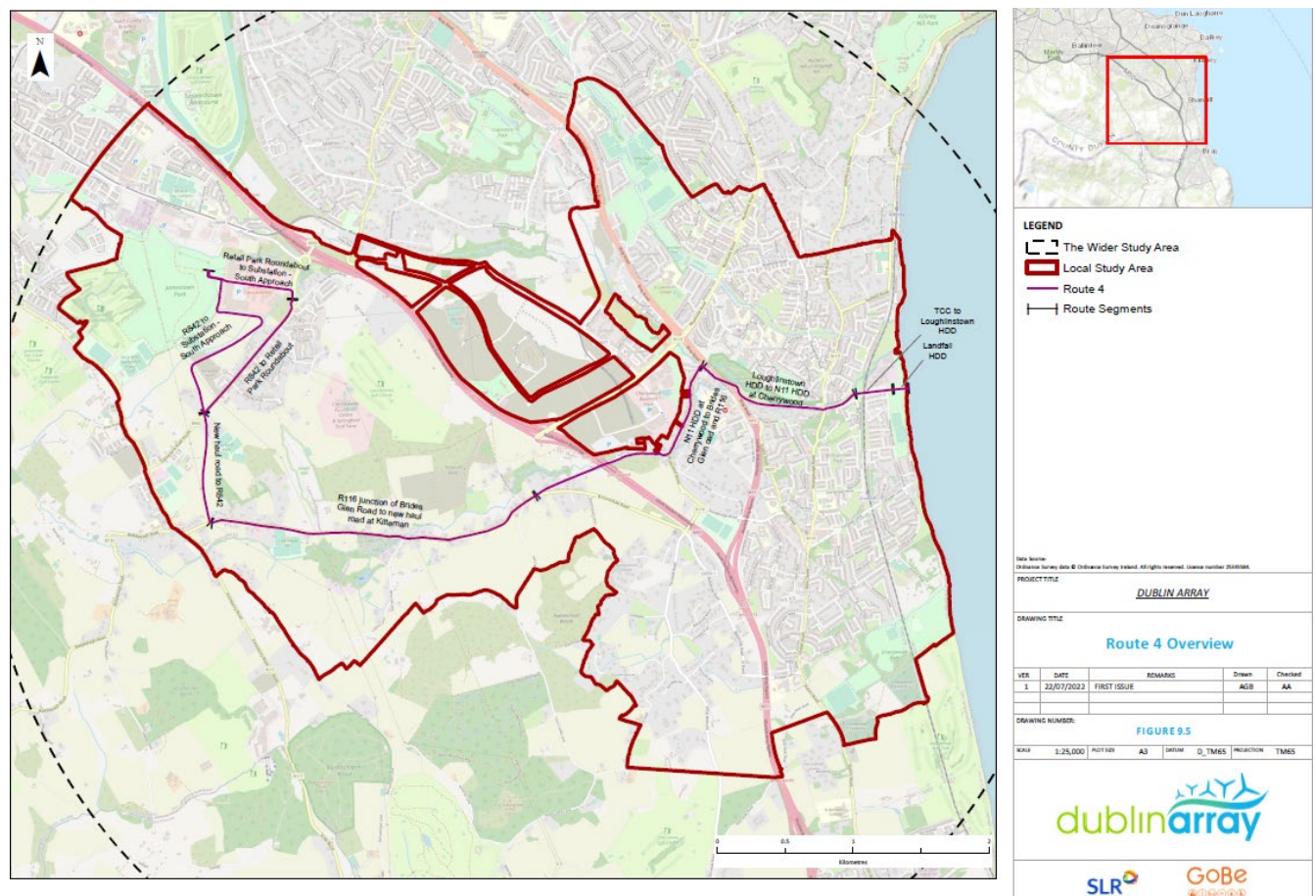


Figure 9-5 Route option 4 Overview

Route Option 4 will be assessed in detail against each of the performance criteria outlined in Section 8.

9.4.1 Technical Performance

1. Construction disruption (installation phase)
2. Joint Bay Location Suitability
3. Constructability (Major and Minor Crossings)
4. Utility Congestion and Utility Interference

9.4.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes to accommodate vehicle traffic and the construction works associated with the HV cable circuit. This criterion assesses the extent of the anticipated construction works along any given section of road / including the temporary traffic management requirements and temporary works.

In Route Option 4, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management including Stop & Go temporary traffic lights. It is anticipated that lane closures and reduction to single lane traffic is required along Cherrywood Road, Brides Glen, Ballycorus Road and Glenamuck to facilitate construction of that entire section of the cable route. The requirement for a temporary road closure will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Cable route 4 is primarily through local and regional roads and will therefore require temporary traffic management safe systems of work and will result in local traffic disruption.

A full road closure is anticipated along the planned cable route, this road closure would be required on Commons Road for the duration of the trench excavation, duct installation and road reinstatement. It is likely that full road closure would also be required along Cherrywood road.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will go in the road to minimise disruption.

Based on the high- level assessment of temporary Traffic Management anticipated to be required for this route, this route has been assigned a Moderate High (Light Blue).

Moderate – High (Blue)

Public Access Assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route. This route has therefore been assigned a of Moderate-High impact (Blue).

Moderate – High (Blue)

9.4.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 4, there are a total of 34 cable joint bays proposed at 17 separate locations along route option 4. This is a similar number of joint bays to route options 5,6 & 7. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the same design principles such as minimum amount of cable joint bays, separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, 15 of the 17 joint bay locations do not require any major alterations or further road widening to install. 15 of the 17 of the joint bay locations are anticipated to be situated in public roads.

Route 4 has 2 cable joint bay locations situated on private land.

Currently Commons Road would require a minimum of 1 and a maximum of 2 cable joint bays.

Based on this high- level assessment of the technical suitability and the number of joint bays along Route Option 4, this route has been assigned a High impact (Dark Blue).

High (Dark Blue)

9.4.1.3 Constructability

As outlined in Section 8.2.3, the main assessment here is the number of the major crossings per route. The major crossings above that will necessitate deep HDD excavations will have an impact on the overall circuit transmissible power and will be more challenging to construct and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.4.1.4 below.

There are three locations which have been identified as potentially major crossing points. These include crossings through the DART Railway line, Commons Road, N11/ Bray Road. Compared with routes 2 and 5, route 4 presents technically fewer challenging crossings in comparison to the other routes. The narrow width of road and the existing utility congestion in Commons Road will be more challenging to construct the circuit along this section.

Based on this high- level assessment of the major crossing points along Route 4, this route has been assigned a score of Moderate High (Blue).

Moderate High (Blue)

9.4.1.4 Utility congestion and interference

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

As per the other routes, the assessment of Option 4, based on the mapping provided by utility owners, has found that the route crosses several existing LV and MV electricity cables, existing medium pressure gas distribution pipes, several existing water network supplies, and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

An assessment of Commons road has concluded that a double circuit cannot be accommodated along the length from Clifton Park to the N11 Bray Road junction. There is potentially capacity to run a single 220kV circuit beneath Commons road and run the second circuit via River Close (along route option 2).

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A detailed under track crossing (UTX) assessment has been carried out and Irish Rail Engineering have issued a technical approval to cross underneath the DART Line with the cable circuits. Along Route Option 4, there are several other locations which cross and run parallel to existing medium & high voltage cables which would require analysis and potential mitigation against de- rating effects. Along Route Option 4, there are also potential interferences with wastewater pipes and watermain distribution on Commons Road, Brides Glen and Ballycorus Road to be considered.

Given the number and types of utility interfaces primarily in Commons Road and potential interferences along Route Option 4, this route has been assigned a score of a High impact (Dark Blue).

High (Dark Blue)

Combined Technical Performance scores:

Table 9-7 Summary of Technical Assessment for Route Option 4

Route Option	4
Construction Disruption -Traffic	
Construction Disruption-Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.4.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 4 also follows the Commons Road at Shankill and has the same constraints as Route option 3 in this regard. It also follows the Ballycorus Road at Kilternan, adjacent to the Dingle Glen pNHA. This route cuts through dry calcareous & neutral grassland, a species rich habitat, at Kilternan. This route option would have been considered to have a moderate-high ecological impact in the area's natural state. However, the Glenamuck Distributor Road is expected to cross this area which would lessen the potential impact of the cable route. Therefore, this route option is considered to have a potential moderate (Dark Green) impact.

(b) Landscape and Visual

While a section of Route option 4 traverses an area zoned as a High Amenity Area, i.e. along the R116 / Brides Glen Road it would be routed entirely along the existing road route. No other sections of High Amenity Area zoning would be crossed.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Please note that views into the wider landscape from a number of locations along Route option 4 are protected. However, considering the proposed undergrounding of the route option within an existing road route and the temporary disturbance due to the installation of the Dublin Array cable route, the effects on local visual receptors are considered negligible.

Route option 4 is considered to have potential low-moderate low (Green) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 4 would pass over a regionally significant asset(a 16th century house as noted in section 5.5) and in proximity to Shanganagh Bridge, causing potential direct harm to the former with potential harm to the later. This route option is preferably avoided, as the higher risk would require a higher level of assessment and mitigation. Such mitigation measures might include archaeological monitoring during the construction phase, or the use of LiDAR to assist in the

detection of sub-surface remains prior to construction. Route option 4 is considered to have a potential moderate high (Blue) impact.

(d) Water Resources and Flooding

Route Option 4 crosses eight watercourses and runs along existing watercourses for approximately 20% of its route. However, this route avoids all Flood Attenuation areas or proposed works for the mitigation of flood prone areas. Potential construction effects include the potential of flooding at open trenches in combination with inclement weather which may cause downstream siltation from runoff and a displaced flood risk whereby construction works would flood rather than displace water into adjacent properties. However, this route does not interact with any known or proposed flood relief infrastructure. For these reasons, Route Option 4 is considered to have a moderate (Dark Green) impact.

(e) Soil, Geology and Hydrogeology

Route option 4 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. The ranking for Route option 4 is considered to have potential low (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 4 contains 1 no. community facility, 4 no. healthcare facilities within 50m. Route option 4 is considered to have a moderate (Dark Green) impact.

Combined Environmental Performance

Route option 4	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental							

9.4.3 Socio- Economic Performance

(a) Population Land-use and Communities

A limited number of sensitive residential and commercial receptors are proximate to the route option. Those most affected are within the Kiltarnan area, which is dominant of a linear and ribbon development pattern. However, limited impact to land use is foreseen. Those most affected are within the Loughlinstown area. Therefore, this is considered to have potential low-moderate (Green) impact.

With respect to planning applications, Route option 4 is in proximity to 4 no. large scale planning applications and therefore is considered to have a moderate (Dark Green) impact.

With respect to land use patterns, Route option 4 is classified as moderate (Dark Green) impact due to it being a route most likely to affect a significant number of land use types.

With respect to utilities, Route option 4 is proximate to a number of overhead utility lines and is considered to have potential low-moderate low (Green) impact. but has a potential to impact multiple transportation uses and is considered to have potential moderate (Dark Green) impact. The overall classification of this route is considered to have moderate (Dark Green) impact when utilities (Green) and transportation (Dark Green) risks are factored in.

(b) Recreation and Tourism

There are significantly less constraints with respect to sensitive recreation and tourism receptors proximate to this route option given its route away from densely built-up areas and through agricultural lands. Route option 4 contains 1 no. community facility, 4 no. healthcare facilities within 50m. This route option is considered to have potential low-moderate (Green) impact.

Combined Socio-Economic Performance

Route option 4						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.4.3.2 Overall Performance for Route option 4

Overall Performance	Route option 4
Environmental	
Socio-Economic	
Overall Performance	

9.4.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.4.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. The length of this route is in the mid- range of all of the routes.

For this reason, Route Option 4 has been assigned an impact score of Low- Moderate impact (Green).

Low- Moderate (Green) impact.

9.4.4.2 Quantity of Joint Bays

This assessment found that Route Option 4 has the joint second least number of Joint bays along the route and has been assigned a score of Low- Moderate impact (Green).

Low- Moderate (Green) impact.

9.4.5 Summary of Option 4 Assessment

Table 9-8 Assessment Summary for Route Option 4

Option no.	Technical Score	Environmental & Socio-economic	Economic	Combined Performance
4				

In Route Option 5, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management including Stop & Go temporary traffic lights. Lane closures and a reduction to single lane traffic is required along R119 Shanganagh Road, Dublin Road, Rathmichael Road, Ballycorus Road and Glenamuck to facilitate construction of that entire section of the cable route. The requirement for any temporary road closures will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Cable route 5 is primarily through local and regional roads and will therefore require temporary traffic management safe systems of work and will result in local traffic disruption.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will go in the road to minimise disruption.

Based on the high- level assessment of temporary Traffic Management anticipated to be required for this route, this route has been assigned a score of High- impact (Dark Blue).

High (Dark Blue)

Public access assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route, particularly Dublin Road, Stonebridge Road Junction. This route has therefore been assigned a score of Moderate-High impact (Blue).

Moderate - High (Blue)

9.5.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 5, there are a total of 32 cable joint bays proposed at 16 separate locations along route option 5. This is a similar number of joint bays to route options 4,6 & 7. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the same design principles such as minimum amount of cable joint bays, separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, none of the 16 of the joint bay locations require any major alterations or further road widening to install. All 16 of the joint bay locations are anticipated to be situated in public roads.

Route 5 has 0 cable joint bay locations situated on private land.

Based on this high- level assessment of the technical suitability and the number of Joint Bays along Route Option 5, this route has been assigned a score of Moderate-High impact (Blue).

Moderate – High (Blue)

9.5.1.3 Constructability

As outlined in Section 8.2.3, the main assessment here is the number of major crossings per route. The major crossings above that will necessitate trenchless crossing technology will have an impact on the overall circuit transmissible power and present specific challenging construction risk and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.5.1.4 below and is not considered under 'Constructability (major crossings)'.

There are three trenchless crossing locations which have been identified as potentially major crossing points. These include crossings beneath the DART, M11 Stonebridge Road and M50. These major crossings are also technically challenging along with the crossing on routes 1, 2 & 3. Route option 5 crossings at M11 Stonebridge is also of particular concern; high level studies and a review of spatial restrictions for drill entry and exit result in a steep profile gradient for the cable installation that will be challenging to conform with EirGrid technical specification requirements.

Based on this high- level assessment of the major crossing points along Route 5, this route has been assigned a score of High (Dark Blue).

High (Dark Blue)

9.5.1.4 Utility congestion and interference

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

As per the other routes, the assessment of Option 5, based on the mapping provided by utility owners, has found that the route crosses a several existing LV and MV electricity cables, existing medium pressure gas distribution pipes, several existing water network supplies, and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out. Existing utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to

surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

An assessment of Shanganagh Road, Dublin Road and Stonebridge Road has identified a congestion of existing water, gas and electricity services. Whilst there is spare capacity to install double 220kV electricity circuit in the road, the presence of existing services will impact the progress of the new cable installation along route 5.

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A desktop assessment, pending further studies, considers this interference as low due to its perpendicular nature of the crossing. Along Route Option 5, there are several locations which cross and run parallel to high voltage (HV) cables which would require analysis and potential mitigation against de-rating effects. There is a section of this route that runs parallel through Retail Park Road which may cause potential de-rating issues and the available space will need to be reviewed further in design phase, should this route be progressed. Along Route Option 5, there are also potential interferences with cast iron water pipes on Glenamuck Road South, Ballycorus Road Rathmichael Road and Stonebridge Road to be considered.

Given the number and types of utility interfaces and potential interferences along Route Option 5, this route has been assigned a score of a Moderate-High impact (Blue).

Moderate – High (Blue)

Combined Technical Performance scores:

Table 9-9 Summary of Technical Assessment for Route Option 5

Route Option	5
Construction Disruption - Traffic	
Construction Disruption- Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.5.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 5 follows a mature treeline through Rathsallagh at Shangannagh, west of the DART line. This treeline has a high bat roosting potential and bat boxes are also present in several places. The invasive species' butterfly bush, winter heliotrope and cotoneaster spp. are present in several places along the route. Along the Stonebridge Road at Shankill, there is a small section of wet grassland where the route option directly cuts through, which provides suitable habitat for amphibians. The route traverses immature woodland immediately south of the M50 as well as the dry calcareous & neutral grassland at Kiltarnan. Like route option 4, it follows the Ballycorus Road at Kiltarnan, adjacent to the Dingle Glen pNHA. These considerations would have ranked this route at a moderate-high ecological impact,; however, it is worth noting that the Glenamuck Distributor Road Scheme, which is starting construction will disrupt this area. Therefore, this route is considered to have moderate ecological impact (Dark Green)

(b) Landscape and Visual

Route option 5 does not traverse through an area zoned as a High Amenity Area.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Please note that views into the wider landscape from a number of locations along Route option 5 are protected. However, considering the proposed undergrounding of the route within an existing road route and the temporary disturbance due to the installation of the Dublin Array cable route, the effects on local visual receptors are considered negligible.

Route option 5 is considered to have potential low-moderate low (Green) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 5 would pass over a regionally significant asset, causing potential direct harm to the asset and therefore risks harming the significance of the asset. This route is preferably avoided, the higher risk would require a higher level of assessment and mitigation. For this reason, Route option 5 is considered to have a potential moderate (Dark Green) impact.

(d) Water Resources and Flooding

Route option 5 is the preferred route options from the perspective of water resources and Flood Risk. Route option 5 has three watercourse crossings along its length but does not follow any watercourse. Route option 5 does not cross within any flood attenuation area or any downstream works to support any existing flood relief schemes in the area. This route option is considered to have a negligible (Cream) impact.

(e) Soil, Geology and Hydrogeology

Route option 5 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route option be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 5 is considered to have potential low-moderate low (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route 5 contains 3 no. schools, 5 no. healthcare facilities, 2 no. churches, 1 no. shop, 2 no. community facilities, 1 no. childcare facility within 50m. This route option is considered to have potential high (Dark Blue) impact.

Combined Environmental Performance

Route option 5	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental	Green	Light Green	Green	Yellow	Light Green	Dark Blue	Green

9.5.3 Socio- Economic Performance

(a) Population Land-use and Communities

A limited number of sensitive residential and commercial receptors are proximate to this route option. Those most affected are within the Rathsallagh and Shankhill area. It will also impact the Kilternan area which is dominant of a linear and ribbon development pattern. Therefore, this area is considered to have potential low-moderate low (Green) impact.

With respect to planning applications, Route option 5 is in proximity to 4 no. large scale planning applications and therefore is considered to have a moderate-high (Blue) impact.

With respect to land use patterns, Route option 5 is classified as Moderate (Dark Green) impact due to it being a route option most likely to affect a significant number of land use types.

With respect to utilities, Route option 5 is proximate to a number of overhead utility lines low moderate (Green) impact. but has a potential to impact multiple transportation uses moderate (Dark Green) impact. and is therefore classified as an overall moderate (Dark Green) impact.

(b) Recreation and Tourism

There are a number of constraints with respect to sensitive recreation and tourism receptors proximate to this route option. Route option 5 contains 3 no. schools, 5 no. healthcare facilities, 2 no. churches, 1 no. shop, 2 no. community facilities, 1 no. childcare facility within 50m. Therefore, this route option is considered to have a moderate-high (Blue) impact.

Combined Socio-Economic Performance

Route option 5						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.5.3.2 Overall Performance for Route option 5

Overall Performance	Route option 5
Environmental	
Socio-Economic	
Overall Performance	

9.5.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.5.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. For Route 5, the length is in the mid-range in comparison with the other routes. Therefore, it is considered a slightly higher economic impact than routes 1,2, 3 and 4 but lower impact than routes 6 and 7.

For this reason, Route Option 5 has been assigned an impact score of Low- Moderate impact (Green).

Low- Moderate (Green) impact.

9.5.4.2 Quantity of Joint Bays

This assessment found that Route Option 5 has the joint second least number of Joint bays along the route and has been assigned a score of Low- moderate impact (Green).

Low- Moderate (Green) impact.

9.6.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes to accommodate vehicle traffic and the construction works associated with the HV cable circuit. This criterion assesses the extent of the anticipated construction works along any given section of road / including the temporary traffic management requirements and temporary works.

In Route Option 6, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management included Stop & Go temporary traffic lights. Lane closures and a reduction to single lane traffic is required along R119 Shanganagh Road, Ferndale, Rathmichael Road, Ballycorus Road and Glenamuck to facilitate construction of that entire section of the cable route. The requirement for any temporary road closures will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Cable route 6 is primarily through local and regional roads and will therefore require temporary traffic management safe systems of work and will result in local traffic disruption.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will go in the road to minimise disruption.

Based on the high- level assessment of temporary Traffic Management anticipated to be required for this route, this route has been assigned a score of High-moderate impact (Blue). This is due to the high number of single lane road closures along the full length of the route.

High- moderate (Blue)

Public access assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route. This route has therefore been assigned a of Moderate impact (Dark Green).

Moderate (Dark Green)

9.6.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 6, there are a total of 40 cable joint bays proposed at 20 separate locations along route option 6. This is a similar number of joint bays to route options 5 & 7. The number of joint bays is particularly high due to the increased cable route length. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the

same design principles such as minimum amount of cable joint bays, separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, 0 of the 16 of the joint bay locations do not require any major alterations or further road widening to install. 16 of the 16 of the joint bay locations are anticipated to be situated in public roads.

Route 6 has 0 cable joint bay locations situated on private land.

Based on this high- level assessment of the technical suitability and the number of Joint Bays along Route Option 6, this route has been assigned a score of Moderate impact (Dark Green).

Moderate (Dark Green)

9.6.1.3 Constructability

As outlined in Section 8.2.3, the main assessment here is the number of major crossings per route. The major crossings above that will necessitate trenchless crossing technology will have an impact on the overall circuit transmissible power and present specific challenging construction risk and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.6.1.4 below and is not considered under 'Constructability'.

There are two trenchless crossing locations which have been identified as potentially major crossing points. These include crossings beneath the DART and M11. Whilst these two major crossings are also technically challenging, route option 6 & 7 has the least number of trenchless crossings on all the 7 routes.

Based on this high- level assessment of the major crossing points along Route 6, this route has been assigned a score of Low-Moderate impact (Green).

Low Moderate (Green)

9.6.1.4 Utility congestion and interference

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

As per the other routes, the assessment of Option 6, based on the mapping provided by utility owners, has found that the route crosses a several existing LV and MV electricity cables, existing

medium pressure gas distribution pipes, several existing water network supplies, and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

An assessment of Shanganagh Road and Ferndale Road has identified a congestion of existing water, gas and electricity services. Whilst there is spare capacity to install double 220kV electricity circuit in the road, the presence of existing services will impact the progress of the new cable installation along route 6.

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A desktop assessment, pending further studies, considers this interference as low due to its perpendicular nature of the crossing. Along Route Option 6, there are several locations which cross and run parallel to high voltage (HV) cables which would require analysis and potential mitigation against de-rating effects. This includes a 110kV circuit at the southern side of the Ballyogan substation site.

There is a section of this route that runs parallel through Retail Park Road which may cause potential de-rating issues and the available space will need to be reviewed further in design phase, should this route be progressed. Along Route Option 6, there are also potential interferences with cast iron water pipes on Glenamuck Road South, Ballycorus Road Rathmichael Road and Stonebridge Road to be considered.

Given the number and types of utility interfaces and potential interferences along Route Option 6, this route has been assigned a score of a Moderate-High impact (Blue).

Moderate – High (Blue)

Combined Technical Performance scores:**Table 9-11 Summary of Technical Assessment for Route Option 6**

Route Option	6
Construction Disruption - Traffic	
Construction Disruption- Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.6.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Route option 6 predominantly follows the road except for where it cuts through a small section of broadleaved woodland east of the M11, until it crosses the dry calcareous & neutral grassland at Kiltarnan. The invasive species' cherry laurel, butterfly bush & winter heliotrope occur roadside for a large portion of the route option along Ferndale Road. Like route options 4 & 5, it follows the Ballycorus Road at Kiltarnan, adjacent to the Dingle Glen pNHA. This route option is considered to have mid-level ecological impact (Dark Green).

(b) Landscape and Visual

Route option 6 does not traverse through an area zoned as a High Amenity Area.

The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Please note that views into the wider landscape from a number of locations along Route option 6 are protected. However, considering the proposed undergrounding of the route option within an existing road route and the temporary disturbance due to the installation of the Dublin Array cable route, the effects on local visual receptors are considered negligible

Route option 6 is considered to have potential low-moderate low (Green) impact. impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 6 intrudes on a Zone of Notification around a monument. Although the potential for remains are unlikely, a higher-level assessment would be required to establish this, and it would risk potential further investigations or observations. For this reason, Route option 6 is considered to have a negligible (Cream) impact.

(d) Water Resources and Flooding

Route option 6 crosses 6 no. watercourses along its length. While Route option 6 generally avoids all flood attenuation and all proposed flood relief scheme works within the study area, this route

option does run parallel to a number of watercourse crosses in close proximity to the Carrickmines substation. For this reason, the route option is considered to have potential low-moderate (Green) impact.

(e) Soil, Geology and Hydrogeology

Route option 6 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route option be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 6 is considered to have potential low-moderate (Green) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 6 contains 2 no schools, 8 no. shops, 3 no. pubs, s no. bus stops, 2 no. health facilities, 2 no. churches, two no. recreational/sports areas and 3 no healthcare facilities within 50m. This route option is considered to have a high moderate (Dark Blue) impact.

Combined Environmental Performance

Route option 6	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental	Green	Light Green	Yellow	Light Green	Light Green	Dark Blue	Green

9.6.3 Socio- Economic Performance

(a) Population Landuse and Communities

A number of sensitive residential and commercial receptors proximate to this route option. Those most affected are within the Rathsallagh and Shankhill area. It will also impact the Kiltarnan area which is dominant of a linear and ribbon development pattern. However, limited impact to land use

is foreseen. Those most affected are within the Loughlinstown area. Therefore, this area is considered to have potential low (Green) impact.

With respect to planning applications, Route option 6 is in proximity to 4 no. large scale planning applications and therefore is considered to have a moderate (Dark Green) impact.

With respect to land use patterns, Route option 6 is considered to have a moderate (Dark Green) impact. due to it being a option with strong potential to affect a significant number of land use types.

With respect to utilities, Route option 6 is proximate to the largest number of overhead utility lines is considered to be a low (Green) impact. However, there is a potential to impact multiple transportation uses and is considered to have a moderate/high (Blue) impact. Therefore, Route option 6 is considered to have an overall moderate (Blue) impact when utilities (Green) and transportation (Blue) risks are factored in.

(b) Recreation and Tourism

A number of recreation and tourism receptors are proximate to the route option, in particular in the areas of Loughlinstown and Shankill. Route option 6 appears to be the most constrained as it contains 2 no. schools, 8 no. shops, 3 no. pubs, s no. bus stops, 2 no. health facilities, 2 no. churches, two no. recreational/sports areas and three no healthcare facilities within 50m. Therefore, this route option is considered to have a high moderate (Dark Blue) impact.

Combined Socio-Economic Performance

Route option 6						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.6.3.2 Overall Performance for Route option 6

Overall Performance	Route option 6
Environmental	
Socio-Economic	
Overall Performance	

9.6.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.6.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. The length of Route Option 6 is the longest of all 7 routes. Therefore, it falls into a higher impact category than the other routes.

For this reason, Route 6 has been assigned a score of Moderate-High impact (Blue).

Moderate - High (Blue)

9.6.4.2 Quantity of Joint Bays

This assessment found that Route Option 6 has one of the higher number of Joint bays along the route and has been assigned a score of Moderate impact (Dark Green).

Moderate (Dark Green)

9.6.5 Summary of Option 6 Assessment

Table 9-12 Assessment Summary for Route Option 6

Option no.	Technical Score	Environmental & Socio-economic	Economic	Combined Performance
6				

9.7 Option 7

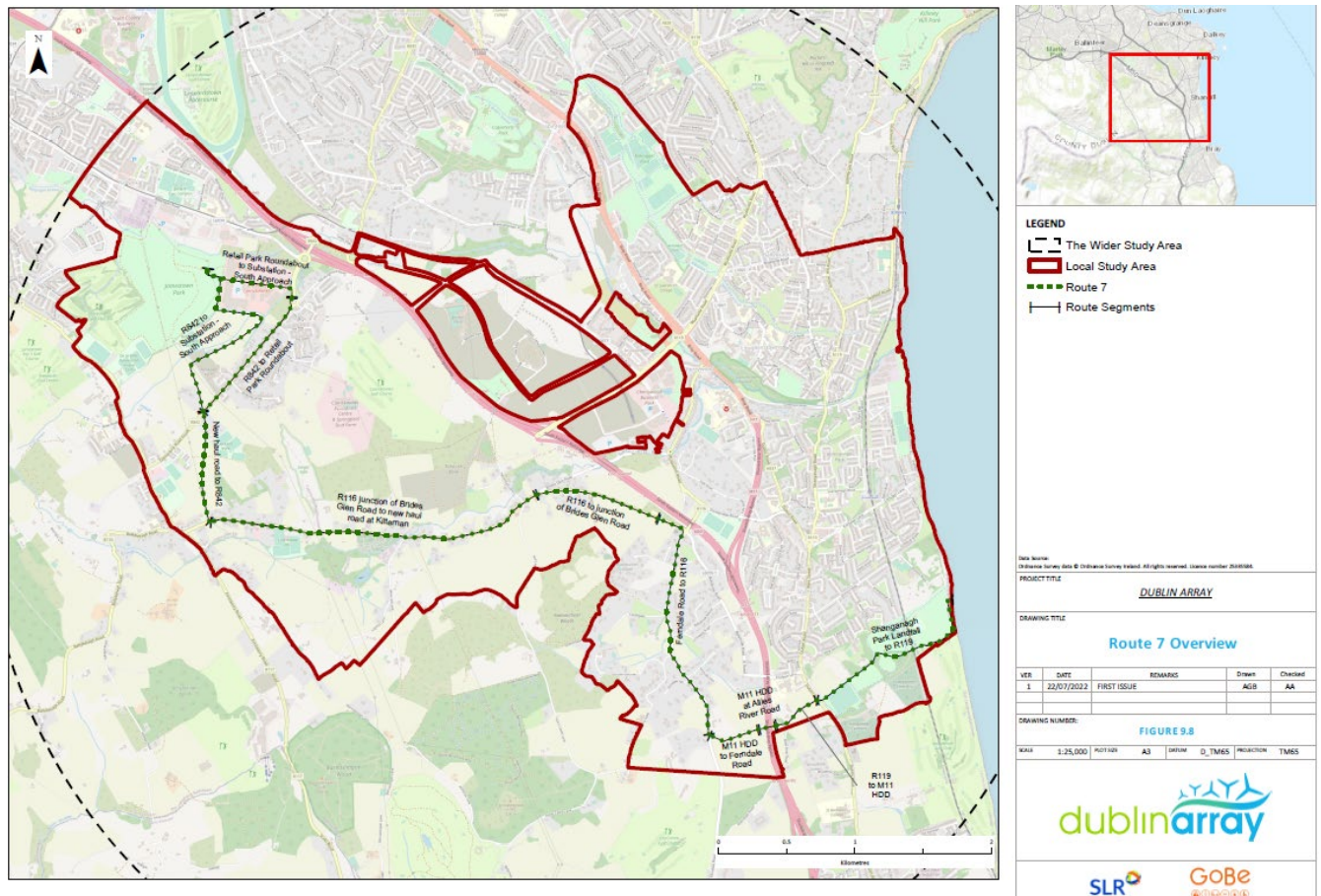


Figure 9-8 Route option 7 Overview

Route Option 7 will be assessed in detail against each of the performance criteria outlined in Section 8.

9.7.1 Technical Performance

1. Construction disruption (installation phase)
2. Joint Bay Location Suitability
3. Constructability (major and minor crossings)
4. Utility Congestion and Utility Interference

9.7.1.1 Construction disruption

Temporary Traffic Management Assessment

It is anticipated that there will be several partial lane closures required along the routes to accommodate vehicle traffic and the construction works associated with the HV cable circuit. This criterion assesses the extent of the anticipated construction works along any given section of road / including the temporary traffic management requirements and temporary works.

In Route Option 7, there are several areas where the road width will be reduced to single lane. Vehicle traffic shall be controlled using traffic management including Stop & Go temporary traffic lights. Lane closures and a reduction to single lane traffic is required along Ferndale Road, Rathmichael Road, Ballycorus Road and Glenamuck to facilitate construction of that entire section of the cable route. The requirement for any temporary road closures will follow the necessary permissions with the local authority and road diversions for traffic vehicles will be implemented.

Cable route 7 is primarily through local and regional roads and will therefore require temporary traffic management safe systems of work and will result in local traffic disruption.

The exact location of the cable trench will be defined later in the detailed design phase of the project and will depend on further surveys, consultation and assessments. Consultations with the local authorities will help to define where the cable trench will go in the road to minimise disruption.

Based on the high- level assessment of temporary Traffic Management anticipated to be required for this route, this route has been assigned a score of High- impact (Dark Blue).

High (Dark Blue)

Public access assessment

Based on a high- level assessment of impacts within 50m of the cable route to public accessways/ vulnerable access points, there are several schools and community facilities that will be impacted by this route. This route has therefore been assigned a of Low- Moderate impact (Green).

Low- Moderate (Green)

9.7.1.2 Joint Bay location suitability

As set out in Section 8.2.2, the technical suitability of joint bay locations along each route have been assessed under this criterion.

From a high-level desktop study for Route Option 7, There are a total of 36 cable joint bays proposed at 18 separate locations along route option 7. This is a similar number of joint bays to route options 5 & 6. The number of joint bays is particularly high due to the increased cable route length. Further engineering and suitability assessments will be undertaken during the detailed design phase for the emerging preferred route. All the route options will be developed with the same design principles such as minimum amount of cable joint bays, the separation distances between joint bays and EirGrid specification requirements for periodic maintenance.

From a high-level review, 15 of the 18 of the joint bay locations do not require any major alterations or further road widening to install 15 of the 18 of the joint bay locations are anticipated to be situated in public roads.

Route 7 has 3 cable joint bay locations situated on private land.

Based on this high- level assessment of the technical suitability and the number of Joint Bays along Route Option 7, this route has been assigned a score of Moderate-High impact (Blue).

Moderate – High (Blue)**9.7.1.3 Constructability**

As outlined in Section 8.2.3, the main assessment here is the number of major crossings per route. The major crossings above that will necessitate trenchless crossing technology will have an impact on the overall circuit transmissible power and present specific challenging construction risk and are therefore the main consideration under this assessment.

The interaction with utilities is assessed in Section 9.7.1.4 below and is not considered under 'Constructability'.

There are two trenchless crossing locations which have been identified as potentially major crossing points. These include crossings beneath the DART and M11. Whilst these two major crossings are also technically challenging, Route option 6 & 7 has the least number of trenchless crossings on all the 7 routes.

Based on this high- level assessment of the major crossing points along Route 7, this route has been assigned a score of Low- Moderate impact (Green).

Low Moderate (Green)**9.7.1.4 Utility congestion and interference**

The assessment of the potential impacts on utilities is informed by desk- based research on the extent and nature of utilities that are likely present in the study area. This criterion is critical to assess the capacity of each of the existing routes to accommodate the new infrastructure.

Utility Congestion: The number of utilities in an existing route restricting availability to install new infrastructure and key utility relocations required. (Note: Utility data from network operators Irish Water, ESBN, Virgin and Gas Networks Ireland has been acquired to inform this assessment).

As per the other routes, the assessment of Option 7, based on the mapping provided by utility owners, has found that the route crosses a several existing LV and MV electricity cables, existing medium pressure gas distribution pipes, several existing water network supplies, and existing wastewater network.

It is expected that all utilities encountered during construction will remain in-situ or, where necessary, appropriate diversions or modifications carried out, exiting utility diversions or alterations will be identified during the design development of the cable route, consultation and design reviews with the respective utility providers will be undertaken to ensure disruption to surrounding communities is kept to an absolute minimum. Any required disruptions would be carefully planned to ensure that the duration is minimised in so-far as is possible.

An assessment of Ferndale Road, Rathmichael Road and Ballycorus has identified a congestion of existing water, gas and electricity services. Whilst there is spare capacity to install double 220kV

electricity circuit in the road, the presence of existing services will impact the progress of the new cable installation along route 7.

Utility Interference: The second part of this assessment is interference with existing utilities. While there may be physical space to install the proposed infrastructure in the proximity of other utilities the interaction between the two may yield unacceptable results. This is a high-level desktop assessment and detailed electrical interference studies will be undertaken on the emerging preferred route.

All 7 routes cross the Irish Rail DART line. A desktop assessment, pending further studies, considers this interference as low due to its perpendicular nature of the crossing. Along Route Option 7, there are several locations which cross and run parallel to high voltage (HV) cables which would require analysis and potential mitigation against de-rating effects. This includes a 110kV circuit at the southern side of the Ballyogan substation site.

There is a section of this route that runs parallel through Retail Park Road which may cause potential de-rating issues and the available space will need to be reviewed further in design phase, should this route be progressed. Along Route Option 7, there are also potential interferences with cast iron water pipes on Glenamuck Road South, Ballycorus Road Rathmichael Road. Ferndale Road, Alley Rover Road and Dublin Road to be considered.

Given the number and types of utility interfaces and potential interferences along Route Option 7, this route has been assigned a score of a Moderate-High impact (Blue).

Moderate – High (Blue)

Combined Technical Performance scores:

Table 9-13 Summary of Technical Assessment for Route Option 7

Route Option	7
Construction Disruption -Traffic	
Construction Disruption-Access Points	
Joint Bay Location Suitability	
Constructability	
Utility Congestion & Interference	
Combined Technical Performance	

9.7.2 Environmental Performance

(a) Biodiversity, Flora and Fauna

Approximately 100 sand martin nests were identified immediately south of where the route option begins at the sedimentary sea cliffs at Shanganagh. No sand martins were present at the time of survey (start September) and no white washing was present. This suggests these were not in use during the latest breeding season of 2022. The route option follows mature treelines and

hedgerows for a significant portion and traverses these in several places. Route option 7 then joins route options 4, 5 & 6 with the above-mentioned invasive species present along the route option and traverses the dry calcareous & neutral grassland at Kilternan. Like route options 4, 5 & 6, it follows the Ballycorus Road at Kilternan, adjacent to the Dingle Glen pNHA. This is considered to have mid-level ecological impact (**Dark Green**).

(b) Landscape and Visual

Route option 7 does not traverse through an area zoned as a High Amenity Area. The effects on existing hedgerows and tree belts would be the same as discussed under Biodiversity, Flora and Fauna above.

Please note that views into the wider landscape from a number of locations along Route option 7 are protected. However, considering the proposed undergrounding of the route option within an existing road route and the temporary disturbance due to the installation of the Dublin Array cable route, the effects on local visual receptors are considered negligible. Route option 7 is considered to have potential low-moderate low (**Green**) impact in landscape/visual terms.

(c) Archaeology, Architecture & Cultural Heritage

Route option 7 is the preferred route option on the basis that it does not intrude into any Zones of Notification or monuments of significance and is proximate to the lowest number of assets. The route option is proximate to two assets but would not likely intrude on any extended archaeological remains related to these features. An assessment would be able to further establish this potential. For this reason, Route 7 is considered to have a negligible (**Cream**) impact.

(d) Water Resources and Flooding

Route option 7 crosses 6 no. watercourses along its length. While Route option 6 generally avoids all flood attenuation and all proposed flood relief scheme works within the study area, this route option does run parallel to a number of watercourse crosses in close proximity to the Carrickmines substation. For this reason, the route option is considered to have a low (**Green**) impact.

(e) Soil, Geology and Hydrogeology

Route option 7 must traverse the Killiney Bay Geological Heritage Site at its landfall location and consultation with the GSI will be required should this route option be selected. There is potential to encounter unstable or unknown ground conditions and elevated groundwater levels close to the ground surface. Ground investigation will be carried out to confirm the ground conditions along the preferred route option in advance of design and construction works.

Permanent or temporary removal of soils / excavation of bedrock may be necessary during the construction of the Project and this could alter infiltration or drainage pattern.

There are no identifiable geological constraints mapped. Detailed ground investigation prior to design will identify any local geological issues along the selected preferred route option.

There is potential for the contamination of soils and bedrock through spills or leaks from material used on site during construction or maintenance works; particularly at the former Ballyogan Landfill. Groundwater bedrock aquifers have been mapped within the LSA. Route option 7 is considered to have potential low-moderate low (**Green**) impact.

(f) Noise and Air

The construction works will result in a temporary increase in noise and dust within 50m of each route option. Site selection for the Project should consider sensitive receptors such as domestic dwellings and recreational areas.

In addition to residential receptors which are present on all seven Route options, the following sensitive receptors have distinguished the ranking of the route options as follows:

Route option 7 contains 2 no recreational / sports areas, 1 no. school, 1 no. church, and three no. healthcare facilities within 50m. This considered to have potential low-moderate moderate (Dark Green) impact.

Combined Environmental Performance

Route option 7	Biodiversity	Landscape and Visual	Archaeology, Architecture & Cultural Heritage	Water & Flooding	Soils, Geology and Hydrogeology	Noise	Combined Environmental Performance
Environmental	Green	Light Green	Yellow	Light Green	Light Green	Green	Green

9.7.3 Socio- Economic Performance

(a) Population Land-use and Communities

A number of sensitive residential and commercial receptors proximate to this route option. Those most affected are within the Shankhill area. It will also impact the Kilternan area which is dominant of a linear and ribbon development pattern. However, limited impact to land use is foreseen. Those most affected are within the Loughlinstown area. Therefore, this area is considered to have a low (Green) impact.

With respect to planning applications, Route option 7 is in proximity to 6 no. large scale planning applications and is therefore classified as moderate high (Blue) impact.

With respect to land use patterns, Route option 7 is considered to have a moderate (Dark Green) impact. impact due to it being a route option less likely to affect a significant number of land use types.

With respect to utilities, Route option 7 is proximate to the most overhead utility lines and is considered to have a moderate (Dark Green) impact. However, this route option has a strong potential to impact multiple transportation uses and therefore is considered to have a moderate high (Dark Blue) impact. Route option 7 is considered to have an overall moderate (Blue) impact when utilities (Dark Green) and transportation (Dark Blue) risks are factored in.

(b) Recreation and Tourism

There is a limited number of recreation and tourism receptors proximate to this route option, in particular in the areas of the coast and Shankhill. Route option 7 contains 2 no recreational / sports areas, 1 no. school, 1 no. church, and three no. healthcare facilities within 50m. Therefore, this route option is considered to be a negligible (Green) impact.

Combined Socio-Economic Performance

Route option 7						
	Population and Economics	Planning Applications	Land Use Patterns	Existing Utilities	Recreation and Tourism	Combined Socio-Economic Performance
Socio-economic						

9.7.3.2 Overall Performance for Route option 7

Overall Performance	Route option 7
Environmental	
Socio-Economic	
Overall Performance	

9.7.4 Economic Performance

As set out in Section 8.5, the areas considered to assist with determining the best route option are as follows:

- Length of installed cable; and
- Quantity of Joint Bays

9.7.4.1 Length of installed cable

The first economic assessment is from the overall length of the cable routes. The length of Route Option 7 is one of the longer routes and therefore, it falls into the highest impact category.

For this reason, Route 6 has been assigned a score of Moderate impact (Dark Green).

Moderate (Dark Green)

9.7.4.2 Quantity of Joint Bays

This assessment found that Route Option 7 has one of the higher number of Joint bays along the route and has been assigned a score of Moderate impact (Dark Green).

Moderate (Dark Green)

9.7.5 Summary of Option 7 Assessment

Table 9-14 Assessment Summary for Route Option 7

Option no.	Technical	Environmental & Socio-economic score	Economic	Combined Performance
7				

10 Onshore Indicative Construction Sequence and Programme

The installation of the onshore infrastructure, excluding surveys and site preparation, is anticipated to take approximately 24 months and onshore construction is likely to commence in advance of the offshore construction programme. Preconstruction and enabling works may require an additional year.

Construction will occur during normal construction working hours, with the exception of works associated with the entry and exit pits at the TJBs and special crossings associated with trenchless construction techniques. This will typically occur 24 hours per day, seven days per week for defined periods within the construction programme.

The main construction activities and durations within the overall 24 month construction programme are described as follows;

- | | |
|---|-----------|
| • Onshore substation groundworks, drainage and fencing | 18 weeks; |
| • Onshore substation civil works, ducting and surfacing | 34 weeks; |
| • Special crossings works (per location) | 16 weeks; |
| • Transition Joint Bays | 70 weeks; |
| • Cable trench and joint bay installation | 70 weeks; |
| • Substation energisation | 16 weeks. |

11 Summary- Emerging Best Performing Options

11.1 Description

As set out at in *Section 1.5 Scope of the Report*, a desktop study across 7 routes (beginning at either Shanganagh Cliffs or Shanganagh Park landfall locations and all ending at the emerging preferred substation at Ballyogan was undertaken to assess each route against a set criteria (technical, economic, environmental and socio- economic performances) to identify the emerging preferred route(s). The results of the study are presented throughout the report and summarised in the tables below.

Table 11-1 Summary of Technical Assessment for all Route Options

Route Option	1	2	3	4	5	6	7
Construction Disruption (Traffic Management)							
Construction Disruption (Public Access)							
Joint Bay Location Suitability							
Constructability (major & minor crossings)							
Utility Congestion & Interference							
Overall Performance							

The table below presents the overall results for the assessment of all 7 routes against the criteria: Environmental, Socio- economic, Technical and Economic.

Table 11-2 Overall Summary of the Route Selection Report Assessment

Route Option	1	2	3	4	5	6	7
Environmental & Socio economic							
Technical							
Economic							
Overall Performance							

It was determined from this report that routes 1 and 2 performed the best across the multi-criteria analyzed. Routes 5, 6 and 7 had a higher socio-economic impact with a greater potential impact to local communities. Routes 3 and 4 had significant technical challenges, most notably along Commons Road where utility congestion results in insufficient capacity for a double circuit. Routes 1 and 2 indicated a balance of low moderate risk across the multi-criteria analysis.

Engagement with DLRCC (within whose functional area all cable route options are located) on all seven routes was sought at an early stage (refer to section 7). The regional importance of Shanganagh Park and the heavily restricted nature of road access to the section of the park adjacent to the shoreline when compared with Shanganagh Cliffs was profiled by DLRCC. Commons Road and Ferndale Road were highlighted as roads with a high number of existing utilities (more detail is available in the supporting technical assessment report in Appendix 02 carried out by Mott MacDonald). This increased the technical risk on routes 3, 4 and 5. DLRCC highlighted a number of ongoing and future development plans south of routes 5, 6 and 7 such as Rathmichael Road, Ferndale Road and Ballycorus Road. The limited space availability within these roads was outlined by DLRCC having regard to room for future utilities, the presence of mature hedgerows and tree lines immediately adjacent to these roads (limiting the ability to widen without the risk of significant vegetation loss) and their narrowness (unsuitability to accommodate construction phase activities without significant traffic disruption). The greater risks along these routes means they were not selected as an emerging preferred route. DLRCC further indicated that due to the dynamic nature of development planning and infrastructure delivery within the Cherrywood SDZ, there would be significant uncertainty about available space for this infrastructure between Junction Q (Cherrywood SDZ), Grand Parade (B - C) and Castle Street (D - M) (as outlined Chapter 4, Map 4.5 of the Cherrywood SDZ) in the context of the timelines for the development of the Dublin Array project. This effects a significant section of Route 1. Considering this feedback, particularly relating to Route 1 and the uncertainties around Cherrywood development, Route 2 was identified as the emerging preferred route in January 2023.

11.2 Variations to the Emerging Preferred Route 2

The emerging preferred route was made available during the Dublin Array Spring 2023 Public Consultation Campaign. The purpose of the consultation was to update local communities, the public, public representatives and other interested stakeholders on the latest project plans, including emerging preferred onshore cable routing details. Between 26th January – 31st March 2023 there were 8 in-person exhibition²² events and an online webinar run over this period. During this public consultation feedback was received which identified a number of variations to the emerging preferred route which were given consideration as described hereunder. Please see Figure X which highlights the following variations along the emerging preferred route.

Variation 1 – Loughlinstown Linear Park

Feedback from the Roads Section of DLRCC requested consideration of a shorter route/route optimisation via Gleantann and Loughlinstown Drive to arrive at the N11; this reduced the cable route within Loughlinstown Linear Park by approximately 300m, avoided Glenavon Park, Wyattville Road (L1065) and approximately 700m of cable along the busy Wyattville Road (R118) network.

²² <https://dublinarray.com/wp-content/uploads/2023/10/14172-rwe001-2023.pdf>

Variation 2 - N11 Crossing

To optimise the N11 crossing which was presented at the Dublin Array 2023 public consultation a review was completed of the bridge design of the Wyattville Road (R118)/N11 overbridge. It was identified that there was no capacity within the bridge structure to accommodate the cable infrastructure. To effect a crossing at this location the need for a trenchless installation technique was therefore necessary.

Variation 3 – Beckett Road and the M50 Crossing

To optimise the crossing of the M50 which was presented at public consultation, a review of future planned development and infrastructure in the general environs of the M50 was completed. This identified that Beckett Road was an emerging opportunity for a cable route due to the maturity of its development stage and confidence in its capacity to accommodate underground cable infrastructure. Beckett Road is a road infrastructure project included in the consented Cherrywood Planning Scheme, a Strategic Development Zone in the adopted DLRCDP 2022-2028. A 1.4km section of the proposed Beckett Road (which has a total length of approximately 2 km) was consented in November 2022 (planning application reference DZ21A/1017). This road section starts at Wyattville Road (R118), connecting from Cherrywood Avenue and routing under Wyattville Road (R118) as an underpass. This section of Beckett Road then runs parallel with the M50 on the east side with future junctions connection to Bishop's street and Mercer Drive. The 1.4km extent of Beckett Road that has been permitted ends at Mercer Drive. The Cherrywood Planning Scheme proposes that Beckett Road will connect into the proposed Kilternan Link Road (KLR), a proposed overpass of the M50 and connecting to the existing local road network at Golf Lane.

Through a process of engagement with DLRCC an alignment of an underground cable route for the remaining section of Beckett Road and the future KLR was identified which would not impede the delivery of this future road infrastructure incorporating a trenchless crossing of the M50.

Variation 4 – Glenamuck District Distributor Road Crossing

To optimise the cable route through the GDDR which was presented at the Dublin Array 2023 public consultation a review was completed of the available GDDR design and the GDDR team within DLRCC were engaged. It was identified that there was no capacity within the GDDR design at this stage to accommodate the cable infrastructure due to the maturity of the development. To effect a crossing at this location the need for a trenchless installation technique was therefore necessary.



11.3 Comparison with Route 1 – the Next Best Performing Route

The variations of the Preferred Route as summarised were considered against the other route options. Route 1 was the other best performing route from the assessment with Route 2. The route traversed a greater section of park land, including over 1,000m through Kilbogget Park. The trenchless crossing under the N11 requires more assessment to prove technically deliverable. Route 1 runs parallel with the Luas line for approximately 750m along Grande Parade; further engagement with TII is required to confirm acceptability of electrical interference.

Route 1 proposes to sit within the extent of the proposed Castle Street (D – M) as set out in the Cherrywood Planning Scheme. The lands in Priorsland along the planned Castle Street road are subject to 1:100 year flood events. Section 3.2 of the EirGrid Connection Agreement (document reference OFS-CAB-101-R2) clearly states that, "Cables shall not be routed through any area likely to flood (areas classified in 1 in 100 year fluvial and pluvial events)." This constraint eliminates Castle Street as an option.

11.4 Next Steps

Following engagement with EirGrid and DLRCC on the identified preferred route, the next phase is to progress to planning design phase. Subject to successful completion of further design of this infrastructure a planning application will be submitted to the consenting authority (An Bord Pleanála). This will involve more detailed site investigations and environmental surveys to optimise the cable route with careful consideration of sufficient space for cable and joint bay infrastructure in addition to the necessary trenchless crossings for the preferred route.

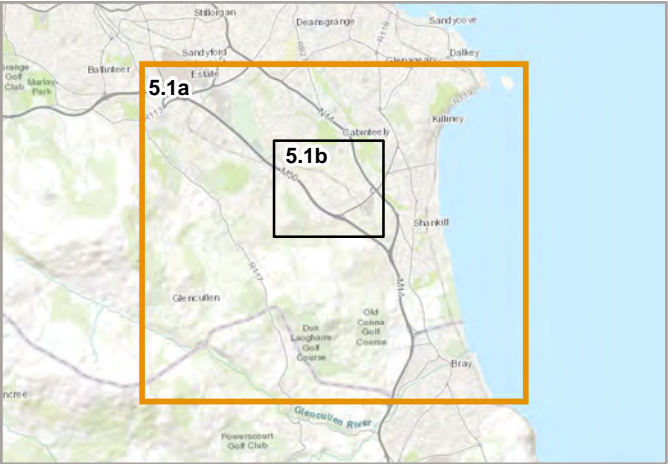
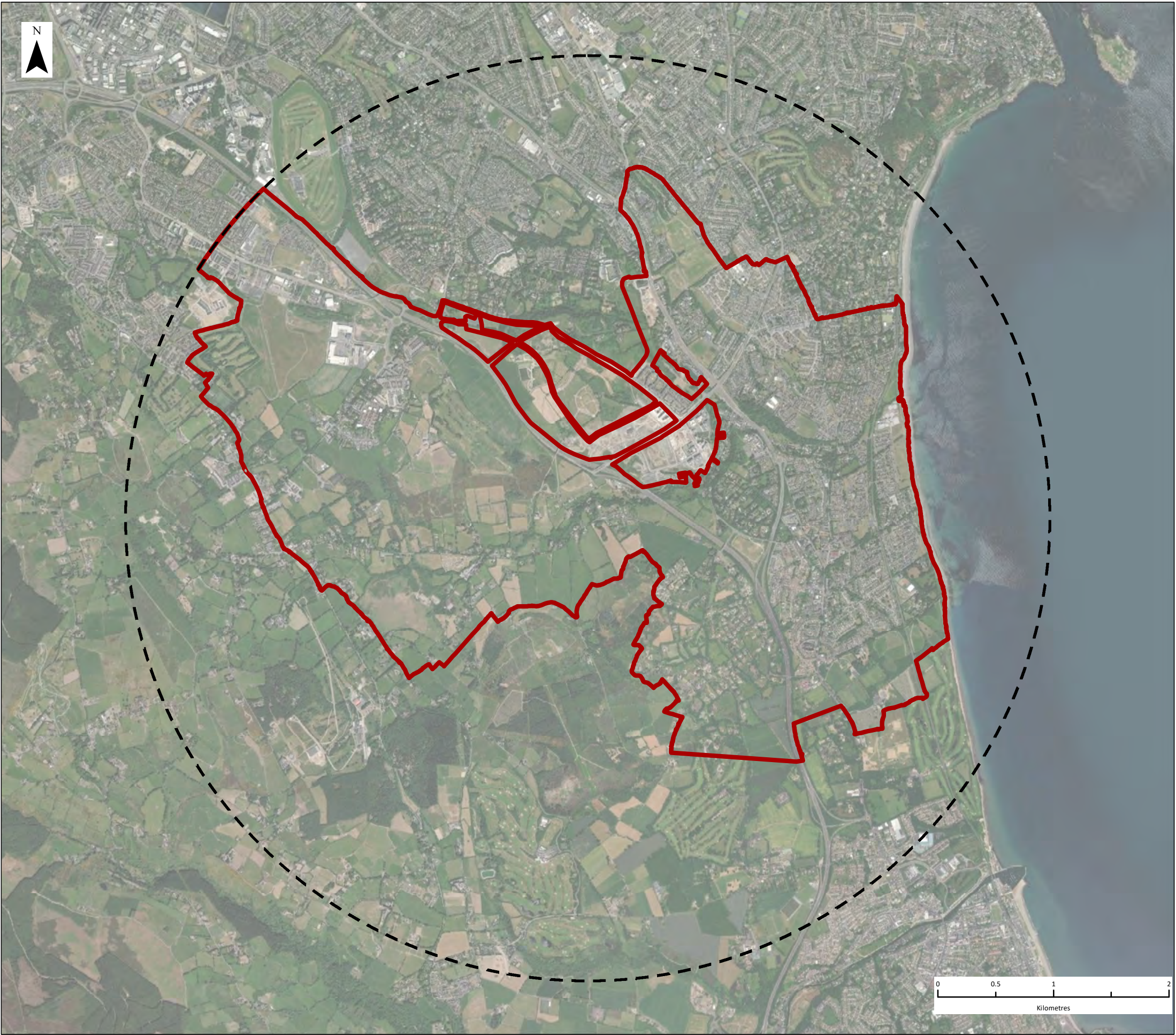
12 List of Appendices

12.1 Appendix 01

12.1.1 Environmental & Socio-economic Appraisal Figures

12.2 Appendix 02

12.2.1 Technical Feasibility Assessment (MMD)



- LEGEND**
- Priority Search Area
 - The Wider Study Area

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PROJECT TITLE
DUBLIN ARRAY

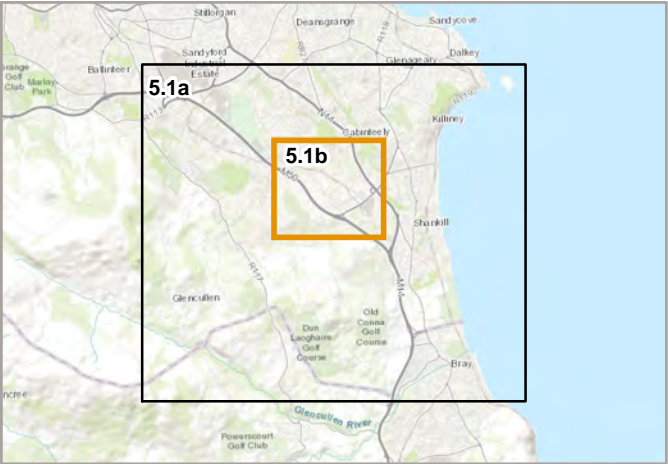
DRAWING TITLE
**WIDER RADIAL STUDY AREA
(THE WIDER STUDY AREA) AND LOCAL STUDY AREA**

VER	DATE	REMARKS	Drawn	Checked
1	17/11/2022	FIRST ISSUE	AGB	AA


DRAWING NUMBER:
FIGURE 5.1a


SCALE	1:35,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

 Priority Search Area

 The Wider Study Area

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PROJECT TITLE

DUBLIN ARRAY

DRAWING TITLE

**WIDER RADIAL STUDY AREA
(THE WIDER STUDY AREA) AND LOCAL STUDY AREA**

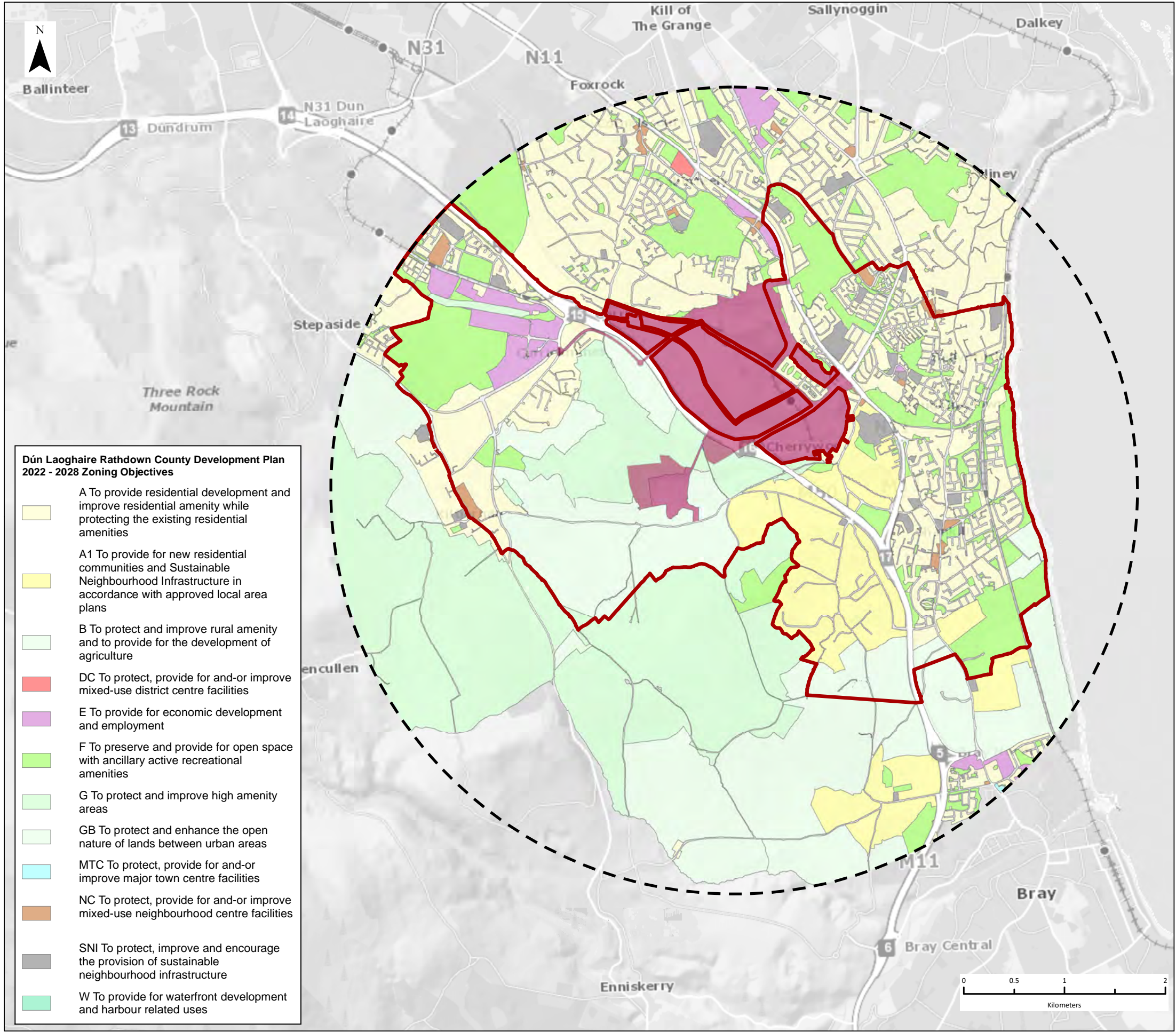
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1	17/11/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:

FIGURE 5.1b

SCALE	1:10,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Cherrywood Adopted Planning Scheme

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

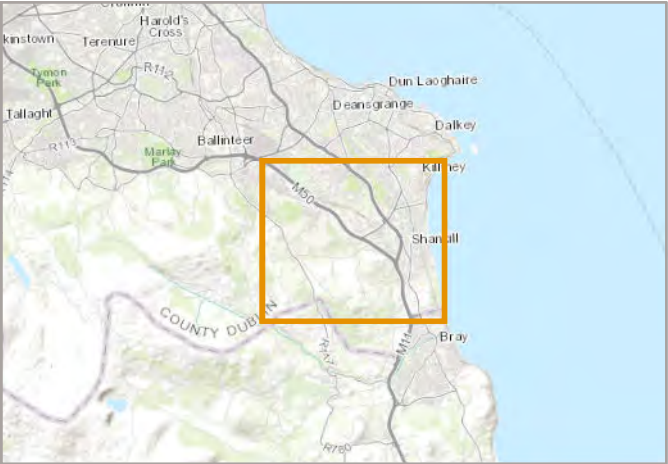
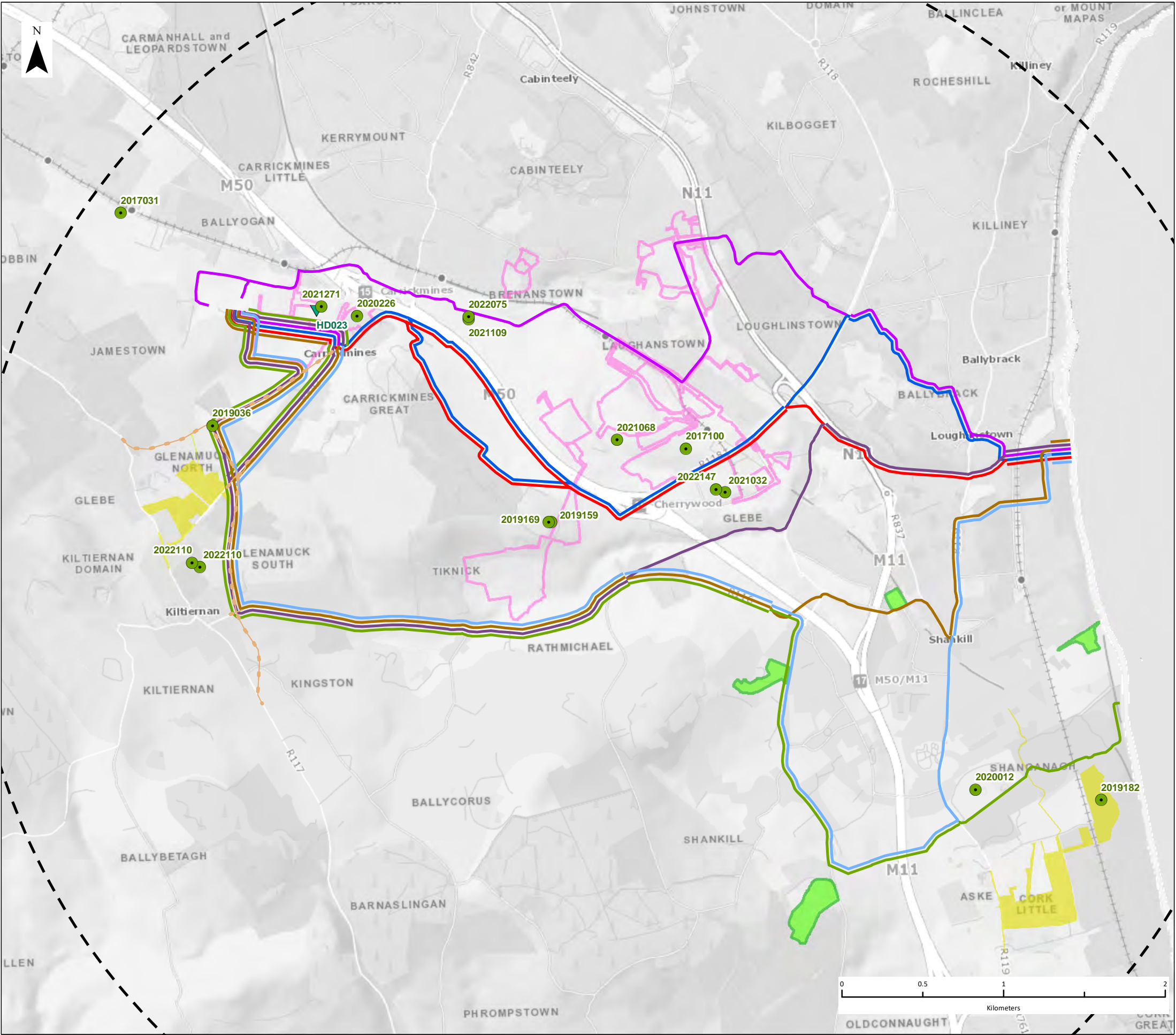
DRAWING TITLE
**WIDER STUDY AREA ZONING
OBJECTIVES FROM DUN LAOGHAIRE
RATHDOWN COUNTY DEVELOPMENT PLAN**

VER	DATE	REMARKS	Drawn	Checked
1	17/11/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 5.2

SCALE	1:40,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- Cherrywood
- Local Council Planning
- Planning Board
- EIA Location
- EIA Location - Archived
- Strategic Infrastructure Development

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Planning Application Data obtained from the Dún Laoghaire Rathdown County Planning Viewer.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster

PROJECT TITLE

DUBLIN ARRAY

DRAWING TITLE

PLANNING APPLICATIONS

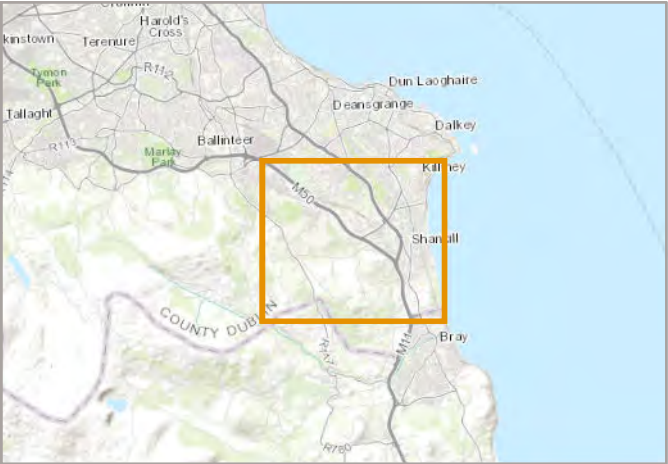
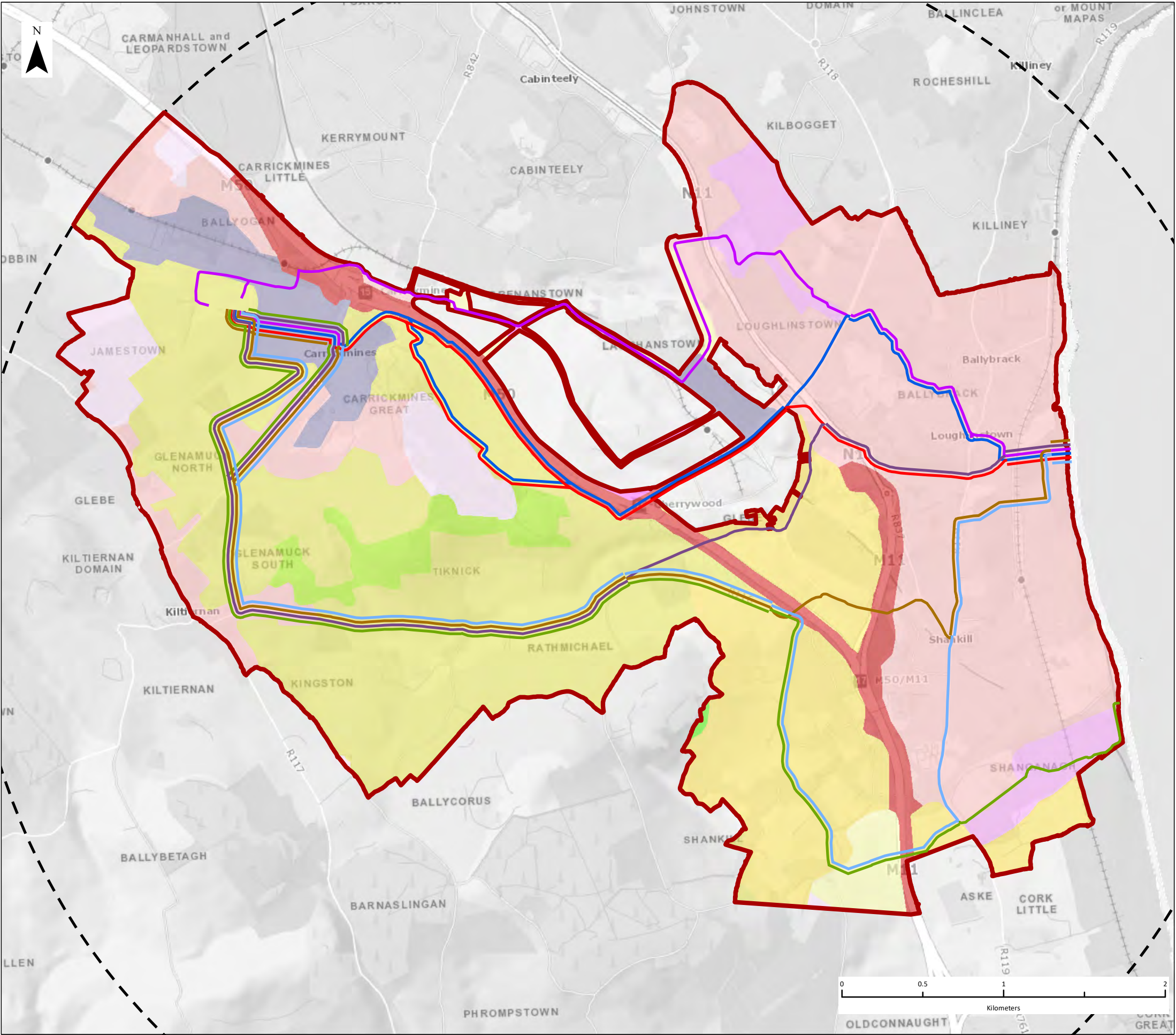
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FIGURE 5.4

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

Priority Search Area The Wider Study Area

Route 1 Route 3 Route 5 Route 7

Route 2 Route 4 Route 6

Corine Landcover 2018

- 112: Discontinuous urban fabric
- 121: Industrial or commercial units
- 122: Road and rail networks and associated land
- 133: Construction sites
- 141: Green urban areas
- 142: Sport and leisure facilities
- 211: Non-irrigated arable land
- 231: Pastures
- 242: Complex cultivation patterns
- 243: Land principally occupied by agriculture, with significant areas of natural vegetation
- 313: Mixed forest
- 324: Transitional woodland-shrub
- 523: Sea and ocean

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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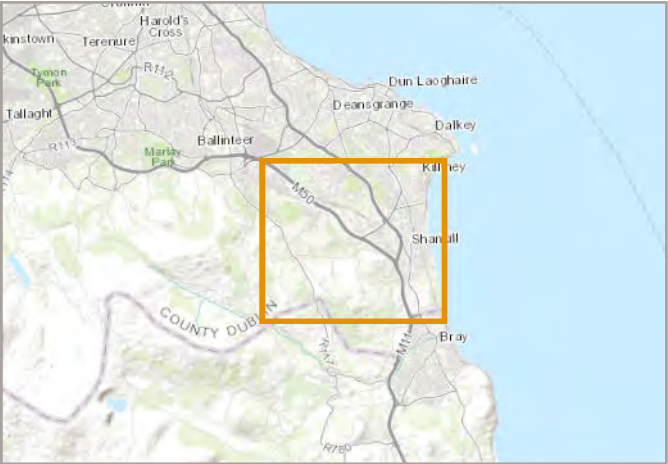
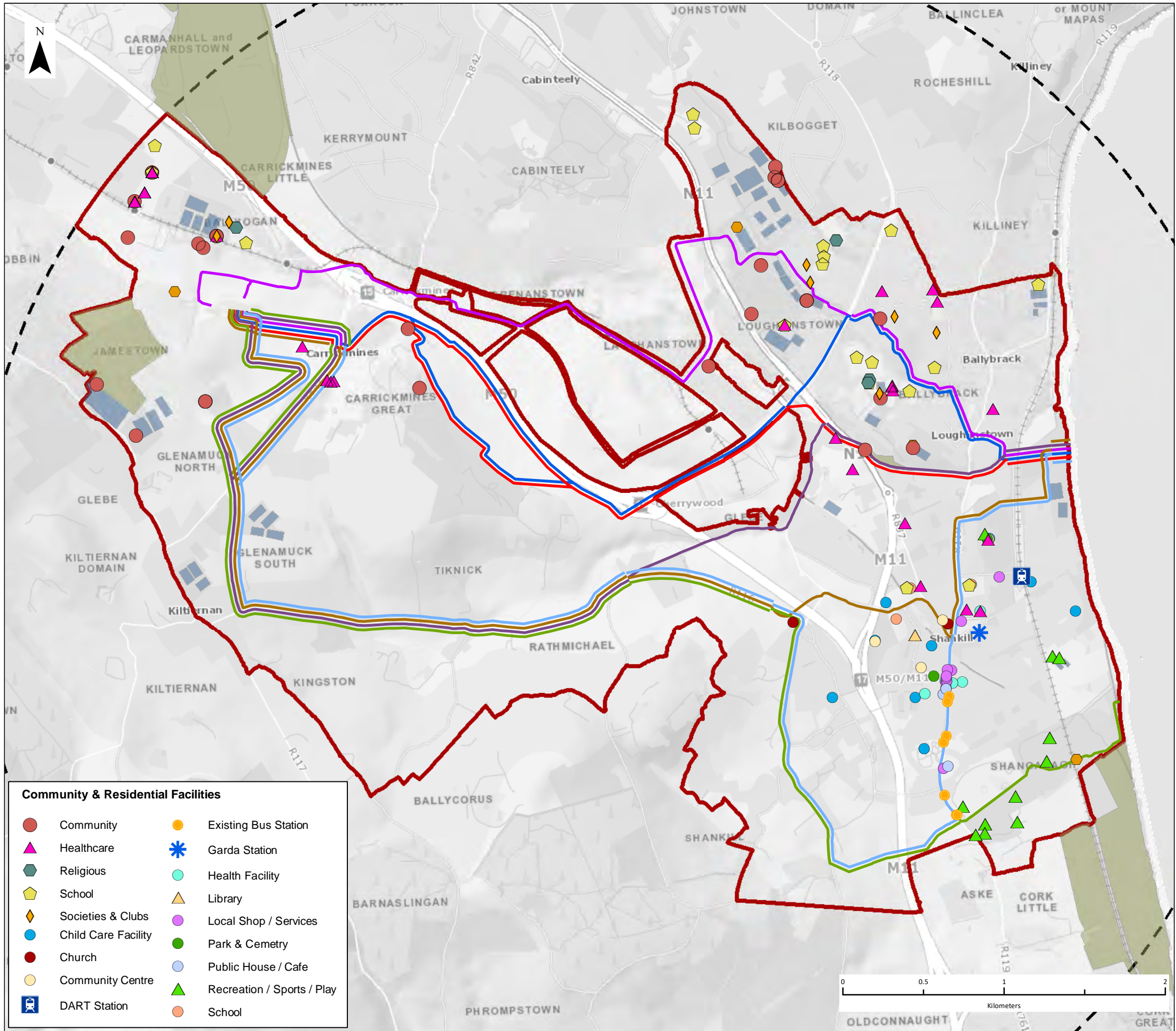
CORINE LANDCOVER

VER	DATE	REMARKS	Drawn	Checked
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FIGURE 5.5

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- Dog Walking
- Recreational Activities**
- Outdoor Sports Facility
- Sports Pitches & Playgrounds

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User

PROJECT TITLE
DUBLIN ARRAY

DRAWING TITLE
**COMMUNITY/RESIDENTIAL FACILITIES,
TOURISM, RECREATION & AMENITIES**

VER	DATE	REMARKS	Drawn	Checked
1	17/11/2022	FIRST ISSUE	AGB	AA

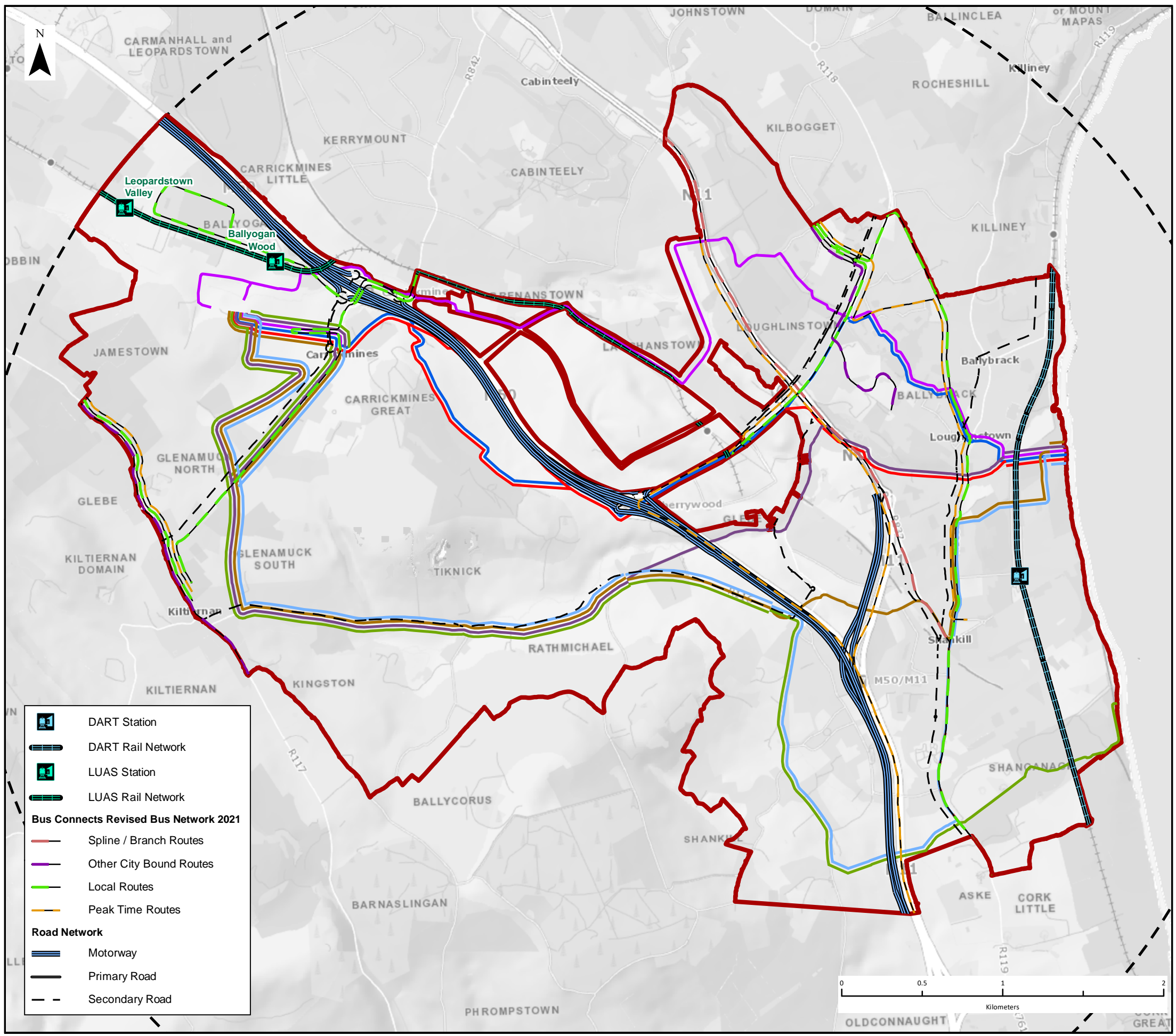
DRAWING NUMBER:
FIGURE 5.6

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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Community & Residential Facilities

- Community
- Healthcare
- Religious
- School
- Societies & Clubs
- Child Care Facility
- Church
- Community Centre
- DART Station
- Existing Bus Station
- Garda Station
- Health Facility
- Library
- Local Shop / Services
- Park & Cemetery
- Public House / Cafe
- Recreation / Sports / Play
- School



LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE

DUBLIN ARRAY

DRAWING TITLE

ELECTRICITY NETWORKS,
TRAFFIC & TRANSPORTATION

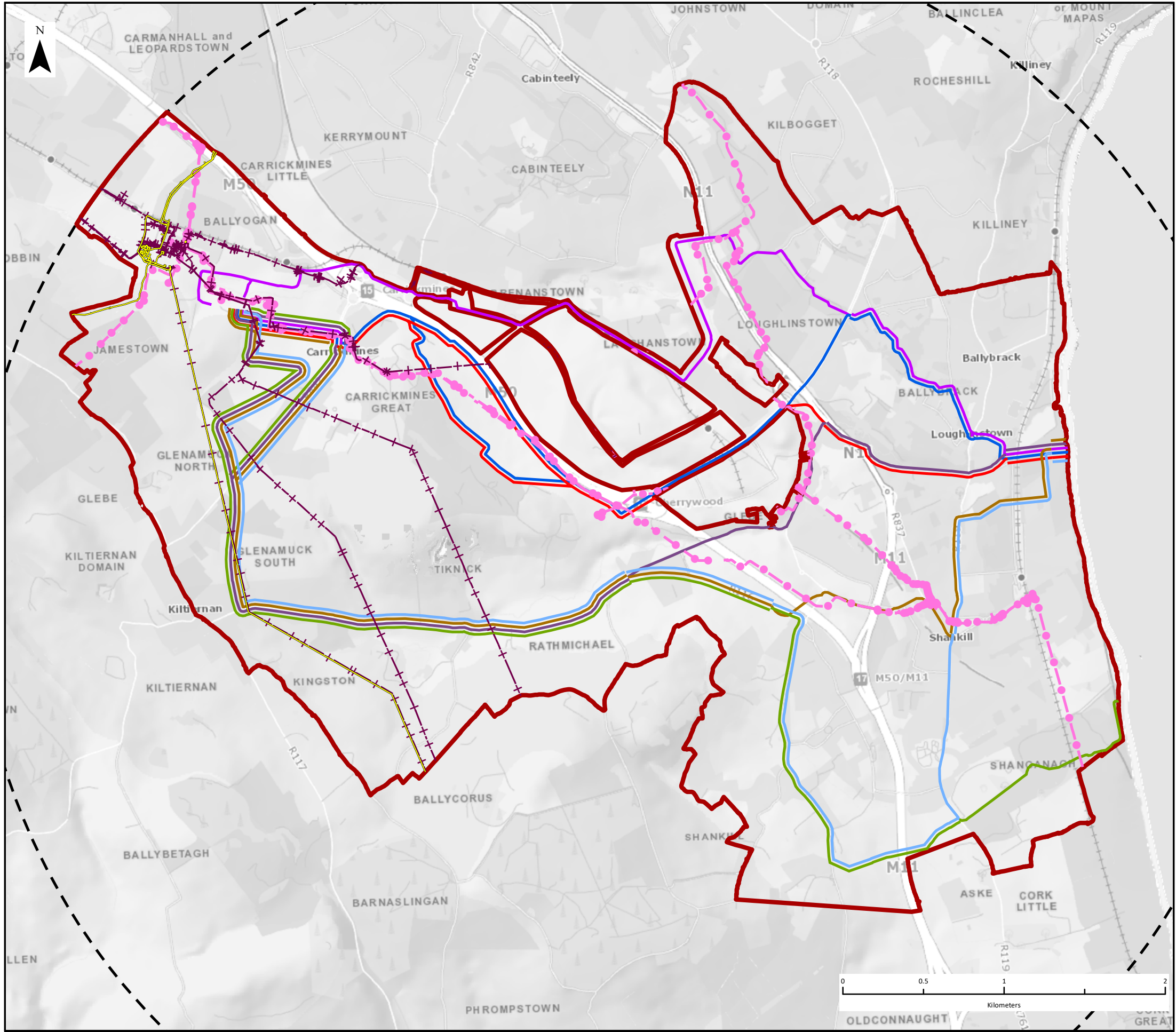
VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:

FIGURE 5.7a

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7

High Voltage Transmission Line

- 38kV Network Object
- 110kV Network Object
- 220kV Network Object

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

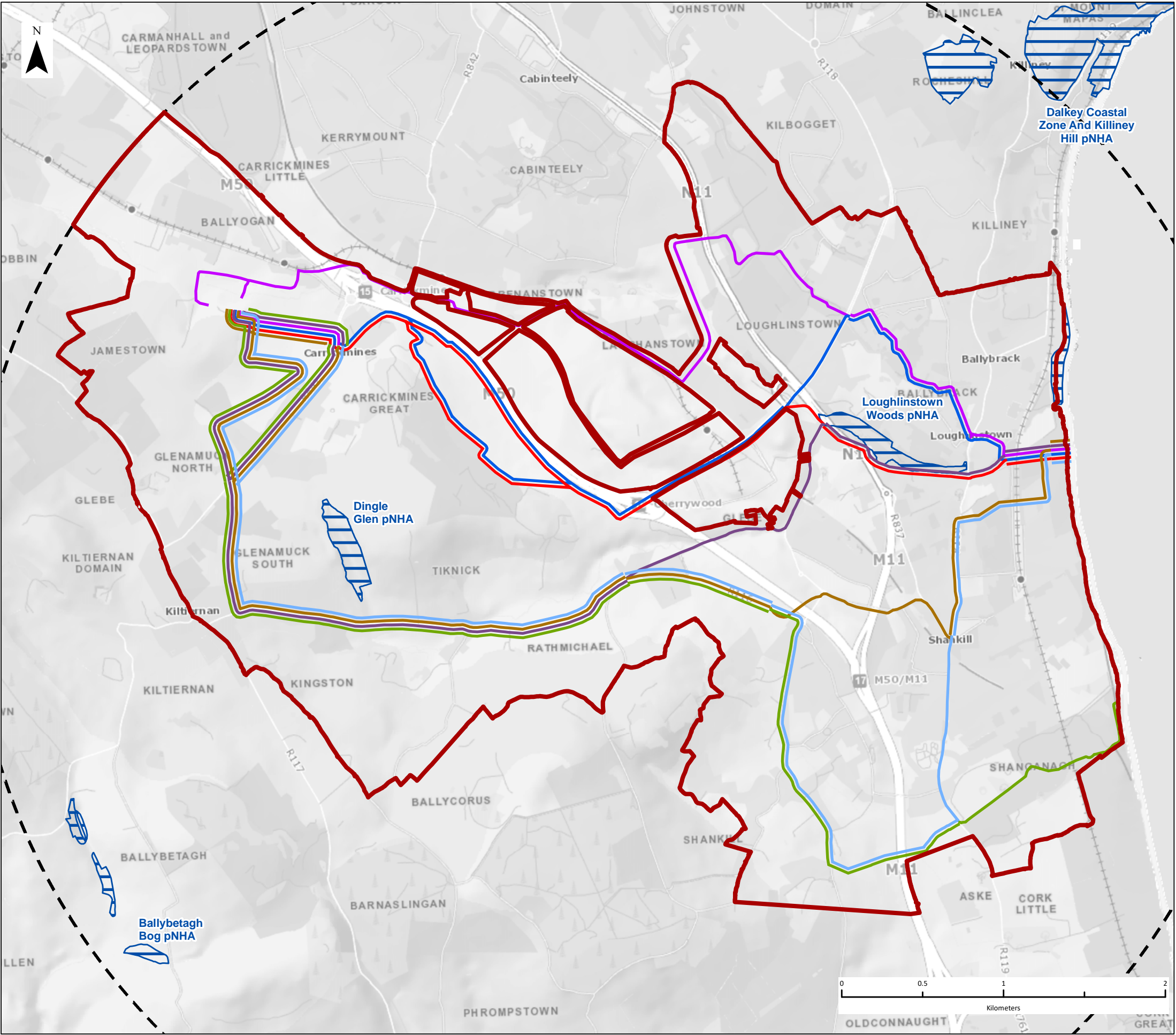
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**ELECTRICITY NETWORKS,
TRAFFIC & TRANSPORTATION**

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.7b

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- Proposed Natural Heritage Area (pNHA)

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE

DUBLIN ARRAY

DRAWING TITLE

DESIGNATED SITES

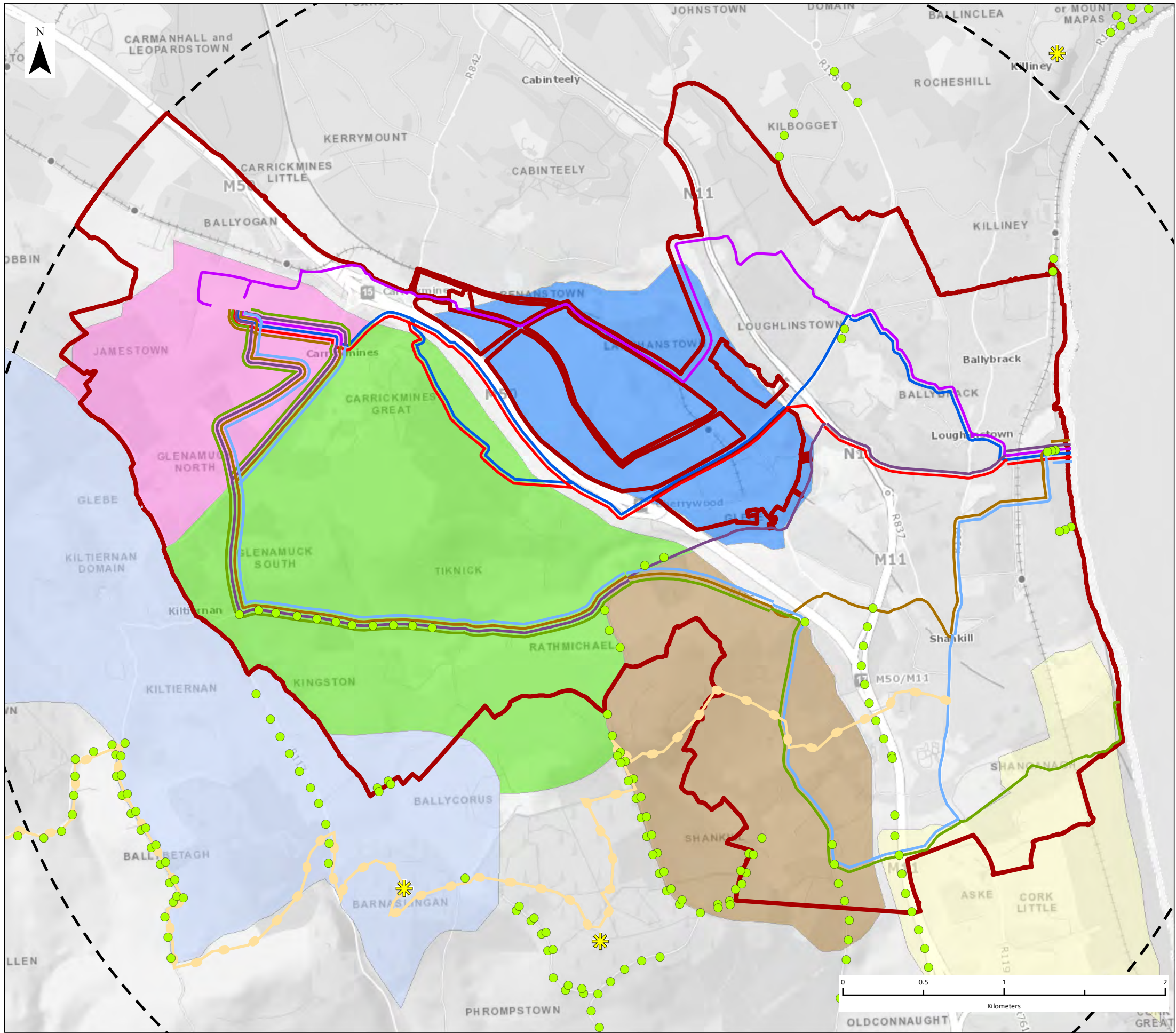
VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:

FIGURE 5.8

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- To Preserve Prospects
- To Preserve Views
- Dublin Mountains Way
- Landscape Character Assessment**
- Ballycorus
- Carrickmines
- Cherrywood/Rathmichael
- Kiltiernan Plain
- Rathmichael
- Shanganagh

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
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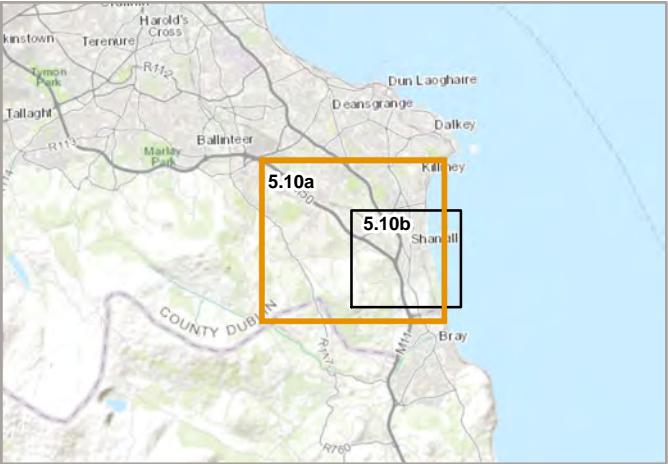
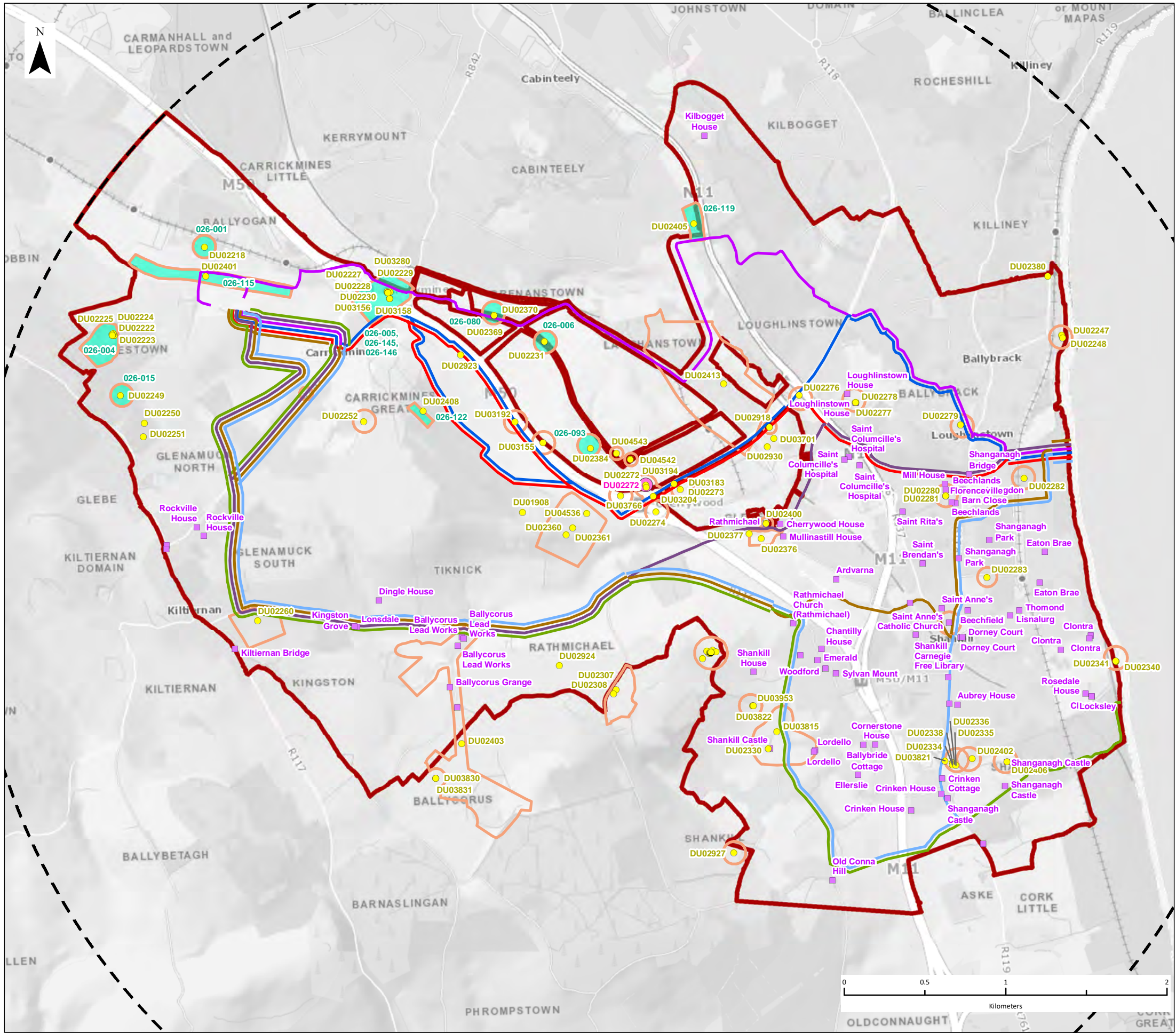
DRAWING TITLE
LANDSCAPE CHARACTER & CONSTRAINTS

VER	DATE	REMARKS	Drawn	Checked
1	17/11/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 5.9

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- National Monument
- National Inventory of Architectural Heritage Building / Recorded Protected Structure
- Monument in State Care
- Records of Monuments and Place
- SMR Zone of Notification

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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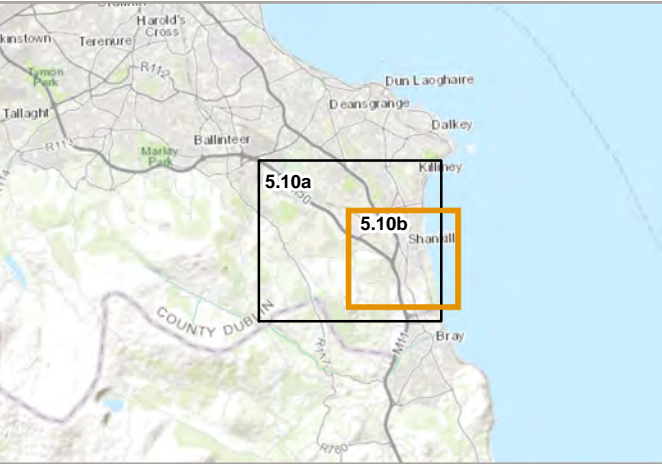
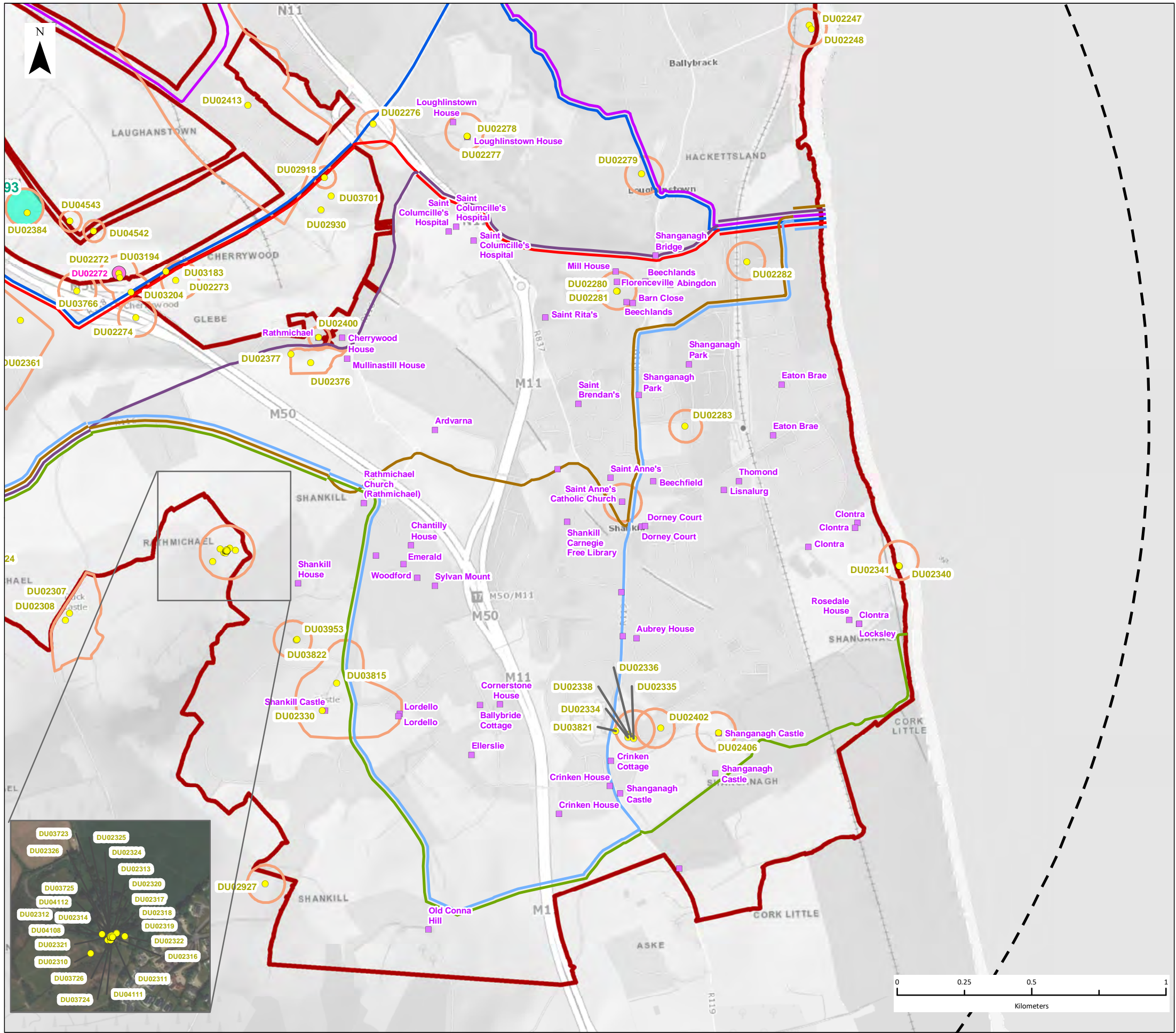
DRAWING TITLE
**ARCHAEOLOGY, ARCHITECTURAL
& CULTURAL HERITAGE CONSTRAINTS**

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DRAWING NUMBER:
FIGURE 5.10a

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- National Monument
- National Inventory of Architectural Heritage Building / Recorded Protected Structure
- Monument in State Care
- Records of Monuments and Place
- SMR Zone of Notification

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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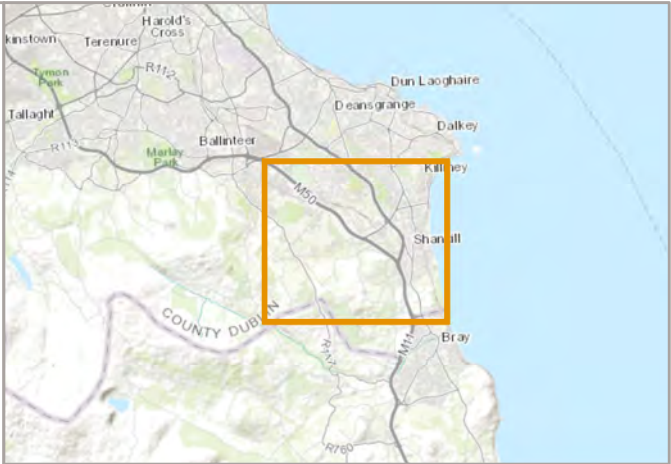
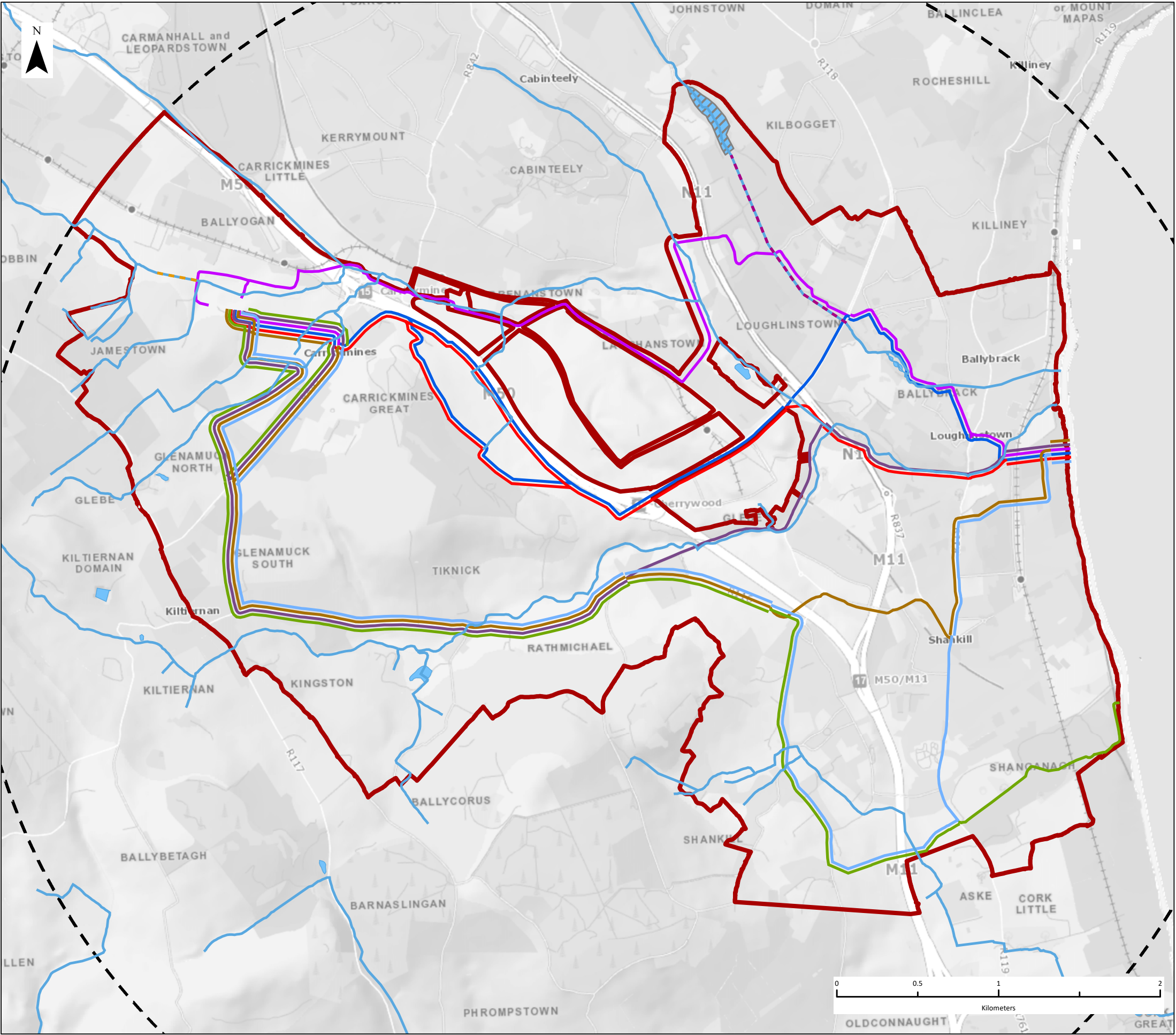
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**ARCHAEOLOGY, ARCHITECTURAL
& CULTURAL HERITAGE CONSTRAINTS**

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.10b

SCALE	1:15,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- Culvert under Ballyogan Former Landfill
- Indicative Path of Culvert for Deansgrange Stream
- Watercourse
- Waterbody
- Kill-o-the-Grange Stream Flood Attenuation areas for DLR Deansgrange Flood Relief Scheme (DLRC)

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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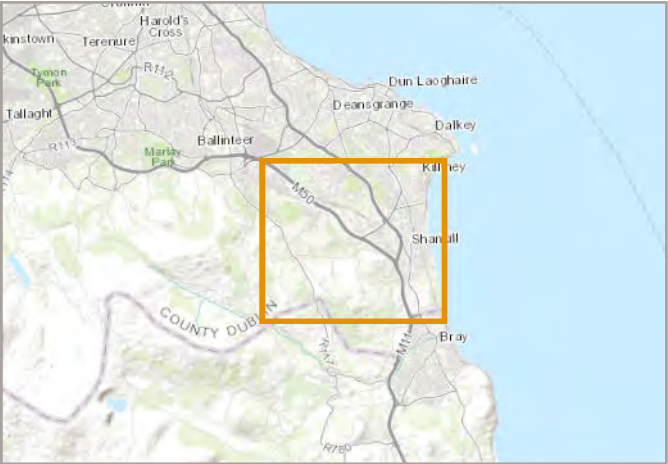
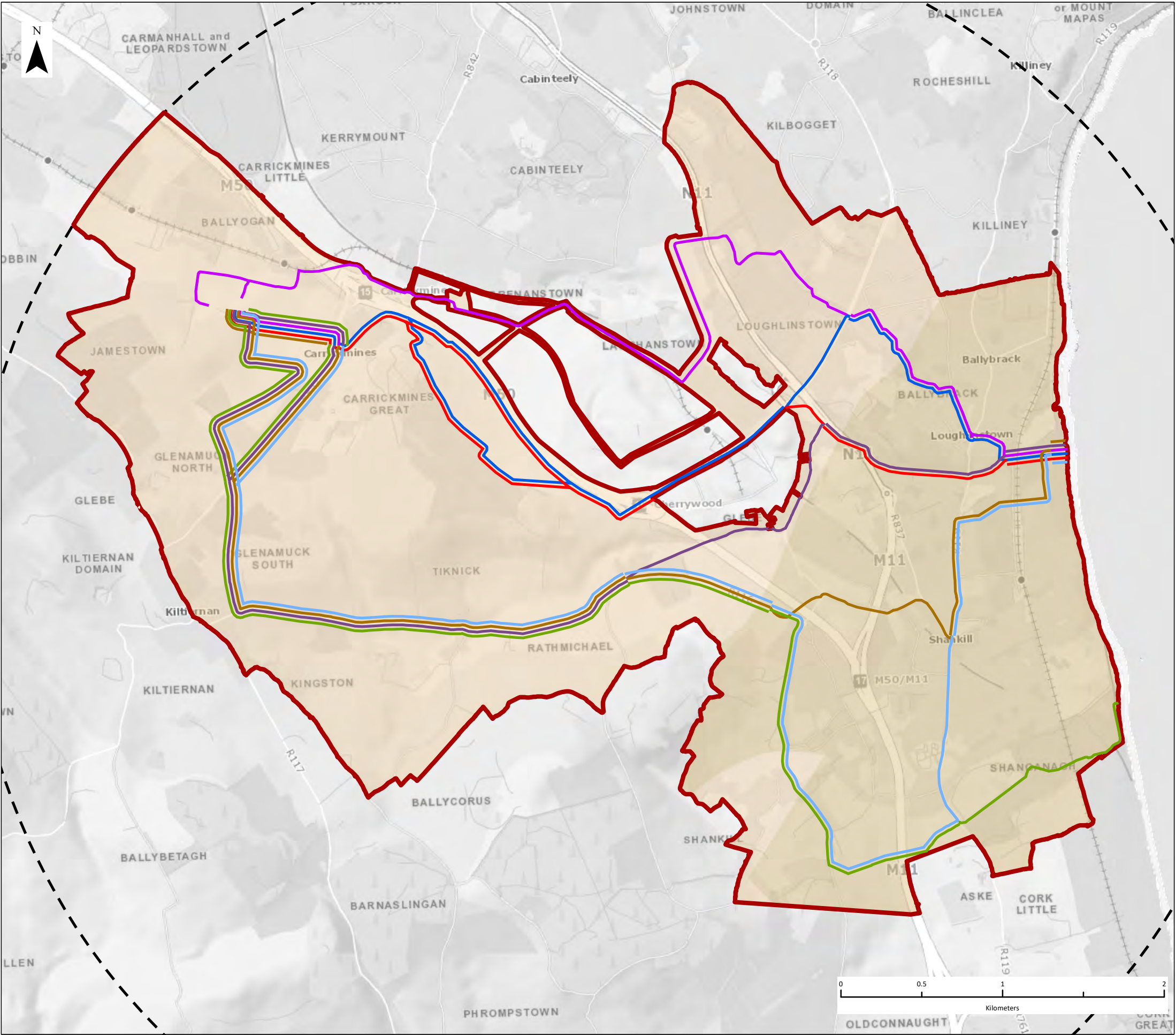
DRAWING TITLE
SURFACE WATER & CFram CONSTRAINTS

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.11

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7

Groundwater Bedrock Aquifers

- LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- PI - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
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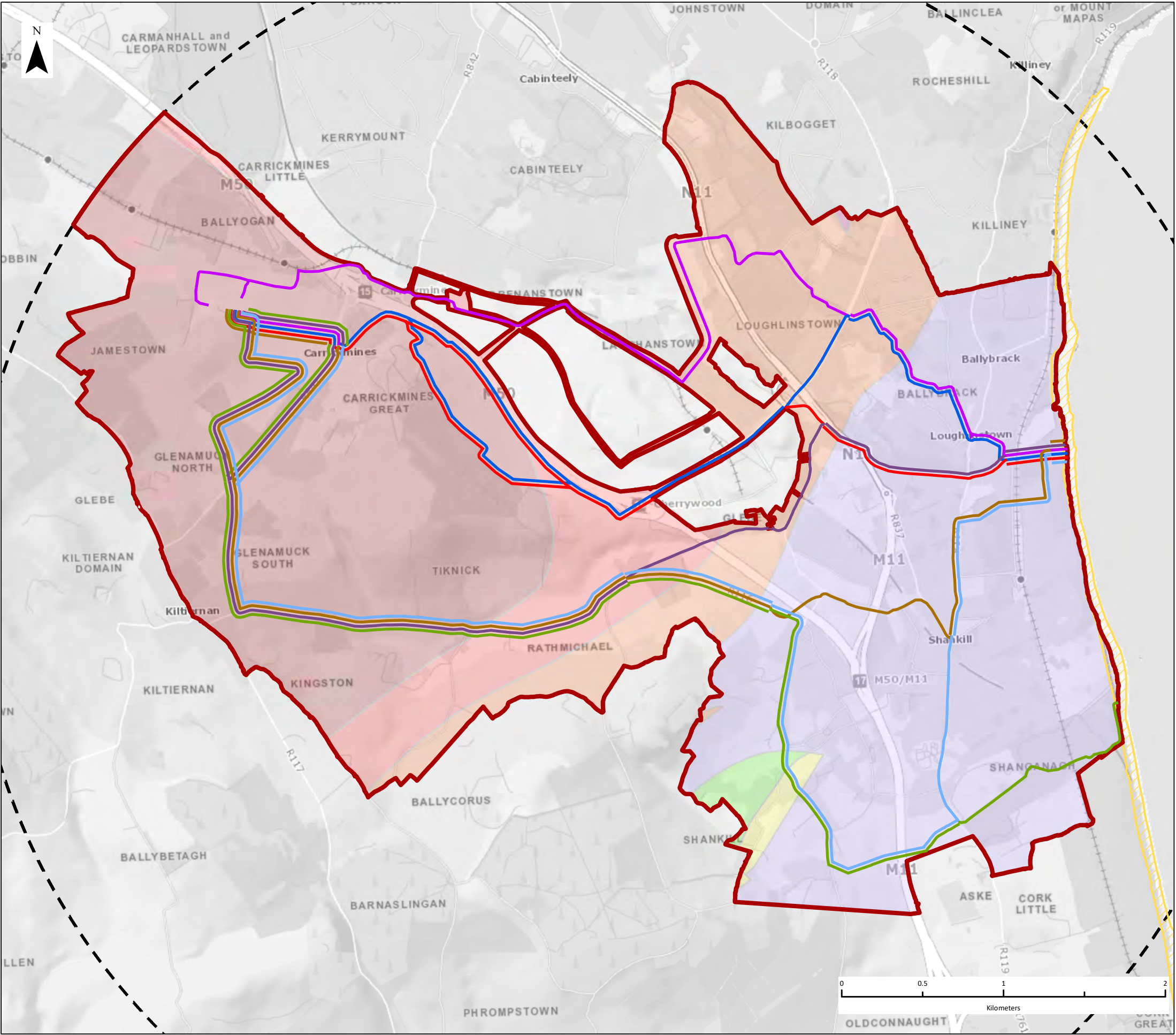
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HYDROGEOLOGY

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.12

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

Priority Search Area

The Wider Study Area

Route 1 Route 4 Route 7

Route 2 Route 5

Route 3 Route 6

Geological Heritage Area

Bedrock Geology

Bray Head Formation

In Bray Head Formation

Type 1 granodiorite

Type 3 muscovite porphyritic

Type 2e equigranular

Type 2p microcline porphyritic

Maulin Formation

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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GEOLOGY

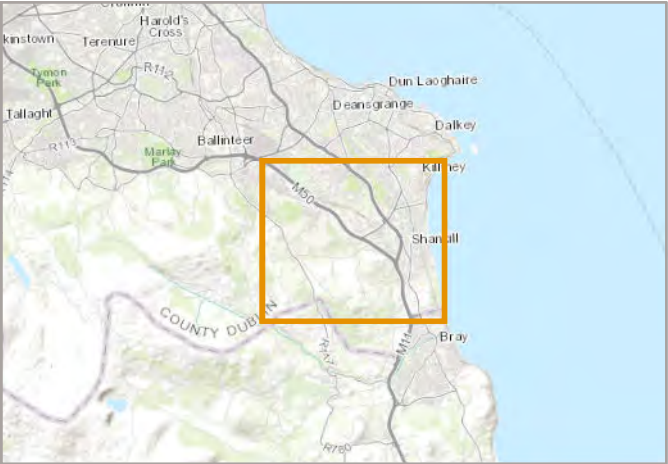
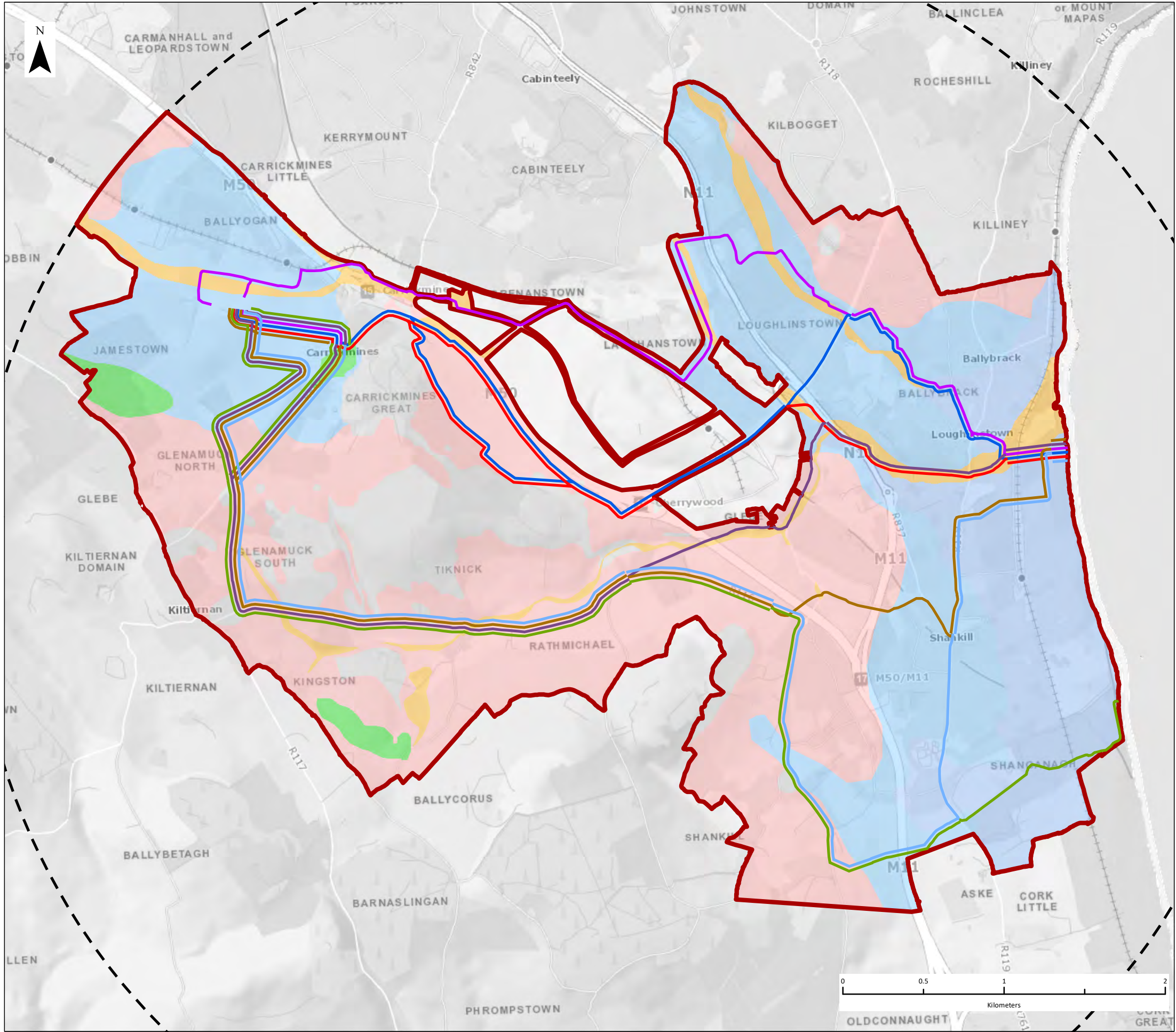
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DRAWING NUMBER:

FIGURE 5.13

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7

Superficial Geology

- Alluvium
- Gravels Derived from Chert, Granite and Limestones
- Irish Sea Till Derived from Limestones
- Marine Beach Sands
- Bedrock Outcrop or Subcrop
- Till Derived from Granites
- TLs, Till Derived from Limestones

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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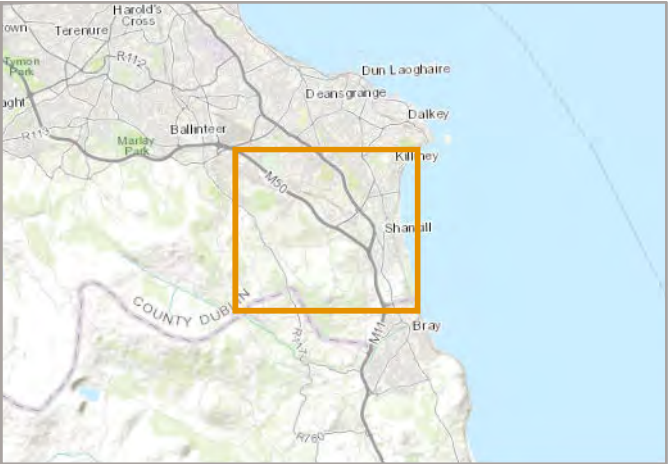
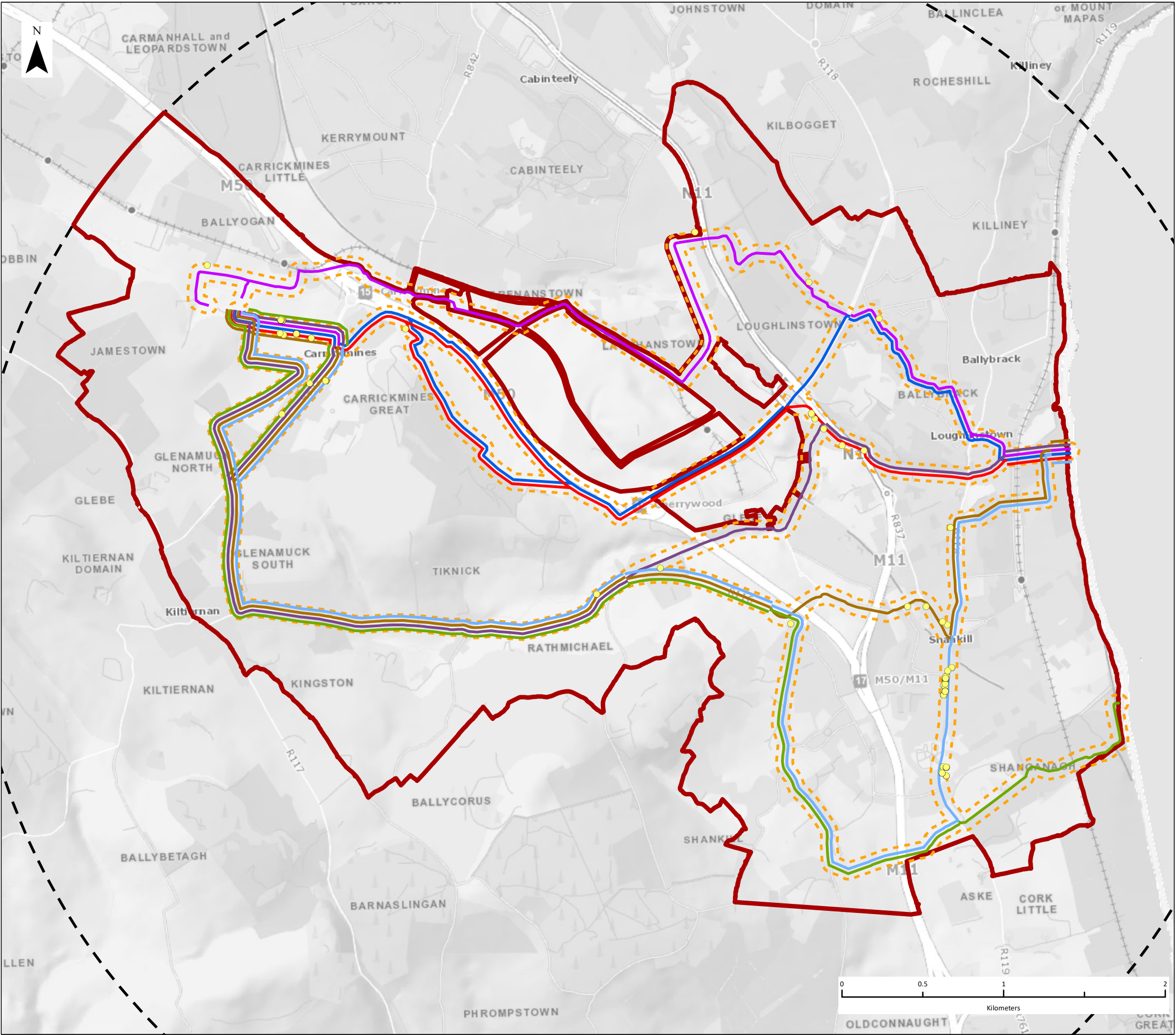
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SUBSOILS

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.14

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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LEGEND

- Priority Search Area
- The Wider Study Area
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- All Routes 50m Buffer
- Sensitive Noise Receptor within 50m of a Cable Route

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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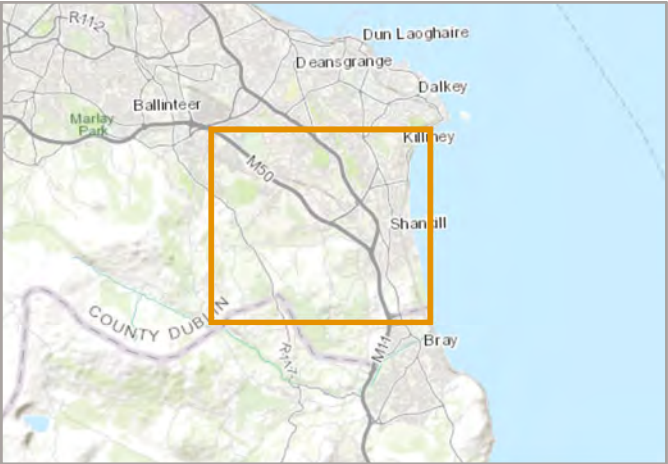
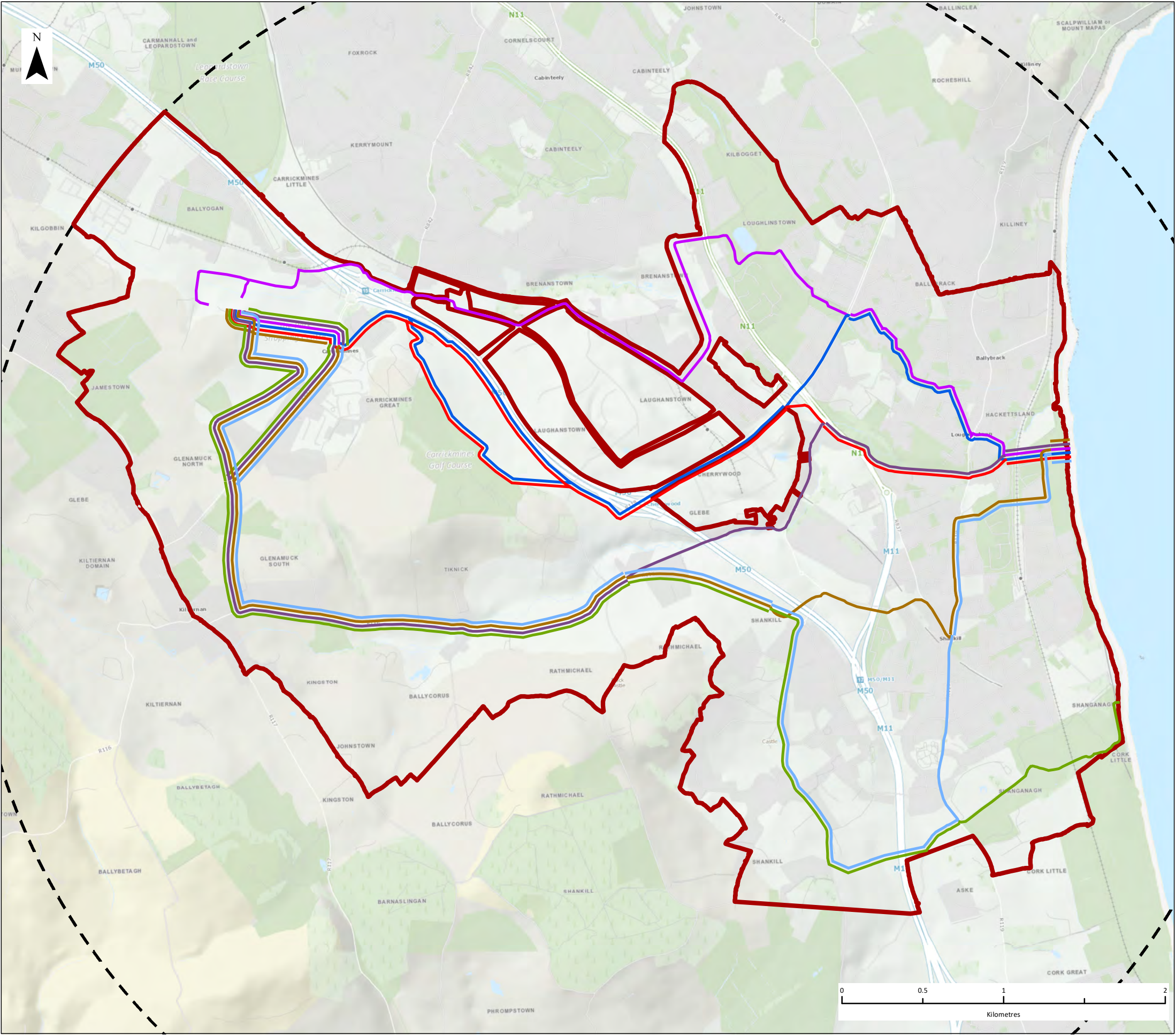
DRAWING TITLE
SENSITIVE NOISE RECEPTORS

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 5.15

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 1
 - Route 2
 - Route 3
 - Route 4
 - Route 5
 - Route 6
 - Route 7

Notes:
Overlying multiple route options are shown as parallel lines

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE

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DRAWING TITLE

Shortlist Options

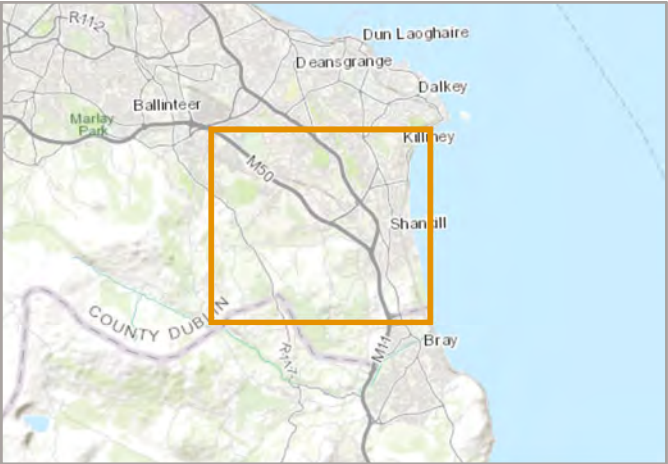
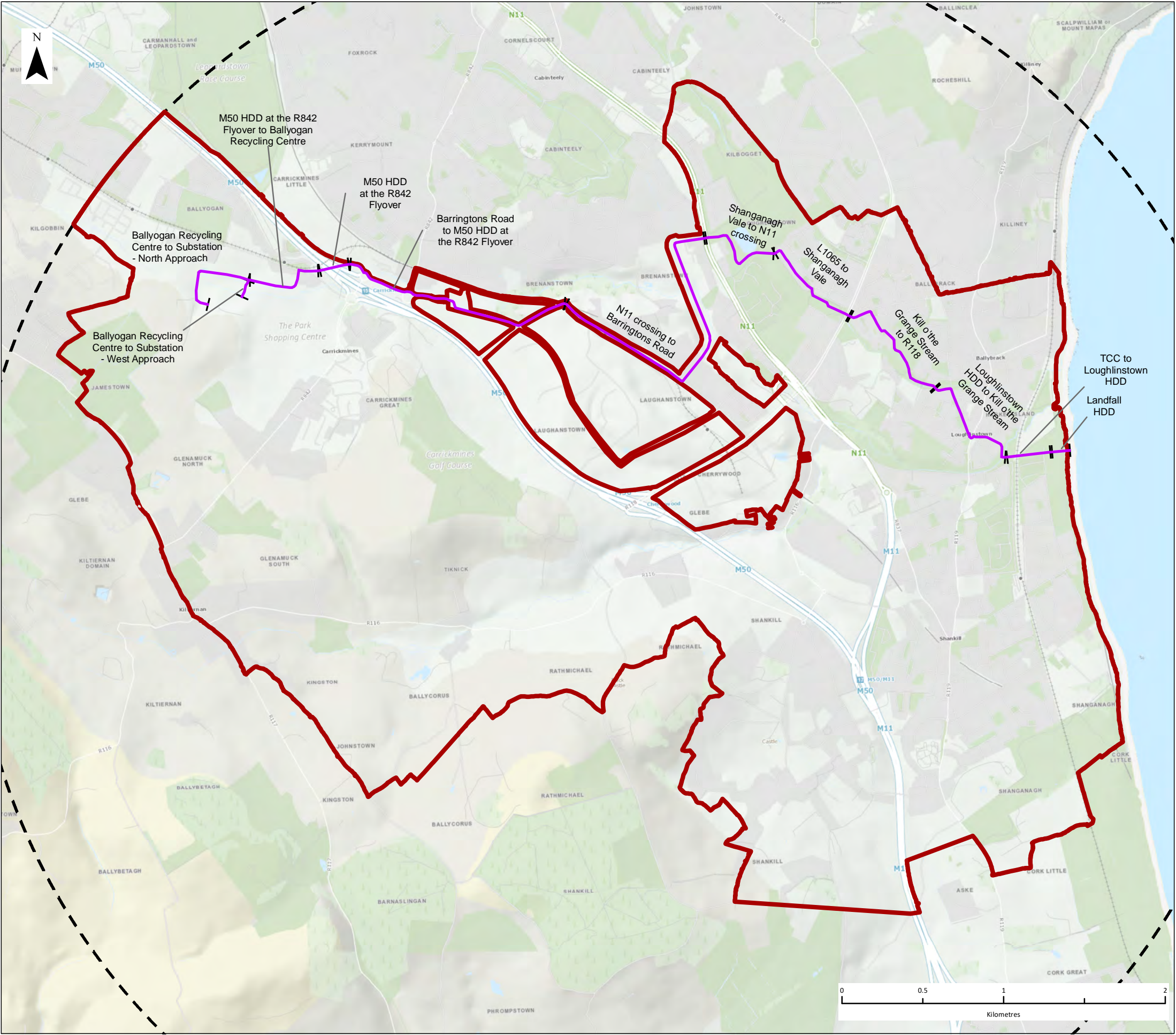
VER	DATE	REMARKS	Drawn	Checked
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FIGURE 9.1

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 1
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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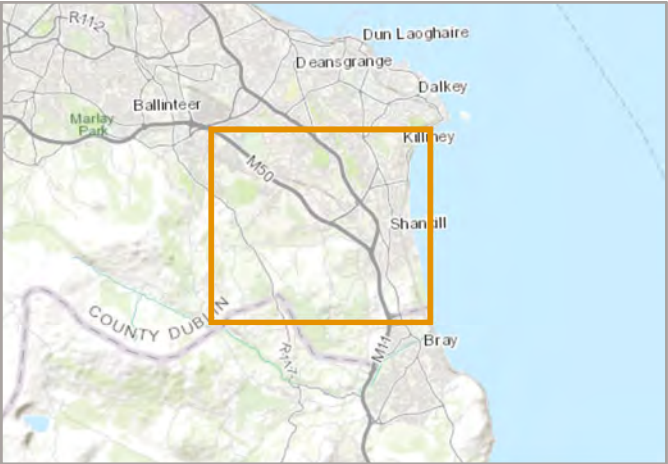
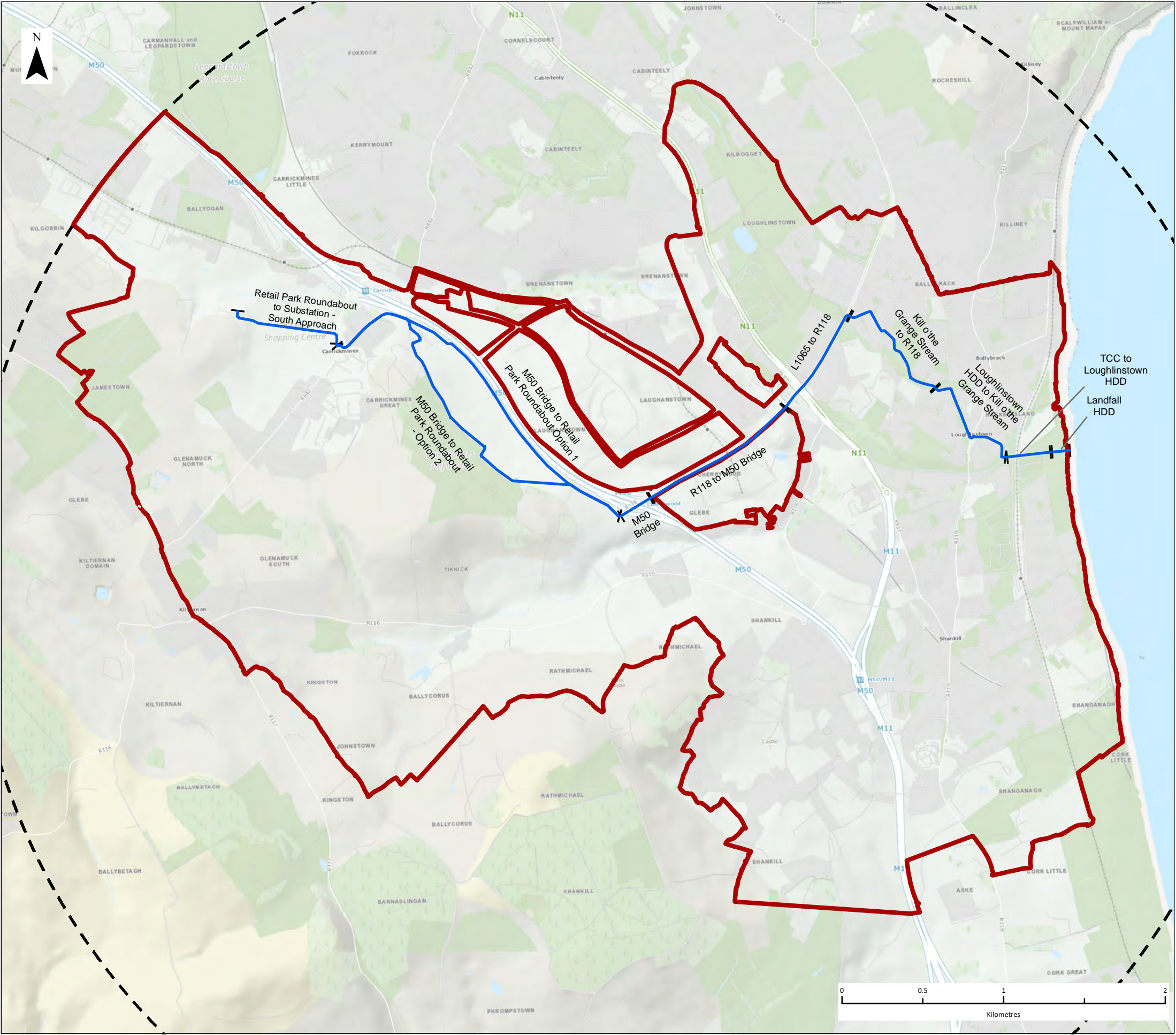
DRAWING TITLE
Route 1 Overview

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DRAWING NUMBER:
FIGURE 9.2

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 2
 - | Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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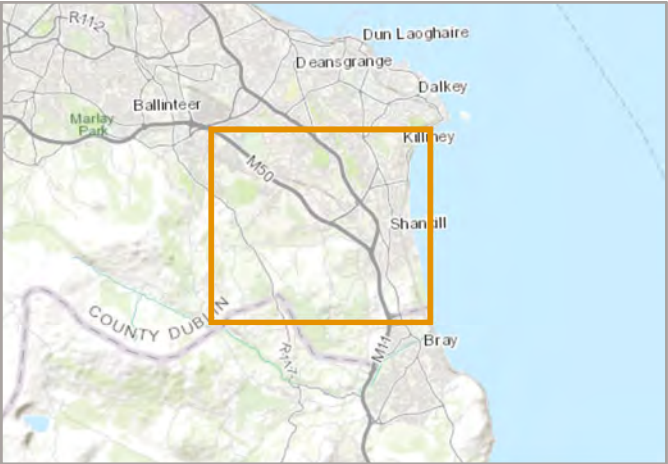
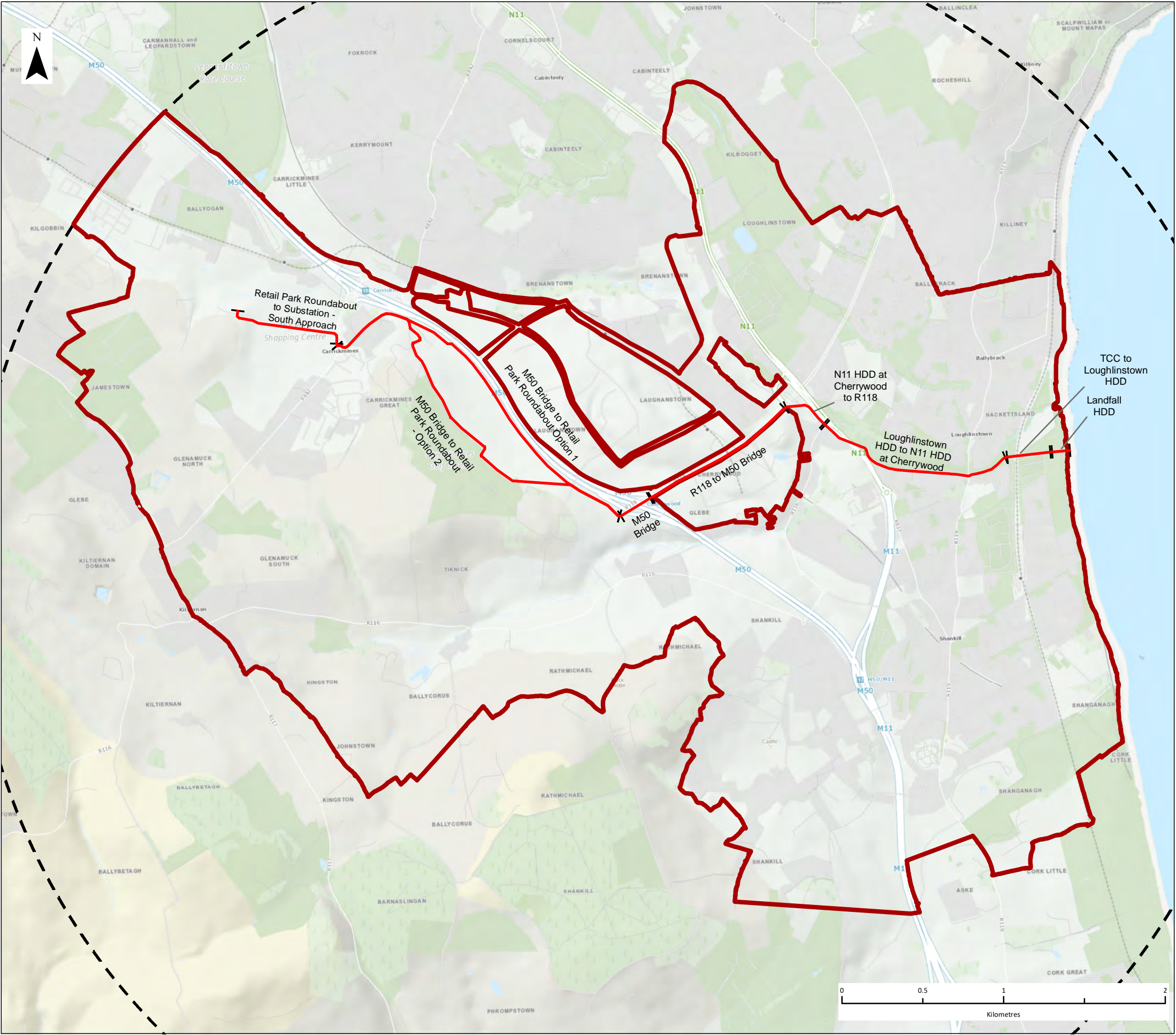
DRAWING TITLE
Route 2 Overview

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
FIGURE 9.3

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 3
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

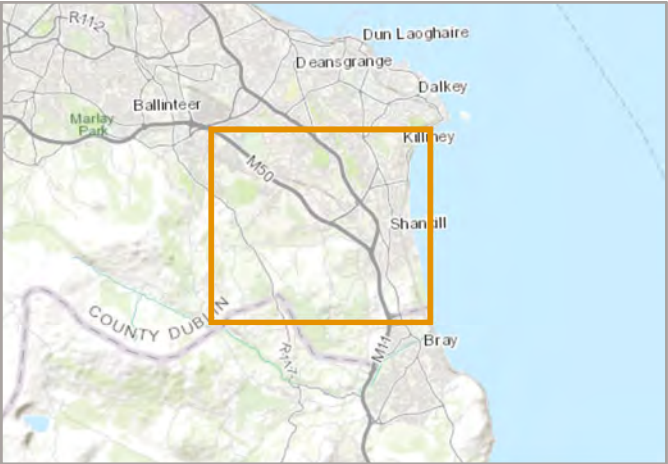
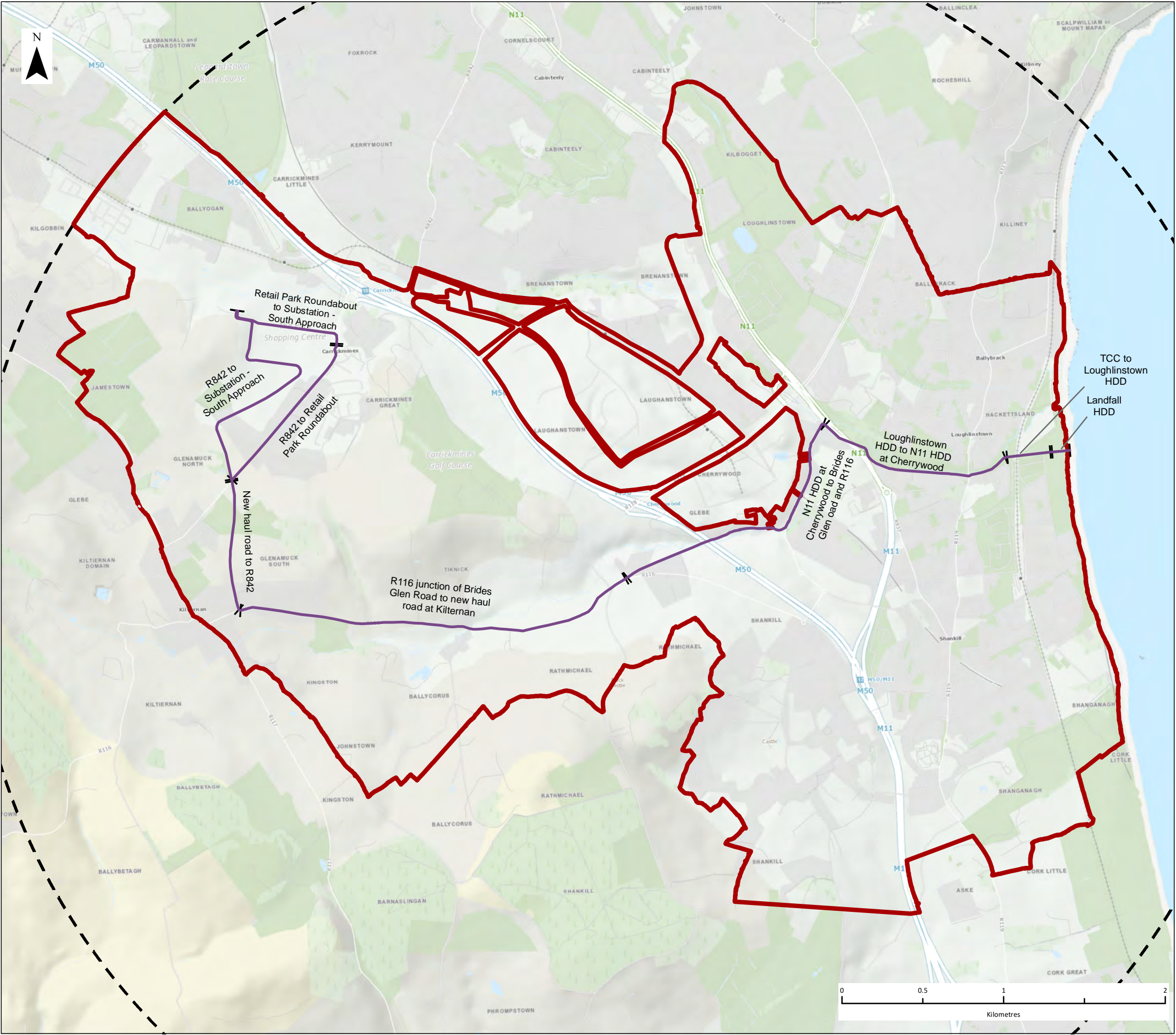
DRAWING TITLE
Route 3 Overview

VER	DATE	REMARKS	Drawn	Checked
1	22/07/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 9.4

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 4
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

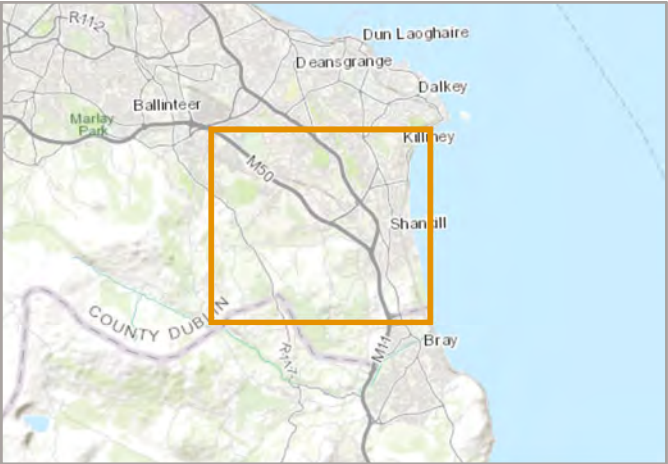
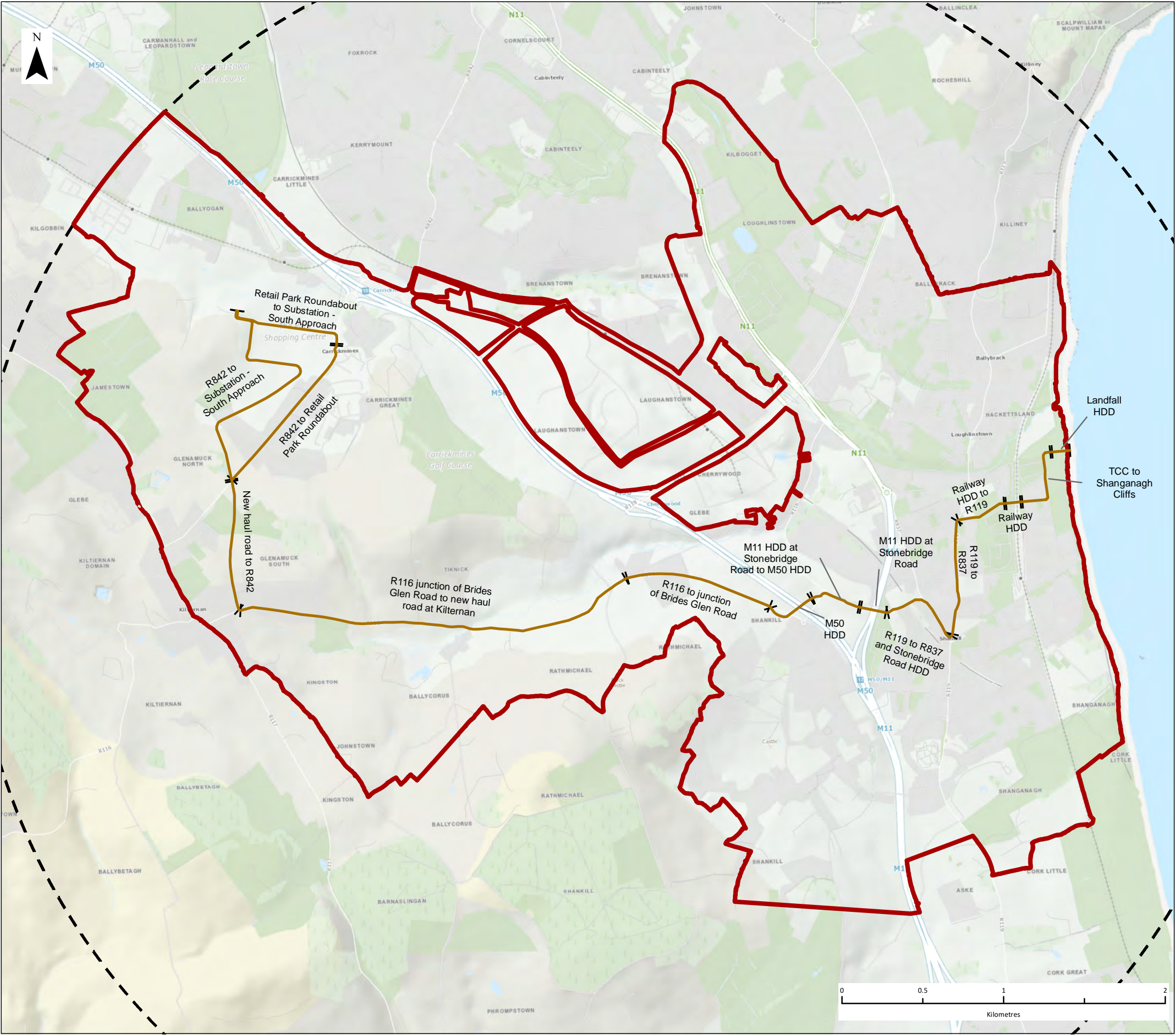
DRAWING TITLE
Route 4 Overview

VER	DATE	REMARKS	Drawn	Checked
1	22/07/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 9.5

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 5
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

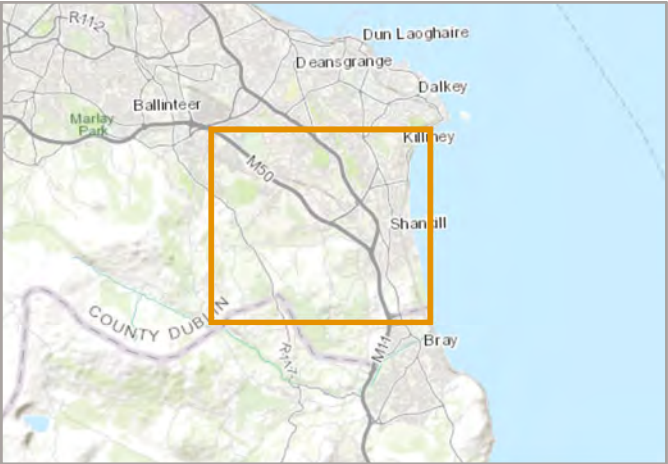
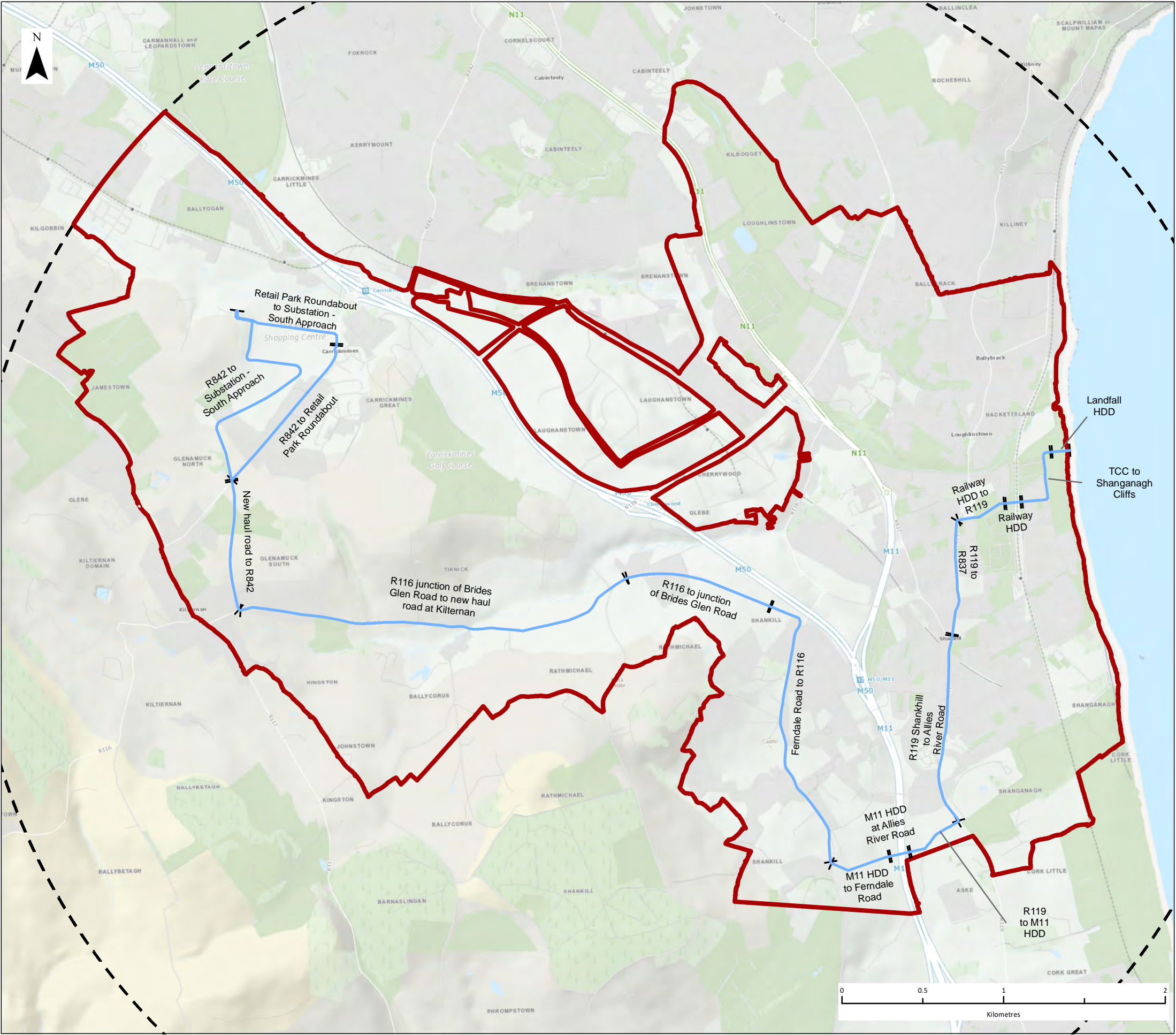
DRAWING TITLE
Route 5 Overview

VER	DATE	REMARKS	Drawn	Checked
1	22/07/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 9.6

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 6
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

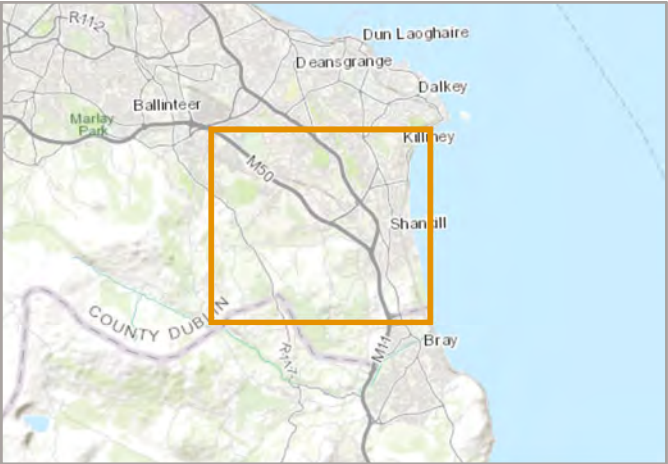
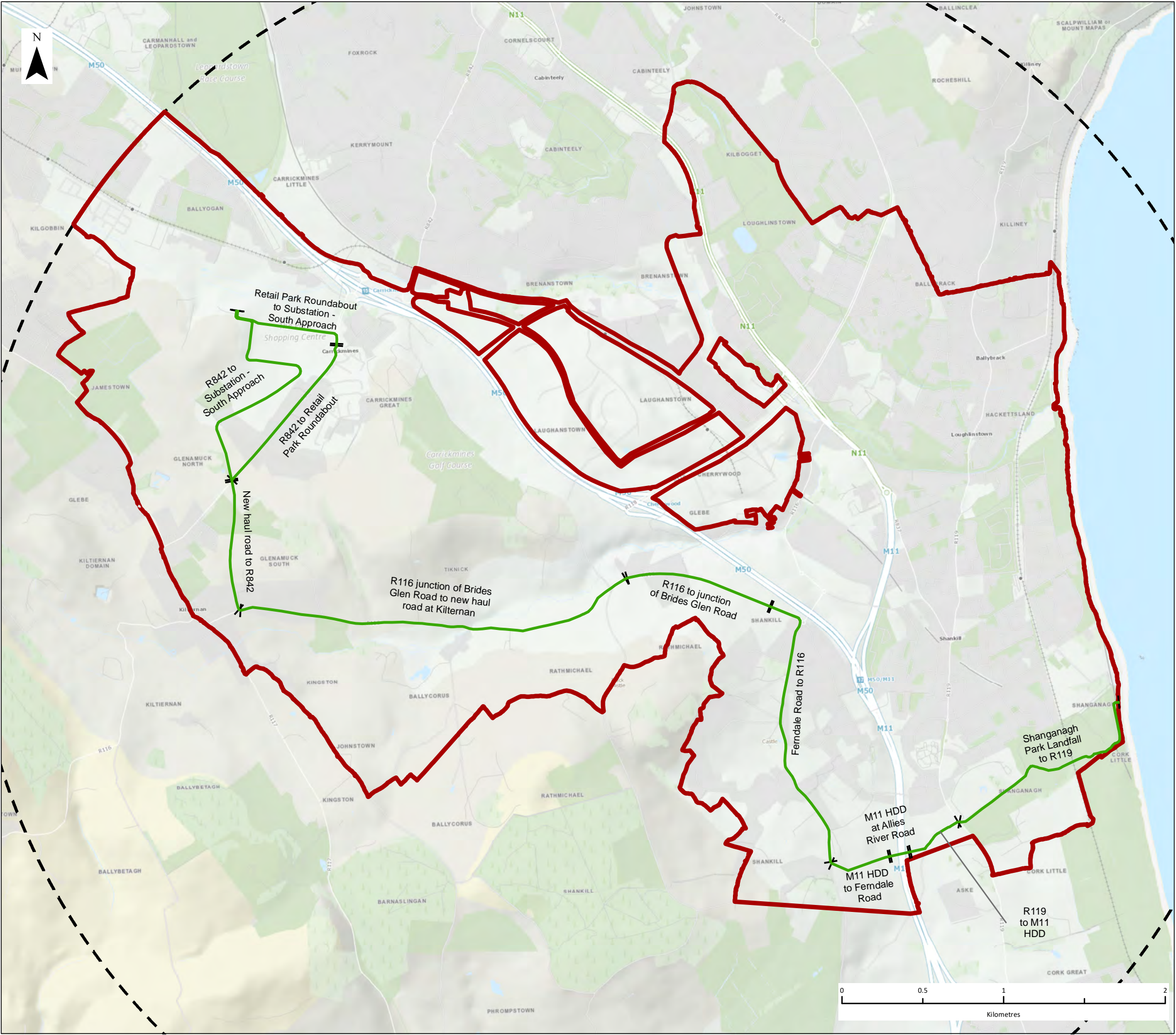
DRAWING TITLE
Route 6 Overview

VER	DATE	REMARKS	Drawn	Checked
1	22/07/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 9.7

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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- LEGEND**
- Priority Search Area
 - The Wider Study Area
 - Route 7
 - Route Segments

Data Source:
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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PROJECT TITLE
DUBLIN ARRAY

DRAWING TITLE
Route 7 Overview

VER	DATE	REMARKS	Drawn	Checked
1	22/07/2022	FIRST ISSUE	AGB	AA

DRAWING NUMBER:
FIGURE 9.8

SCALE	1:25,000	PLOT SIZE	A3	DATUM	D_TM65	PROJECTION	TM65
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Cable Route Assessment Report

Dublin Array

January 2023

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Mott MacDonald
South Block
Rockfield
Dundrum
Dublin 16
D16 R6V0
Ireland

T +353 (0)1 2916 700
mottmac.com

RWE

Cable Route Assessment Report

Dublin Array

January 2023

Directors: J T Murphy BE HDipMM CEng
FIEI FConsEI FIAE (Managing), D Herlihy
BE MSc CEng, R Jefferson BSc MSCS
MRICS MCIArb DipConLaw, J Shinkwin
BE DipMechEng CEng MIEI, M D Haigh
BSc CEng FICE MCIWEM (British)
Innealtóirí Comhairleach (Consulting
Engineers)
Company Secretary: Michael Cremin CPA
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1 Introduction

1.1 General

RWE have appointed Mott MacDonald Ireland Limited (MM) to provide HV cable route assessment and HV cable design services as part of a variation to an existing wider contract associated with the Dublin Array offshore windfarm.

RWE provided MM with seven cable route options that were developed as part of an earlier optioneering exercise. MM have assessed these routes and select a preferred route option based on the approach identified in the next section.

1.2 Scope

1.2.1 Cable Route Review

The seven preliminary cable routes (as provided by RWE) were reviewed under the criteria identified in Table 1.1. These criteria provide an appropriate and consistent approach when compared to other similar type HV cable route assessments.

Table 1.1: Performance Criteria

Criteria	Sub Criteria	Details
Constructability	Utility congestion	This will consider the number of existing below ground services along the proposed cable route and the complexity of crossing or running parallel to these services.
	Traffic management	This will consider the requirement for road closures, lane closures and the impact that this may have on the area in question.
	Abnormal loads	This will consider the capacity of the cable route to accommodate abnormal loads for cable drum delivery and offloading.
	Joint Bay locations	This will consider the capacity of the cable route to accommodate precast HV cable joint bays during both the construction and operational phases.
Cost	-	Costs will be identified for each cable route based on a standard €4.1m cost per km for a double circuit 220kV cable installation. Additional costs of €1000 per metre will be included for trenchless technique sections.
Programme	-	The programme for the cable works will be calculated based on a single installation crew working at a rate of 30 metres per day.

1.2.2 Cable Route Assessment

The various routes were assessed based on the performance scheme as per Table 1-2 below.

Table 1-2: Assessment Table

Description	Impact
Low risk /complexity/cost/duration <i>(Criteria shall be awarded a low risk for example if no utility services are in the proposed route)</i>	Low
Low to moderate risk/complexity/cost/duration <i>(Criteria shall be awarded a Low to moderate risk for example if there is a minimum level of utility services effected by the proposed route)</i>	Low Moderate
Moderate risk/complexity/cost/duration <i>(Criteria shall be awarded a Moderate risk for example if the number of utility services are as per the norm in the proposed route)</i>	Moderate
Moderate to high risk/complexity/cost/duration <i>(Criteria shall be awarded a Moderate to high risk for example if there is a high level of utility services effected by the proposed route)</i>	Moderate High
High risk/complexity/cost/duration <i>(Criteria shall be awarded a High risk for example if there is no space for the proposed cable due to the number of existing utility services in the proposed route)</i>	High

Each cable route was assessed based on the criteria listed in Table 1.1 and was allocated a performance indicator ranging from low to high. An overall performance indicator was then allocated to each route to allow for a relative comparison between the seven route options.

2 Design Considerations

2.1 Cable Ratings

The two 220 kV cable circuits are required to achieve a continuous target rating of 1143 A (per circuit)¹. Thermal rating studies have assessed the following cable types in Table 2-1 to inform the minimum spacing required between circuits to achieve target ratings. The installation and environmental parameters for the ratings assessment are as per OFS-CAB-101-R1².

Conductor CSA (mm)	Insulation	Sheath/Screen
2500 (Cu, segmented, single core)	XLPE	Aluminium wire screen
2500 (Al, segmented, single core)	XLPE	Aluminium wire screen
2000 (Cu, segmented, single core)	XLPE	Aluminium sheath
1600 (Cu, segmented, single core)	XLPE	Aluminium sheath

Table 2-1: Cable types considered for thermal rating studies

2.2 Trench Configurations

The two 220 kV cable circuits will be installed in various formations as required along the onshore route from landfall to Customer station.

Typically, standard depth trefoil arrangement will require 600mm wide trench and the standard depth flat formation will require 1.1m wide trench. According to EirGrid specifications, standard depth is 950mm to the top of the HV ducts. For shallow crossings, a minimum vertical cover of 450mm may be considered, subject to prior written agreement with EirGrid.

The following trench configurations have been considered as part of the ratings assessment:

- Standard trefoil formation
- Standard flat formation
- Increased depth trefoil formation (up to 2.5m to top of backfill)
- Increased depth flat formation (up to 2.5m to top of backfill)
- Trenchless Techniques, single and multiple bores with unfilled ducts (up to 8.5m to crown of ducts)

Trenchless Techniques refers to boring/tunnelling type construction methods that allow the ducts to be routed below obstacles such as railways, watercourses, motorways and major utility crossings. These techniques may include methods such as Horizontal Directional Drilling (HDD), pipe jacking, micro-tunnelling etc.

For constructability of the double circuit sections of the routes on public roads it has been assumed that only one circuit will be constructed at any one time, therefore minimising the open trench works to 600m or 1100mm depending on the cable arrangement. This will ensure a construction enclosure width of 3m can be maintained for duct installation along the route.

During joint bay installation and cable pulling it is estimated that road closures will be required on roads with widths of less than 7m. This would assume road closures on residential roads

¹ 004519731-01 Rev 0 – Onshore Export Cable Loadings for Rating Calculations

² OFS-CAB-101-R1, EirGrid 220 kV and 400 kV Underground Cable Functional Specification 17/10/2022

where joint bays are located. In the event of a road closure being required in residential areas with no alternative routes, works will need to be planned and coordinated with affected residents. Plans will need to be made to provide emergency access if required.

2.3 Obstacles and Clearances

A minimum clearance of 300mm is required from the new 220kV cable circuits to any existing third-party services. This clearance shall be increased to 600mm or more for high pressure gas / explosive services, to be agreed with the third-party asset owner.

3 Route Option 1

3.1 Route Description

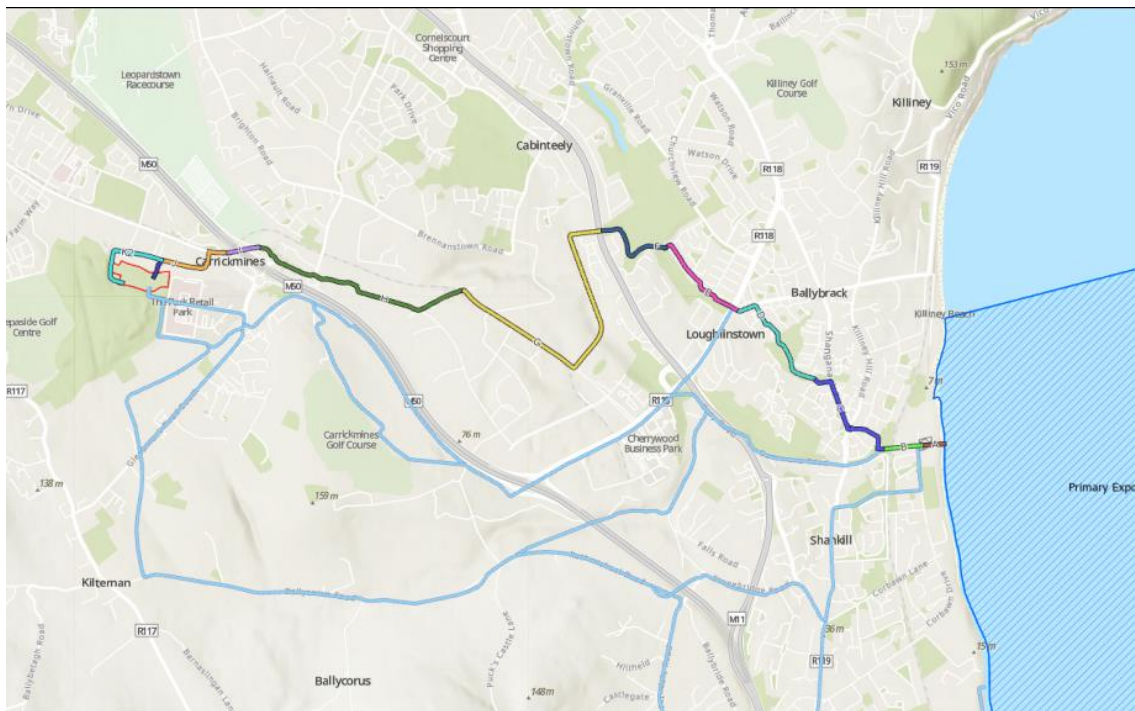
Route 1 is approximately 7.7km in length.

The route comes onshore at Shangangh Cliffs, then continues under Shangangh Community Garden and the Dublin-Rosslare railway line. It continues along Bayview Crescent, then heads north-west on the R119 road roundabout along Shangangh Road before turning west along Achill Road.

Route 1 then traverses Loughlinstown Park continuing north-west onto Glenavon Park Road, turning south-west at the next roundabout on to Wyattville Road before crossing the R118 road onto Ashlawn Park. The route then crosses Kilgobbin Park car park, follows Coolevin Road, turning south-west onto Cabinteely GAA pitch, then circling around the perimeter of Cabinteely Athletic running track.

The route then crosses under the N11 Road using a trenchless technique and onto Orchard Square where it crosses development land at Lehaunstown. It turns north-west along Grand Parade, passes over the Luas tram line via the existing bridge at Barringtons Road, follows Castle Street then crosses agricultural land before re-joining the road network at the two roundabouts located at the entrance to the existing Carrickmines Park and Ride facility. The M50 motorway will be crossed using a trenchless technique and the route will head on to Ballyogan Link Road and then to the proposed substation site.

Figure 3.1: Route Map



3.2 Route Assessment

Route 1 is approximately 7.7 km in length. Of the total distance, approximately 3.9km (51%) crosses private lands and 3.8km (49%) is within public roads. The route will be assessed under the three main criteria of constructability, cost and programme.

3.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

3.2.1.1 Utility Congestion

There are approximately 28 water utilities that will be impacted on the route. Some large water services such as 750mm diameter crossings at Achill Road and Kilbogget, and 3 crossing locations at Carrickmines Park and Ride Facility will require detailed investigations on required crossing depths. This route would also require the crossing of piped water mains and 750mm diameter foul gravity pipe at Ballyogan Road. The route encounters water mains in all the residential areas, however, given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 9 gas utilities encountered on the route. The route crosses 5 medium-size piped gas mains and 1 high pressure gas main which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

Several ESB LV & MV cables are encountered by the route. Utility relocations may be required for some of these crossings.

The route requires the crossing of three minor water courses at Bay View Glen, Achill Road, and the approach to the proposed substation where a short trenchless technique may be required.

Trenchless techniques will also be required where the route crosses the rail line at Shanganagh, the M50, the N11 near Kilbogget Park and the crossing at the R118/Wyattville Road Junction.

The route runs parallel to the Luas tram line at Grand Parade for approximately 800m before passing over the Luas underpass at Barringtons Road. Studies are required to determine if the cable system will have any negative effects (induced voltages etc.) on the Luas infrastructure in this area and this will remain a risk until determined otherwise. Preliminary investigations confirmed that space is available on the bridge at Barringtons Road to accommodate the cable ducts.

The route passes under the M50 and its 2 slip roads at Ballyogan Road. Trenchless techniques would be required for these crossings.

The existing utilities encountered by Route 1 will not restrict the potential for installation of the new 220kV cable infrastructure. Some utility diversions will be required but the level of utilities will not affect the feasibility of the proposed works. The level of Utility Congestion has been assessed as **Moderate**.

3.2.1.2 Traffic management

A construction enclosure width of 3m will be required for duct installation as outlined in section 2.2. Assessing the road conditions and width in the residential section of Route 1 including Bayview Crescent, Achill Road, Glenavon Park Estate, Coolevin and Orchard Square, it is expected that no road closures will be required for duct installation as there is sufficient space to facilitate a 3m wide construction enclosure and a passing lane within the residential roads. Road closures may be required for cable pulling as referenced in section 2.2.

Lane closures and traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents.

Access to residential driveways and on street parking will be disrupted for short durations, typically for a period of 2-3 hours.

Regional road sections are affected by Route 1 namely Shanganagh Road, Wyattville Link Road, R118, Cherrywood, Grand Parade/Barringtons Road and Carrickmines Park and Ride roundabout. Single lane closures and traffic management shall be sufficient to facilitate construction.

Wider traffic disruption on the local road network may be caused by construction. Diversions are available for all sections along this route except where local access to residential estates is required.

Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Low Moderate**.

3.2.1.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have dual carriage width and with traffic management in place, should be sufficient to provide access for heavy/abnormal loads. The sections of the route that cross park and private lands will require temporary roads or trackway to be installed to allow transport of heavy/abnormal loads. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

3.2.1.4 Joint Bay locations

The exact location of joint bays will be determined in future design stages. At this stage there is no pinch point area identified that will hinder the installation of joint bays. There will be approximately 13 Joint Bays needed per circuit for this route. Approximately 20% will need to be located along residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the joint bays' construction activities will occur. This is temporary and for a short duration of time and hence is assessed as **Low**.

3.2.2 Cost

Overall cost of €33.0m is assessed as **Low Moderate**. The costs are based on the works below:

3.2.2.1 Standard installation

Route 1 is approximately 7.7km long.

3.2.2.2 Trenchless Technique

For Route 1 it is expected that approximately 810m of trenchless techniques will be required for the following obstacles:

- Rail Line
- Water Courses x 3
- M50
- N11
- R118

3.2.3 Programme

3.2.3.1 Overall works duration

Route 1 has an overall length of approximately 7.7km. Assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week, a construction duration of 86 weeks is expected.

This is assessed as **Low Moderate**.

3.3 Summary

The summary table below outlines the performance of route 1 based on the assessments carried out in section 3.2.

Table 3-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	Some diversions required but the level of utilities will not affect the feasibility of the proposed works.	Moderate
	Traffic management	Expected no road closures will be required. Access to residential driveways and on street parking will be disrupted for short durations.	Low Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint Bay locations	At this stage there is no pinch point in the area that will hinder the installation of Joint Bays.	Low
Cost	-	€33.0m	Low Moderate
Programme	-	86 Weeks	Low Moderate

4 Route Option 2

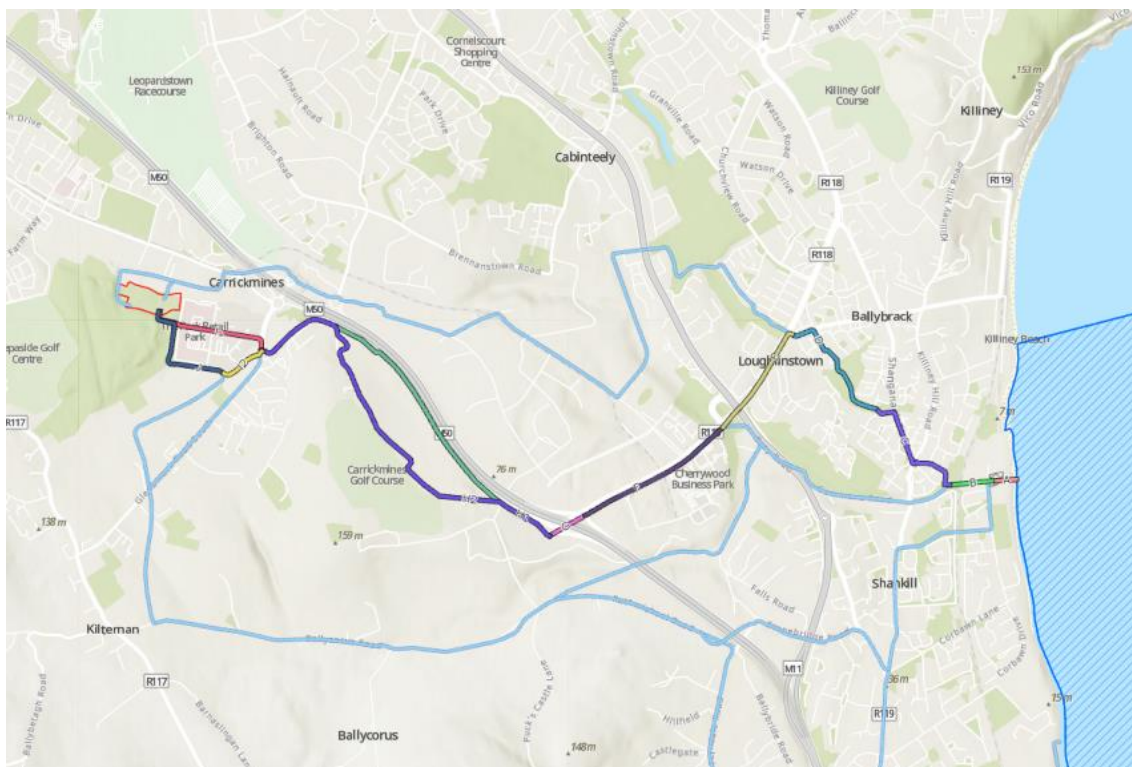
4.1 Route Description

Route 2 is approximately 7.0km in length.

The route comes onshore at Shangangh Cliffs, then continues under Shangangh Community Garden and the Dublin-Rosslare railway line. It continues along Bayview Crescent, then heads north-west on the R119 road roundabout along Shangangh Road before turning west along Achill Road. Route 2 then traverses Loughlinstown Park moving on to Glenavon Park Road, turning south-west at the next roundabout onto Wyattville Road.

The route then follows the R118 road south-west, crossing the N11 road and continuing south-west along the R118 road, crossing under the M50 motorway at Junction 16, before turning to take a north-west direction, parallel to the M50, across agricultural land to Golf Lane. Here it meets the Glenamuck road roundabout where it turns north onto Glenamuck Road, then west through Carrickmines Retail Park and onto the proposed site.

Figure 4.1: Route Map



4.2 Route Assessment

Route 2 is approximately 7.0km in length.

Of the total distance, approximately 3.3km (44%) crosses private lands and 4.3km (56%) is within the public roads. The route covers various terrains including park land, agricultural land, public roads and residential housing estate roads. There are 2 water courses, 1 railway

crossing, 1 motorway and 1 national road crossing required. The route will be assessed under the three main criteria of constructability, cost and programme.

4.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

4.2.1.1 Utility Congestion

There are approximately 21 known water utilities that will be impacted on the route. Some large water services such as 750mm diameter crossing at Achill Road will require a detailed investigation on required crossing depths. This route would also require the crossing of piped water mains and 750mm diameter foul gravity pipe at Ballyogan Road and again on approach to the proposed site at Carrickmines. The route encounters water mains in all the residential areas, however, given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 8 gas utilities encountered on the route. The route crosses 5 medium-size piped gas mains which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required at some of these interfaces.

The route requires the crossing of 2 minor water courses at Bay View Glen and Achill Road where short trenchless techniques may be required.

The route crosses the rail line at Shanganagh and this will require a trenchless technique.

The route crosses 2 road bridges, passing over the N11 national road and M50 motorway. A review of the bridge design details determined that there were no feasible options available to accommodate the cable ducts within the bridge structure or within the bridge deck. As such, a trenchless technique crossing would be required parallel to the bridges for each of these crossings.

The level of Utility Congestion has been assessed as **Moderate**.

The number of existing utilities encountered by Route 2 will not restrict the potential for installation of the new 220kV cable infrastructure.

4.2.1.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. Assessing the road conditions and width in the residential section of Route 2 including Bayview Crescent, Achill Road and Glenavon Park Estate, it is expected no road closures will be required for duct installation. Road closures may be required for cable pulling as referenced in section 2.2.

Lane closures and traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents.

Access to residential driveways and on street parking will be disrupted for short durations.

Regional road sections are affected by Route 2 namely Shanganagh Road, Wyattville Road, R118 and Glenamuck Road. Lane closures and traffic management shall be sufficient to facilitate construction.

Wider traffic disruption on the local road network may be caused by construction. Diversions are available for all sections along this route except where local access to residential estates is required.

Road closure on Golf Lane (section G) will need to be avoided as there is no alternative route for access. Construction work on this section may need to be undertaken at night or outside of business hours.

Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Low Moderate**.

4.2.1.3 Abnormal loads

Heavy/Abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have dual carriage width and with traffic management in place, should be sufficient to provide access for Heavy/Abnormal loads. The sections of the route that cross park land and private lands will require temporary roads or trackway to be installed to allow transport of Heavy/Abnormal loads. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

4.2.1.4 Joint Bay locations

The exact location of joint bays will be determined in future design stages. At this stage there is no pinch point area identified that will hinder the installation of Joint Bays. There will be approximately 12 Joint Bays needed per circuit for this route. Approximately 20% will need to be located along residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the Joint Bays construction will occur. This is temporary and for a short duration of time and hence is assessed as **Low**.

4.2.2 Cost

Overall cost of €30.5m is assessed as **Low Moderate**. The costs are based on the works below:

4.2.2.1 Standard installation

Route 2 is approximately 7.0km long.

4.2.2.2 Trenchless Technique

For Route 2 it is expected that approximately 790m of trenchless technique will be required for the following obstacles:

- Rail Line
- Water Courses x 3
- M50
- N11

4.2.3 Programme

4.2.3.1 Overall works duration

Route 2 has an overall length of approximately 7.0km. Assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week, a construction duration of 78 weeks is expected.

This is assessed as **Low**.

4.3 Summary

The summary table below outlines the performance of route 2 based on the assessments carried out in section 4.2.

Table 4-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	Trenchless technique crossing required at N11 and M50. Relatively long section of the route is in road and interfaces with various utilities.	Moderate
	Traffic management	Expected no road closures will be required. Access to residential driveways and on street parking will be disrupted for short durations.	Low Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint Bay locations	At this stage there is no pinch point area that will hinder the installation of Joint Bays.	Low
Cost	-	€30.5m	Low Moderate
Programme	-	78 Weeks	Low

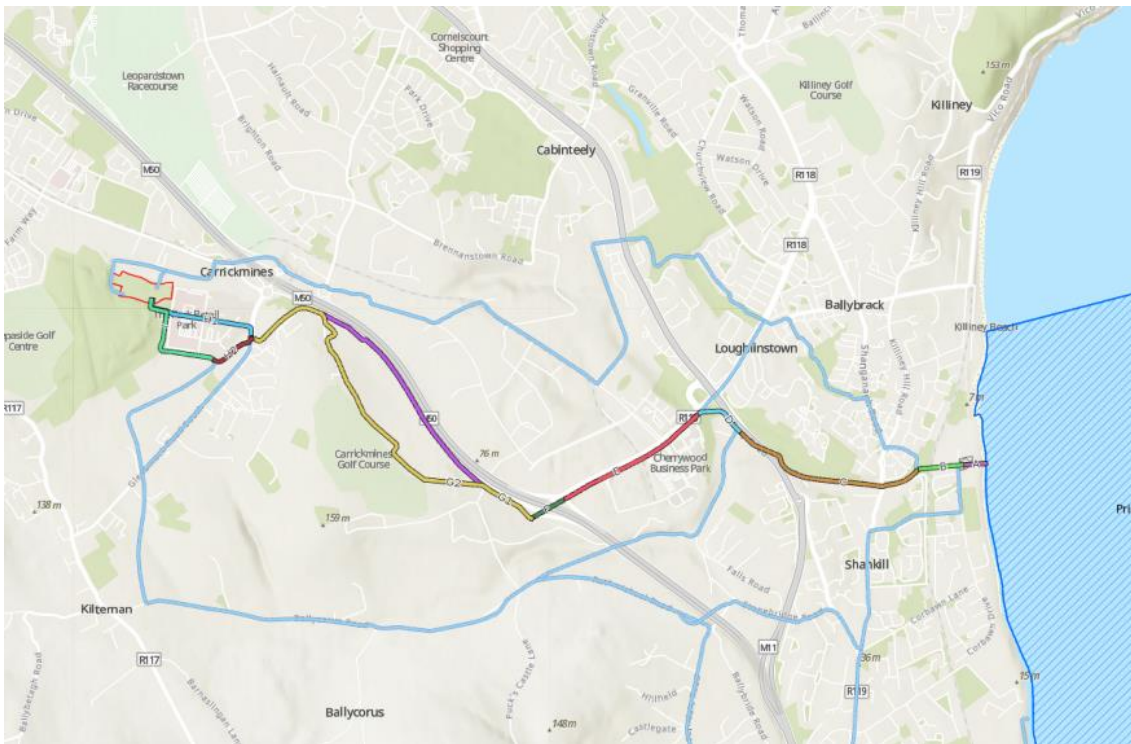
5 Route Option 3

5.1 Route Description

Route 3 is approximately 6.8km in length.

The route comes onshore at Shangangh Cliffs, then continues underneath Shangangh Community Garden and the Dublin-Rosslare railway line and heads west along Commons Road. The route extends the full length of Commons Road and crosses the N11 on to the Bray Road. It turns south-west through the park area and under a water course. The route then joins the R118 Cherrywood Park Road and heads further south-west to the M50 with a trenchless technique crossing required under the M50. The route then heads in a north-west direction parallel to the M50 across agricultural land to Golf Lane. Here it meets the Glenamuck road roundabout where it turns north onto Glenamuck Road, then west through Carrickmines Retail Park and onto the proposed site.

Figure 5.1: Route Map



5.2 Route Assessment

Route 3 is approximately 6.8 km in length. Of the total distance, approximately 2.9km (42%) crosses private lands and 4.0 km (58%) is within public roads. The route covers various terrains including parkland, agricultural land, public roads and residential housing estate roads. There is a minor water course, railway, M50 and N11 road crossing required. The route will be assessed under the three main criteria of constructability, cost and programme.

5.2.0 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

5.2.0.1 Utility Congestion

There are approximately 15 known water utilities that will impact on the route. Commons Road (section C) is a heavily congested section of the route, with a large 1050mm diameter combined sewer, 6" cast iron distribution potable main, 225mm diameter concrete foul and surface water pipes running the length of the road. Given the narrow width of the road it will be challenging to install the proposed double circuit 220kV cables in this area.

The route encounters water mains in all residential areas, given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 9 gas utilities encountered on the route. The route crosses 5 medium gas mains which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required for some of these interfaces.

The route requires the crossing of one minor water course (section D). The route crosses the rail line at Shanganagh and this will require a trenchless technique. The route passes under the M50 and 2 slip roads at junction 16 and a trenchless technique would be required for this crossing. The N11 crossing is also to be undertaken using trenchless techniques. Due to the tight turning constraints on Bray Road a trenchless technique is not feasible due to the lack of space for the receiving/ launch pits.

The level of Utility Congestion has been assessed as **High**. The number of existing utilities in route 3 will impact the available space to install the new 220kV cable infrastructure.

In relation to the route crossing over the M50, a review of the bridge design details determined that there were no feasible options available to accommodate the cable ducts within the bridge structure or within the bridge deck. As such, trenchless techniques would be required parallel to the bridge for this crossing.

5.2.0.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. Assessing the road conditions and width in the residential section of the route 3 including, Commons Road, it is expected road closures will be required for the duct installation. Road closures may also be required for cable pulling as referenced in section 2.2. Elsewhere, lane closures and traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents. Access to residential driveways and on street parking will be disrupted for short durations.

On the Regional roads sections that complete route 3 namely Wyattville Road, R118, Glenamuck Road, lane closures and traffic management shall be sufficient to facilitate construction.

Assessing the wider traffic disruption on the local road network that maybe caused by construction, diversions are available for all sections along this route except in residential

estates. Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Moderate**.

Road closures on Golf Lane (section G) will need to be managed as there is no alternative route for access.

5.2.0.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have dual carriage width and should be sufficient to provide access for heavy/abnormal load with traffic management in place. The sections of the route across park land and private lands will require temporary roads or trackway installed to allow transport of heavy/abnormal loads. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

5.2.0.4 Joint bay locations

The exact location of joint bays will be determined in future design stages. At this stage the Commons Road section of the route is identified as a pinch point area for the installation of joint bays. There will be approximately 12 joint bays required per circuit for this route. Approximately 20% will need to be located within residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the joint bay construction cannot be avoided, this is only temporary and for a short duration of time. This has been assessed as **High** due to the restrictions on Commons Road.

5.2.1 Cost

Overall cost of €29.5m is assessed as **Low**. The costs are based on the works below:

5.2.1.1 Standard Installation

Route 3 is 6.8 km long.

5.2.1.2 Trenchless Technique

For route 3, it is expected that approximately 260m of trenchless technique will be required under the allotment and Railway crossing at Shanganagh Cliffs Estate. The N11 road crossing will require approximately 200m and the M50 road crossing will also require approximately 200m. A further 50m has been allowed for the water crossing near the proposed substation site. This results in a combined total of 710m.

5.2.2 Programme

5.2.2.1 Overall works duration

Route 3 has an overall length of 6.8 km assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week it is expected construction duration of 77 weeks.

This is assessed as **Low**.

5.3 Summary

Table 5-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	Commons road is heavily congested section of the route. given the narrow width of the road it challenging to install the proposed double circuit 220kv cables.	High
	Traffic management	expected no road closures will be required. Lane closures and Traffic management shall be sufficient to facilitate construction Assess to residential driveways and on street parking will be disrupted for short durations.	Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint bay locations	The Commons Road section of the route is identified as a pinch point area for the installation of joint bays.	High
Cost	-	€29.5m	Low
Programme	-	77 Weeks	Low

6 Route Option 4

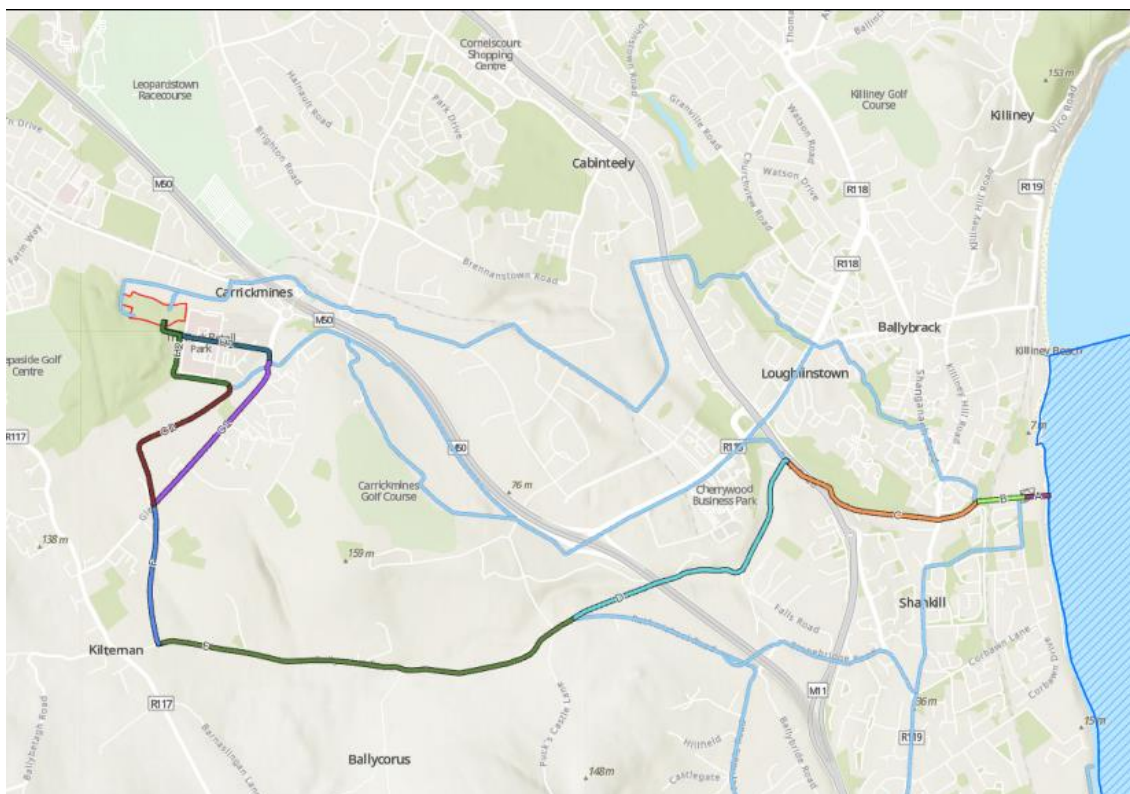
6.1 Route Description

Route 4 is approximately 8.5 km in length.

The route comes onshore at Shangangh Cliffs, then continues underneath Shanganagh Community Garden and the Dublin-Rosslare railway line and heads west along Commons Road. The route extends the full length of Commons Road and then crosses the N11 on to the Bray Road turning south onto to the R116 Cherrywood Road leading under the Cherrywood Viaduct.

The route then follows the Brides Glen Road south-west continuing along the R116 and under the M50. The route continues west on to the Ballycorus Road R116 for approximately 2.5km before heading north across agricultural land (future development) to the Glenamuck Road. The route continues to the Carrickmines Retail Park and on to the proposed substation site.

Figure 6.1: Route Map



6.2 Route Assessment

Route 4 is approximately 8.5 km in length. Of the total distance, approximately 0.3km (3%) crosses private lands and 8.2 km (97%) public roads. The route covers various terrains including parkland, agricultural land, public roads and residential housing estate roads. There is

a minor water course, railway and N11 road crossing required. The route will be assessed under the three main criteria of constructability, cost and programme.

6.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

6.2.1.1 Utility Congestion

There are approximately 22 known water utilities that will impact on the route. Commons Road is a heavily congested section of the route, with a large 1050mm diameter combined sewer, a 6" cast iron distribution potable main and 225mm diameter concrete foul and surface water pipes running the length of the road. Given the narrow width of the road it will be challenging to install the proposed double circuit 220kV cables in this area.

The route encounters water mains in all residential areas and given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 12 gas utilities are encountered on the route. The route crosses 5 medium pressure Gas main which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required at some of these interfaces.

The route requires the crossing of one minor water course. The route crosses the rail line at Shanganagh and this will require trenchless technique . The N11 crossing is also to be undertaken using trenchless techniques. Due to the tight turning constraints on Bray Road a trenchless technique is not feasible due to the lack of space for the receiving/ launch pits.

The level of Utility Congestion has been assessed as **High**. The number of existing utilities along route 4 will restrict the availability of space to install the new 220kV cable infrastructure.

6.2.1.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. Assessing the road conditions and width in the residential section of the route 4 including, Commons Road, it is expected that road closures will be required for duct installation. Road closures may be required for cable pulling as referenced in section 2.2. Elsewhere, lane closures and traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents. Access to residential driveways and on street parking will be disrupted for short durations.

On the Regional roads sections that complete route 4 namely R116 Cherrywood Road and Glenamuck Road, lane closures and traffic management shall be sufficient to facilitate construction.

Assessing the wider traffic disruption on the local road network that maybe caused by construction, diversions are available for all sections along this route except access to residential estates. Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Moderate High**.

6.2.1.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have single carriage width at minimum and should be sufficient to provide access for Heavy/Abnormal load with traffic management in place. The sections the route across park land and Private lands will require temporary roads or trackway installed to allow transport of heavy/abnormal loads. The portion of this route is park land and agricultural lands in approximately 0.3km (3%). It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

6.2.1.4 Joint bay locations

The exact location of joint bays will be determined in future design stages. At this stage the Commons Road section of the route is identified as a pinch point area for the installation of joint bays. There will be approximately 17 Joint Bays required per circuit for this route. Approximately 10% will need to be located in residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the joint bay construction cannot be avoided, this is only temporary and for a short duration of time. Joint bay construction on the Cherrywood Road in proximity to the Cherrywood Viaduct will be prohibitive. This has been assessed as **High** due to the restrictions on Commons Road.

6.2.2 Cost

Overall cost of €36.0m is assessed as **Moderate**. The costs are based on the works below:

6.2.2.1 Standard Installation

Route 4 is 8.5 km long.

6.2.2.2 Trenchless Technique

For route 4 It is expected that approximately 260m of trenchless technique will be required under the allotment and Railway crossing at Shanganagh Cliffs Estate. The N11 road crossing will require approximately 200m and 50m has been allowed for a watercourse crossing. This results in a combined total of 510m.

6.2.3 Programme

6.2.3.1 Overall works duration

Route 4 has an overall length of 8.5km assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week it is expected construction duration of 95 weeks.

This is assessed as **Low Moderate**.

6.3 Summary

Table 6-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	Commons Road is heavily congested section of the route. Given the narrow width of the road it will be challenging to install the proposed double circuit 220kV cables.	High
	Traffic management	Road closures would likely be required at Commons Road. Elsewhere, lane closures and traffic management shall be sufficient to facilitate construction access to residential driveways and on street parking will be disrupted for short durations.	Moderate High
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint bay locations	The Commons Road section of the route is identified as a pinch point area for the installation of joint bays.	High
Cost	-	€36.0m	Moderate
Programme	-	95 Weeks	Low Moderate

7 Route Option 5

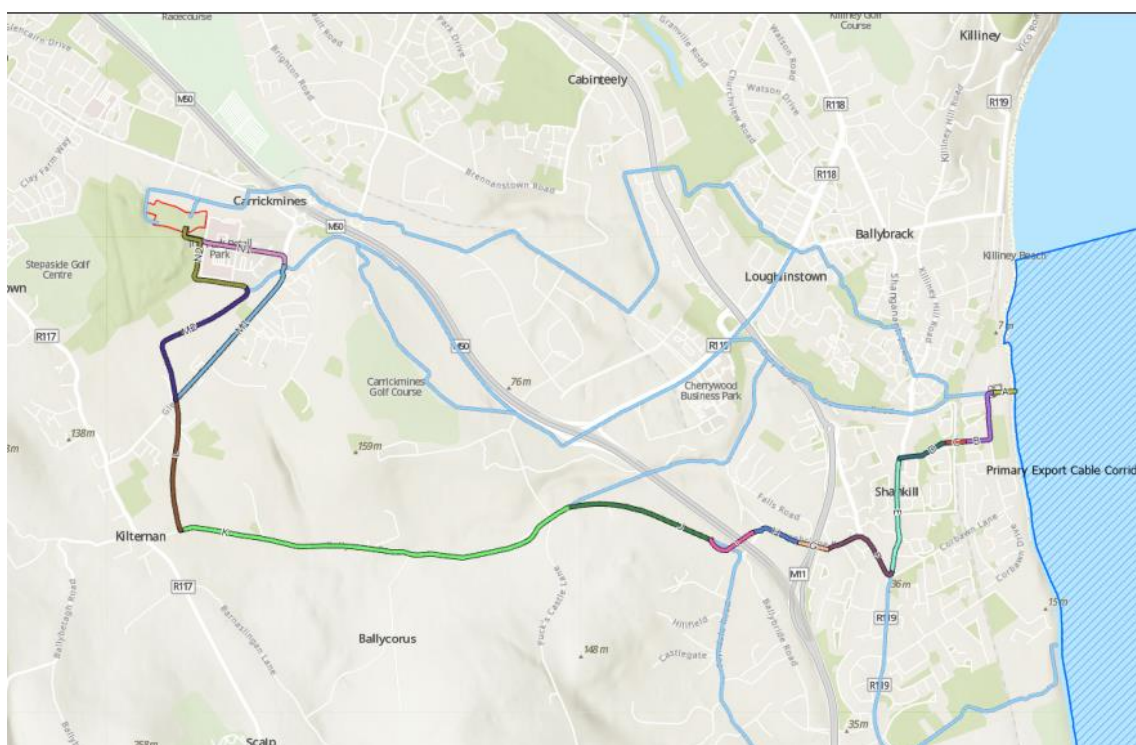
7.1 Route Description

Route 5 is approximately 9.2 km in length.

The route comes onshore at Shangangh Cliffs the route then heads south along Shangangh Cliffs Road for approximately 300m and then heads west along Shangangh Cliffs Estate Road cul de sac. It then passes under the Dublin-Rosslare railway line and is routed into the parkland parallel to Rathsallagh Grove and Rathsallagh Park residential roads.

From here the route joins Shangangh Road (R119) and heads south for 700m. At the roundabout, the route turns north-west up Dublin Road (R837) for 300m before turning west onto Stonebridge Road. The route crosses the M11 (trenchless technique required near the Stonebridge Road bridge) and continues to the roundabout and turns south-west towards the M50. The route passes under the M50 by trenchless technique coming up on the southern side of Rathmichael Road in agricultural land. The route then joins Rathmichael Road and heads north-west to join Ballycorus Road (R116) at the roundabout. The route continues west along Ballycorus Road for 2.5km before turning north across agricultural land (future development) to the Glenamuck Road. The route heads north-east along Glenamuck road and then west through Carrickmines Retail Park and on to the proposed substation site.

Figure 7.1: Route Map



7.2 Route Assessment

Route 5 is approximately 9.2 km in length. Of the total distance, approximately 0.5km (5%) crosses private lands and 8.7 km (95%) public roads. The route covers various terrains including parkland, agricultural land, public roads and residential housing estate roads. There is

a minor water course, railway and M11 and M50 road crossings required. The route will be assessed under the three main criteria of constructability, cost and programme.

7.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

7.2.1.1 Utility Congestion

There are approximately 15 known water utilities that will impact on the route.

The route encounters water mains in all residential areas, given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 7 gas utilities encountered on the route. The route crosses 6 medium pressure gas mains which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required for some of these crossings.

The route requires the crossing of one minor water course. The route crosses the rail line at Shanganagh and this will require a trenchless technique. The M11 and M50 crossings are also to be undertaken using trenchless techniques.

The level of Utility Congestion has been assessed as **Moderate High**. The number of existing utilities in route 5 should not impact the availability of space to install the new 220kV cable infrastructure.

7.2.1.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. Assessing the road conditions and width in the residential section of the Route 5 including, Shanganagh Cliffs Estate Road and Rathsallagh Grove, it is expected no road closures will be required for duct installation. Road closures may be required for cable pulling as referenced in section 2.2. Lane closures and Traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents. Access to residential driveways and on street parking will be disrupted for short durations.

Lane closures and traffic management should be sufficient to facilitate construction on the regional roads sections that complete route 5 namely, Shanganagh Road (R119), Dublin Road (R837), Rathmichael road to Ballycorus road (R116) and Glenamuck Road.

Assessing the wider traffic disruption on the local road network that maybe caused by construction, diversions are available for all sections along this route except residential estates access. Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Moderate**.

7.2.1.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have single carriage width at minimum and should be sufficient to provide access for heavy/abnormal load with traffic management in place. The sections of the route across park land and private lands will require temporary roads or trackway installed to allow transport of heavy/abnormal load. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

7.2.1.4 Joint bay locations

The exact location of joint bays will be determined in future design stages. At this stage there is no pinch point area identified that will hinder the installation of joint bays. There will be approximately 18 joint bays needed per circuit for this route. Approximately 10% will need to be located in residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the joint bay construction works cannot be avoided, this is only temporary and for a short duration of time. This has been assessed as **Moderate**.

7.2.2 Cost

Overall cost of €39.0m is assessed as **Moderate**. The costs are based on the works below:

7.2.2.1 Standard Installation

Route 5 is 9.2 km long.

7.2.2.2 Trenchless Technique

For Route 5 it is expected that approximately 260m of trenchless technique will be required under the Railway crossing at Shanganagh Cliffs Estate. The M11 and M50 road crossings will require approximately 200m each and 50m has been allowed for a minor watercourse crossing. This results in a combined total of 710m of trenchless technique works.

7.2.3 Programme

7.2.3.1 Overall works duration

Route 5 has an overall length of 9.2km assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week it is expected construction duration of 103 weeks.

This has been assessed as **Moderate**.

7.3 Summary

Table 7-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	Almost the entire route is within the public roadway and will interface with exiting utilities throughout.	Moderate High
	Traffic management	It is expected that no road closures will be required. Lane closures and Traffic management shall be sufficient to facilitate construction Access to residential driveways and on street parking will be disrupted for short durations.	Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint bay locations	At this stage there is no pinch point area that will hinder the installation of Joint Bays however there are no areas available off road for easy access and installation.	Moderate
Cost	-	€39.0m	Moderate
Programme	-	103 Weeks	Moderate

8 Route Option 6

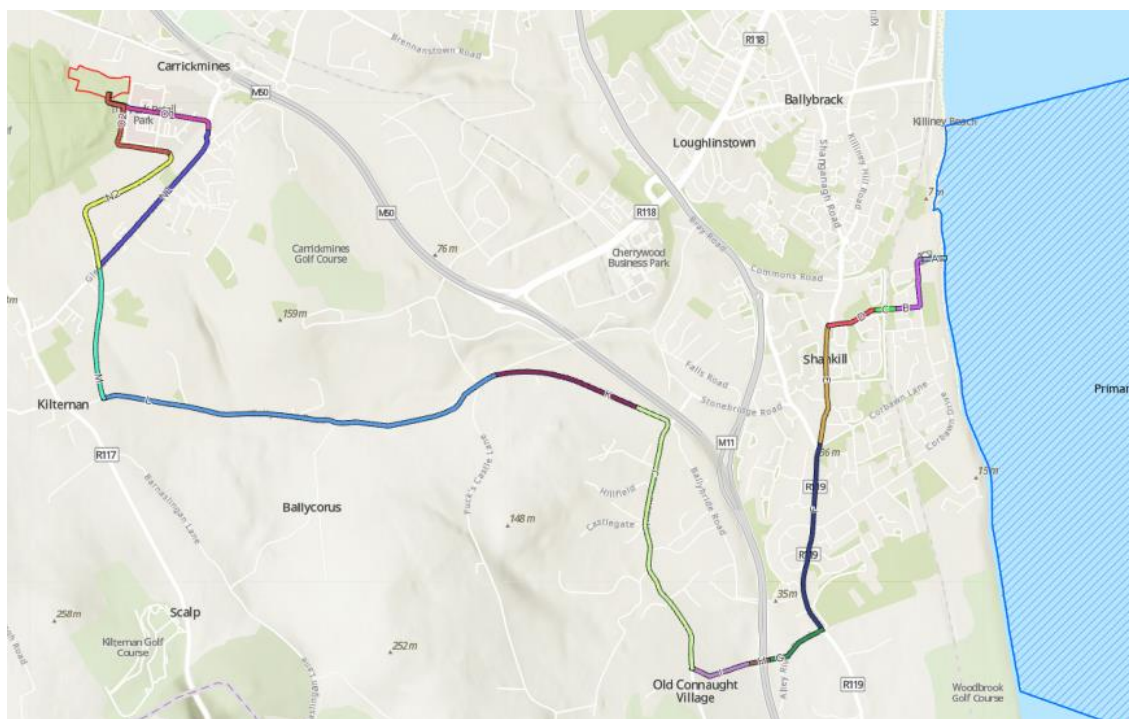
8.1 Route Description

Route 6 is approximately 11.7 km in length.

The route comes onshore at Shangangh Cliffs the route then turns south along Shanganagh Cliffs Road for approximately 300m and then turns west along Shanganagh Cliffs Estate Road cul de sac. It then passes under the Dublin-Rosslare railway line and is routed by the parkland parallel to Rathsallagh Grove and Rathsallagh Park residential roads. From here the route joins Shanganagh Road (R119) and heads south for 2km.

The cable route heads west at the junction with Allies River Road and continues along this road for 300m before crossing through agricultural lands and then under the M11 with a trenchless technique. The cable route re-joins the road network at Ferndale Road and heads north for 1.6km prior before reaching the roundabout at the junction with Rathmichael Road. The route then joins Rathmichael Road and heads north-west to join Ballycorus Road (R116). The route continues west along Ballycorus road for 2.5km before heading north across agricultural land (future development) to the Glenamuck Road. The route heads north-east along Glenamuck road and then west through Carrickmines Retail Park and on to the proposed substation site.

Figure 8.1: Route Map



8.2 Route Assessment

Route 6 is approximately 11.7 km in length. Of the total distance, approximately 1.5km (13%) crosses private lands and 10.2 km (87%) is within public roads. The route crosses various terrains including parkland, agricultural land, public roads and residential housing estate roads. There is a minor water course, railway and M11 road crossings required. The route will be assessed under the three main criteria of constructability, cost and programme.

8.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

8.2.1.1 Utility Congestion

There are approximately 21 known water utility locations that will impact on the route.

The route encounters water mains in all residential areas, given the local residential nature of the supply, this is not expected to provide a challenging installation environment.

There are 3 gas utilities encountered on the route. The route crosses 2 medium pressure gas mains which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required for some of these conflicts.

The route requires the crossing of one minor water course. The route crosses the rail line at Shanganagh and this will require a trenchless technique. The M11 crossing will also require a trenchless technique.

The level of utility congestion has been assessed as **Moderate High**. The number of existing utilities in route 6 should not restrict the availability of space to install the new 220kV cable infrastructure.

8.2.1.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. Assessing the road conditions and width in the residential section of the Route 6 including, Shanganagh Cliffs Estate Road and Rathsallagh grove, it is expected that no road closures will be required for duct installation. Road closures may be required for cable pulling as referenced in section 2.2. Lane closures and traffic management shall be sufficient to facilitate construction, while at all times maintaining access for local residents. Access to residential driveways and on street parking will be disrupted for short durations.

Lane closures and Traffic management shall be sufficient to facilitate construction on the main roads that complete Route 6 namely Shanganagh Road, Ferndale Road, Rathmichael Road, Ballycorus Road and Glenamuck Road.

Assessing the wider traffic disruption on the local road network that maybe caused by construction, diversions are available for all sections along this route except residential estates access. Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Moderate**.

8.2.1.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have single carriage width at minimum and should be sufficient to provide access for heavy/abnormal load with traffic management in place. the sections the route across park land and private lands will require temporary roads or trackway

installed to allow transport of heavy/abnormal load. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

8.2.1.4 Joint Bay locations

The exact location of joint bays will be determined in future design stages however at this stage the section along Ferndale Road has been identified as one area that may be problematic for the installation of joint bays. There will be approximately 24 Joint Bays needed per circuit for this route. Approximately 10% will need to be located along residential estate roads and may present access restrictions to residents during construction. Daily disruption to some residents during a number of the Joint Bays construction will occur. This is temporary and for a short duration of time. This has been assessed as **Moderate High**.

8.2.2 Cost

Overall cost of €49.0m is assessed as **High**. The costs are based on the works below:

8.2.2.1 Standard Installation

Route 6 is approximately 11.7 km long.

8.2.2.2 Trenchless Technique

For Route 6 it is expected that approximately 260m of trenchless technique will be required under the railway crossing at Shanganagh Cliffs Estate. The M11 road crossing will require approximately 200m of trenchless technique. 50m has also been included for a watercourse crossing. This results in a combined total of 510m of trenchless technique.

8.2.3 Programme

8.2.3.1 Overall works duration

Route 6 has an overall length of approximately 11.7km. Assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week, a construction duration of 130 weeks is expected.

This has been assessed as **High**.

8.3 Summary

Table 8-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	The majority of the route is in the public road network and will need to interface with existing utilities.	Moderate High
	Traffic management	No expected road closures will be required. Access to residential driveways and on street parking will be disrupted for short durations.	Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint Bay locations	No significant areas available off road for easy access and installation. Ferndale Road may prove difficult for installations due to Irish Water assets.	Moderate High
Cost	-	€49.0m	High
Programme	-	130 Weeks	High

9 Route Option 7

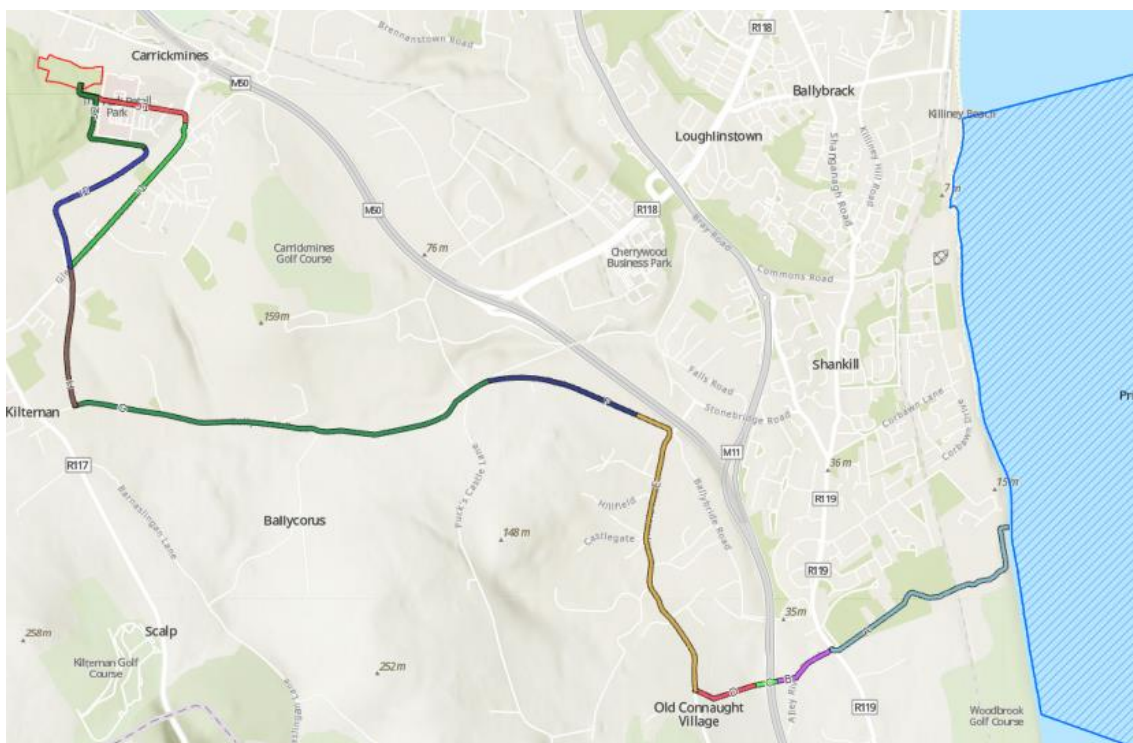
9.1 Route Description

Route 7 is approximately 10.2 km in length.

The route comes onshore at Shanganagh Park which is approximately 1.5km south of the landfall for the other options. The cable route follows the perimeter of the park where possible while heading west avoiding wooded areas and playing pitches. The Rosslare railway line passes through the park from north to south and a trenchless technique will be required at the crossing point.

After exiting Shanganagh Park the cable route crosses Dublin Road (R119), heads west at the junction following Allies River Road and continues along this road for 300m before crossing through agricultural lands and then under the M11 using a trenchless technique. The cable route re-joins the road network at Ferndale Road and heads north for 1.6km prior before reaching the roundabout at the junction with Rathmichael Road. The route then joins Rathmichael Road and heads north-west to join Ballycorus Road (R116) at the roundabout. The route continues west along Ballycorus road for 2.5km before heading north across agricultural land (future development) to the Glenamuck Road. The route heads north-east along Glenamuck road and then west through Carrickmines Retail Park and on to the proposed substation site.

Figure 9.1: Route Map



9.2 Route Assessment

Route 7 is approximately 10.2 km in length. Of the total distance, approximately 3km (30%) crosses private lands and 7.2 km (70%) is within the public roads. The route covers various terrains including parkland, agricultural land and public roads. There is a minor water course,

Railway and M11 road crossing required. The route will be assessed under the three main criteria of constructability, cost and programme.

9.2.1 Constructability

The constructability of the route is assessed under four key construction elements:

- Existing utility congestion within the proposed route.
- Traffic management required during construction.
- Possible constraints for abnormal loads deliveries.
- Constraints on the construction of cable joint bays on the route.

9.2.1.1 Utility Congestion

There are approximately 11 known water utilities that will impact on the route.

There are 2 gas utilities are encountered on the route. The route crosses 1 medium pressure Gas main which would require detailed interaction with Gas Networks Ireland as well as careful planning and installation.

A number of ESB LV & MV cables are encountered by the route. Utility relocations may be required for some of these conflicts.

The route requires the crossing of one minor water course. The route crosses the rail line at Shanganagh and this will require a trenchless technique . The M11 crossing is also to be undertaken using trenchless techniques .

The level of Utility Congestion has been assessed as **Moderate**. The number of existing utilities in route 7 should not restrict the availability of space to install the new 220kV cable infrastructure.

9.2.1.2 Traffic management

A construction enclosure width of 3m has been assumed to be required for duct installation. There are no residential areas within Route 7.

Lane closures and Traffic management shall be sufficient to facilitate construction on the main roads' sections that complete Route 7 namely Ferndale Road, Rathmichael Road, Ballycorus Road and Glenamuck Road.

Assessing the wider traffic disruption on the local road network that maybe caused by construction, diversions are available for all sections along this route. Traffic disruption and temporary traffic management requirements, temporary works and potential road closures on this route have been assessed as **Low Moderate**.

9.2.1.3 Abnormal loads

Heavy/abnormal load vehicles are required to transport HV equipment such as cable drums to the site. All road sections of the route have single carriage width at minimum and should be sufficient to provide access for Heavy/Abnormal load with traffic management in place. the sections the route across park land and Private lands will require temporary roads or trackway installed to allow transport of Heavy/Abnormal load. It is not expected that there will be any significant constraints associated with the transport of cable drums and this is therefore assessed as **Low Moderate**.

9.2.1.4 Joint Bay locations

The exact location of joint bays will be determined in future design stages. There will be approximately 20 Joint Bays needed per circuit for this route. Daily disruption to some residents during the construction of joint bays will occur and the route along Ferndale Road will be challenging for joint bay installations due to existing Irish Water assets. This has been assessed as **Moderate High**.

9.2.2 Cost

Overall cost of €42.5m is assessed as **Moderate High**. The costs are based on the works below:

9.2.2.1 Standard Installation

Route 7 is approximately 10.2 km long.

9.2.2.2 Trenchless Technique

For Route 7 it is expected that approximately 80m of trenchless technique will be required under the railway crossing at Shanganagh Park. The M11 road crossing will require approximately 200m of trenchless technique and 50m has been included for a watercourse crossing. This results in a combined total of 330m for the trenchless technique works.

9.2.3 Programme

9.2.3.1 Overall works duration

Route 7 has an overall length of approximately 10.2km. Assuming a standard duct installation rate of 30m per day per circuit (i.e., excavation, duct installation, backfill and temporary dressing) and assuming a 6-day working week, a construction duration of 113 weeks is expected.

This has been assessed as **Moderate High**.

9.3 Summary

Table 9-1: Assessment Table

Criteria	Sub Criteria	Details	Impact
Constructability	Utility congestion	The majority of the route is in the public road network however the route through Shanganagh Park will be free from utilities.	Moderate
	Traffic management	No residential areas affected	Low Moderate
	Abnormal loads	It is not expected that there will be any significant constraints associated with the transport of cable drums.	Low Moderate
	Joint Bay locations	No significant areas available off road for easy access and installation. Ferndale Road may prove difficult for installations due to Irish Water assets.	Moderate High
Cost	-	€42.5m	Moderate High
Programme	-	113 Weeks	Moderate High

10 Evaluation

10.1 Summary of Routes

Table 10-1: Route Summary

Route ID	Distance	Trenchless Technique	Notes
Route 1	7.70 km	810m	No major constraints but interface with future developments at Cherrywood will present some challenges.
Route 2	7.00 km	790m	Short route, significant off-road section. Trenchless technique at N11 will be challenging due to space restrictions.
Route 3	6.80 km	710m	Short route, significant off-road section. Commons Road will be problematic due to utility congestion.
Route 4	8.50 km	510m	Vast majority of route within public road network. Commons Road will be problematic due to utility congestion.
Route 5	9.20 km	710m	Vast majority of route within public road network. Trenchless technique at M11 could be problematic due to space restrictions.
Route 6	11.70 km	510m	Longest route, vast majority of route within public road network. Joint bay installations could be challenging along Ferndale Road.
Route 7	10.20 km	330m	Long route but very few utilities will be encountered in Shanganagh Park. Joint bay installations could be challenging along Ferndale Road.

10.2 Comparison of Routes

Criteria	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7
Utility congestion							
Traffic management							
Abnormal loads							
Joint Bay locations							
Cost							
Programme							
Overall Performance	Low Moderate	Low Moderate	High	High	Moderate	Moderate High	Moderate

10.3 Best Performing Route

The overall performance for routes 3 and 4 have been assessed as having a high impact due to the utility congestion associated with Commons Road.

Route 7 out-performs route 6 on three of the criteria and is the more attractive option between the two most southerly routes.

Overall, Route 7 and Route 5 perform equally well however they score differently across all criteria except abnormal loads. There is a €3.5m cost difference and an 11-week programme difference between the options.

Both Route 1 and Route 2 out-perform all other options and perform equally well against each-other. Both options have an overall Low–Moderate impact. Route 2 avoids the interface with future developments within the Cherrywood area however the trenchless technique crossing at the N11 will need to be investigated further due to the space restrictions in the area to the east of the bridge.

It is assumed a double circuit 220kV cable will be installed on the option routes. A double circuit installation is likely achievable for Route 1 and Route 2 . The high impact due to the utility congestion associated with Commons Road will remain for a single circuit option on routes 3 and 4.

We recommend that both Routes 1 and 2 are brought forward for further consideration. If a third option is required, then this will be either Route 5 or Route 7 depending on how significant the difference is between the cost and programme criteria.

Appendices

A.	Utility Crossing List	36
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A. Crossing Schedule

B. Route Drawings



	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 1	Irish Water	Bayview Crescent	Surfacewater drain, & 300mm dia Foul Conc + 100mm dia PVC distribution watermain	Minor
		Shanganagh Road	Surface water drain, combined foul/surface gravity drain + 6" dia Cast Iron distribution watermain	Minor
		Achill Road	Combined sewer, main 750mm dia adjacent to stream crossing, PVC distribution	Major
		Glenavon Park Estate	Stormwater surface drain, foul + 6" PVC distribution main	Minor
		Wyattville Road	Gravity combined sewer (section of WV road), Stormwater surface drain + 6" distribution potable main	Minor
		Kilbogget/Ashlawn/Coolevin	750mm dia combined sewer main through green space, conc section box culvert (section of Ashlawn Park) stormwater surface + 6" distribution potable main	Major
		Tullyvale/ Grande Parade/ Barrington Road	525mm dia combined sewer adjacent to stream/planned cyclepath, 300mm surface stormwater drain (GP/BR) + Potable PVC main, deep Foul Sewer main (along GP	Minor
		Carrickmines Park and Ride Roundabout	Combined Foul sewer pipe crossing, 375mm PVC distribution water main	Minor
		M50 Crossing	(HDD Entry) 375mm Foul pipe, connects into 750mm foul gravity pipe. (HDD Exit) 225mm foul pipe + 275mm irish water potable pipe	Minor
		Ballyogan Road	300mm ductile iron trunk watermain	Minor
	Gas	Bayview Crescent	125mm 4 bar medium pressure	Minor
		Achill Road	125mm 4 bar medium pressure	Minor
		Glenavon Park Estate	125mm 4 bar medium pressure	Minor
		Wyattville Road	250mm PE 4 bar medium pressure	Minor
		Kilbogget/Ashlawn/Coolevin	125mm low pressure + 63mm low pressure	Minor
		Tullyvale/ Grande Parade/ Barrington Road	180mm dia 4 bar gas main along (GP)	Minor
		M50 Crossing	200mm high pressure pipe crossing over Ballyogan Rd	Minor
	ESB	Ballyogan Road	180mm 4 bar along Ballyogan Rd	Minor
		Bayview Crescent	MV/LV underground cable	Minor
		Shanganagh Road	MV/LV underground cable = MV overhead lines	Minor
		Achill Road	MV/LV underground cable	Minor
		Glenavon Park Estate	MV/LV underground cable	Minor
		Wyattville Road	MV/LV underground cable. The underground cables do NOT cross the M11 or M50 Bridges	Minor
		Kilbogget/Ashlawn/Coolevin	MV/LV underground cables through the park and estate connections into the substation within the park next to the running track. 38KV underground cable at Jct Q across N11 Bray Road into Cherrywood	Minor
		Tullyvale/ Grande Parade/ Barrington Road	38kv single circuit along (GP & Barr Road), ESB Future 4 way ducts along (GP & Barr Road)	Minor
		Carrickmines Park and Ride Roundabout	Short sections of MV/LV underground cables along LUAS park and Ride	Minor
		M50 Crossing	38kv HV underground cable crosses the M50 at the same location of the proposed M50 HDD	Minor
	Telecoms	Ballyogan Road	The same 38kv HV cables runs along Ballyogan Road + MV Overhead lines	Minor
		Bayview Crescent	Comms	Minor
		Shanganagh Road	Comms	Minor
		Achill Road	Comms	Minor
		Glenavon Park Estate	Comms	Minor
		Wyattville Road	Comms	Minor
		Kilbogget/Ashlawn/Coolevin	Comms	Minor
		Tullyvale/ Grande Parade/ Barrington Road	Traffic Signals Vigin Media - Comms Ducting for both (Footpath) Grande Parade/Berrington Road	Minor
		Carrickmines Park and Ride Roundabout	Comms	Minor
		M50 Crossing	Comms	Minor
		Ballyogan Road	Comms	Minor

	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 2	Irish Water	Bayview Crescent	Surfacewater drain, & 300mm dia Foul Conc + 100mm dia PVC distribution watermain	Minor
		Shanganagh Road	Surface water drain, combined foul/surface gravity drain + 6" dia Cast Iron distribution watermain	Minor
		Achill Road	Combined sewer,main 750mm dia adjacent to stream crossing, PVC distribution potable main + 375mm foul Conc surface gravity	Major
		Glenavon Park Estate	Stormwater surface drain, foul + 6" PVC distribution main	Minor
		Wyattville Road	3 x 225mm up to 375mm Stormwater surface drains + 350mm distribution potable main. 20" Abestos water main pipe across the Wyattville Road near the D Loop	Minor
		Golf Lane	Gravity foul sewer main, stormwater surface + 225mm distribution potable main	Minor
		Glenamuck Road into Retail Park	(Deep + 4m) gravity foul sewer, 375mm surface stormwater drain + 225mm Potable PVC main	Minor
		Bayview Crescent	125mm 4 bar medium pressure	Minor
	Gas	Shanganagh Road		Minor
		Achill Road	125mm medium pressure	Minor
		Glenavon Park Estate	125mm 4 bar medium pressure	Minor
		Wyattville Road	250mm + 90mm medium pressure pipes/although gas pipe do not cross either bridge structure along Wyattville Road	Minor
		Golf Lane	90mm 4 bar medium pressure. 200mm high pressure distribution main crosses over Golf Lane	Minor
		Glenamuck Road into Retail Park	180mm + 90mm medium pressure pipes	Minor
		Bayview Crescent	MV/LV underground cable	Minor
	ESB	Shanganagh Road	MV/LV underground cable = MV overhead lines	Minor
		Achill Road	MV/LV underground cable	Minor
		Glenavon Park Estate	Sections of MV/LV underground cable	Minor
		Wyattville Road	MV/LV underground cables along Wyattville Road, these cables do not cross over the M11 or M50 composite bridges	Minor
		Golf Lane	MV/LV overhead lines with underground cable connection into new housing estate	Minor
		Glenamuck Road into Retail Park	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
		Bayview Crescent	Comms	Minor
	Telecoms	Shanganagh Road	Comms	Minor
		Achill Road	Comms	Minor
		Glenavon Park Estate	Comms	Minor
		Wyattville Road	Comms	Minor
		Golf Lane	Comms	Minor
		Glenamuck Road into Retail Park	Comms Ducting for both Traffic signals & Virgin Media	Minor

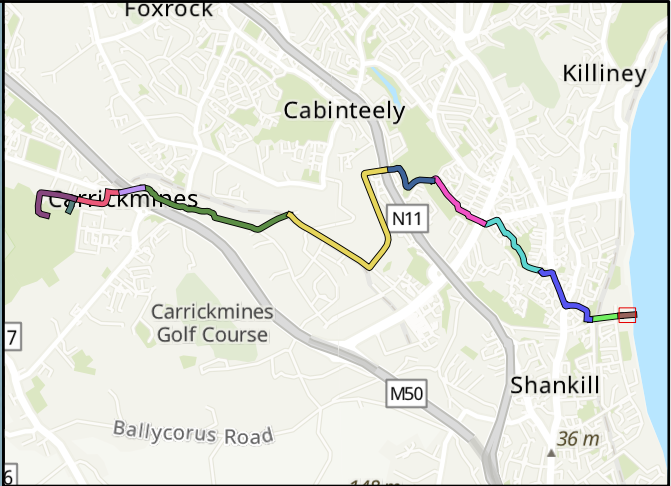
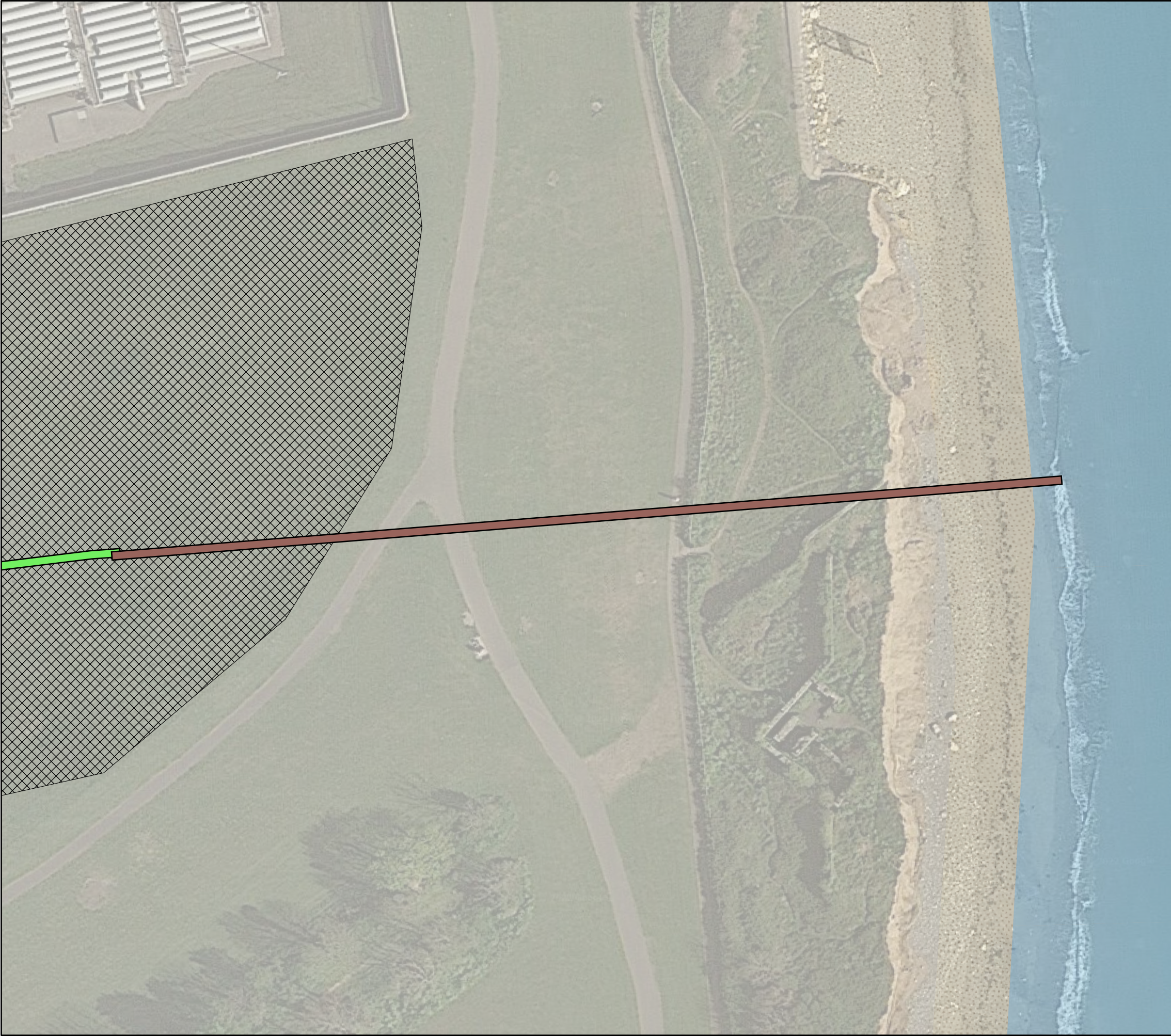
	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 3	Irish Water	Clifton Park	Surface water drain, combined foul/surface gravity drain + 6" dia Cast Iron distribution watermain	Minor
		Commons Road	Large dia combined sewer main 1050mm, 6" CAST IRON distribution potable main + 225mm dia foul conc + surface water pipes	Minor
		N11 Bray Road + HDD Crossing	300mm Stormwater surface drains, foul + 6" CAST IRON distribution main, 900mm foul sewer end of N11 towards the park entry, large dia water main from Cherrywood Road onto N11/Bray rd possible asbestos + 375mm surface gravity through park area upto Wyattville road	Minor
		Wyattville Road R118	3 x 225mm upto 375mm Stormwater surface drains + 350mm distribution potable main. 20" Abestos water main pipe across the Wyattville Road near the D Loop	Minor
		Kennedy Land/ Adjacent to M50		Minor
		Golf Lane	Gravity foul sewer main, stormwater surface + 225mm distribution potable main	Minor
	Gas	Glenamuck Road into Retail Park	(Deep + 4m) gravity foul sewer, 375mm surface stormwater drain + 225mm Potable PVC main	Minor
		Clifton Park	2 x Gas Utility mains along clifton park road	Minor
		Commons Road	2 x Irish Gas Utility mains 250mm PE pipes, service connections into houses and side roads	Minor
		N11 Bray Road + HDD Crossing	Out of service GAS pipe along Bray Rd, 250mm medium pressure main	Minor
		Wyattville Road R118	250mm + 90mm medium pressure along Wyattville Road. The main do not cross the either N11 or M50 bridges	Minor
		Kennedy Land/ Adjacent to M50		Minor
	ESB	Golf Lane	90mm 4 bar medium pressure. 200mm distribution main crosses Golf Lane	Minor
		Glenamuck Road into Retail Park	180mm + 90mm medium pressure	Minor
		Clifton Park	MV/LV underground cables along clifton park into the green space park with spurs heading in different directions to the WWTP and Shanganagh estate	Minor
		Commons Road	Primarily MV overhead lines with underground cable connections into properties	Minor
		N11 Bray Road + HDD Crossing	2 x MV/LV underground cables along Bray road	Minor
		Wyattville Road R118	MV/LV underground cables along Wyattville Road	Minor
	Telecoms	Kennedy Land/ Adjacent to M50	38kV underground cables in parcel of land adjacent to kennedy, cable then connects onto overhead lines across the Kennedy field	Minor
		Golf Lane	MV/LV overheadlines + LV underground cable connections into housing estate	Minor
		Glenamuck Road into Retail Park	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
		Clifton Park	Telecom ducts along Clifton Park	Minor
		Commons Road	Shallow surface telecom ducts <0.3m deep	Minor
		N11 Bray Road + HDD Crossing	Comms	Minor
		Wyattville Road R118	Comms	Minor
		Kennedy Land/ Adjacent to M50	Comms	Minor
		Golf Lane	Comms	Minor
		Glenamuck Road into Retail Park	Comms Ducting for both	Minor

	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 4	Irish Water	Clifton Park	Surface water drain, combined foul/surface gravity drain + 6" dia Cast Iron distribution watermain	Minor
		Commons Road	Large dia combined sewer main 1050mm, 6" CAST IRON distribution potable main + 225mm dia foul conc + surface water pipes	Major
		N11 Bray Road + HDD Crossing	300mm Stormwater surface drains, foul + 6" CAST IRON distribution main, 900mm foul sewer end of N11 towards the park entry, large dia water main from Cherrywood Road onto N11/Bray rd possible asbestos + 375mm surface gravity through park area upto Wyattville road	Major
		Cherrywood Road	375mm Stormwater surface drain + 375mm gravity foul main, 24" CAST IRON or Abestos water main pipe along Cherrywood Rd	Minor
		Brides Glen	Gravity foul sewer main, stormwater surface + CAST IRON or asbestos distribution potable main	Minor
		Ballycorus Road	Gravity Foul sewer main, stormwater + CAST IRON or asbestos distribution potable water main	Minor
		Glenamuck Road South	CAST IRON distribution potable water, stormwater surface drains, gravity foul mains	Minor
		Glenamuck Road into Retail Park	(Deep + 4m) gravity foul sewer, 375mm surface stormwater drain + 225mm Potable PVC main	Minor
	Gas	Clifton Park	2 x Gas Utility mains along clifton park road	Minor
		Commons Road	2 x Irish Gas Utility mains 250mm PE pipes	Minor
		N11 Bray Road + HDD Crossing	Out of service GAS along Bray Rd. 250mm medium pressure main	Minor
		Cherrywood Road	250mm medium pressure, 180mm medium pressure	Minor
		Brides Glen	250mm medium pressure main,	Minor
		Ballycorus Road	No GAS services shown in road from GNI data records	Minor
		Glenamuck Road South	180mm 4 bar medium pressure along Glenamuck Rd into retail park	Minor
		Glenamuck Road into Retail Park	180mm dia 4 bar + 90mm Gas mains	Minor
	ESB	Clifton Park	MV/LV underground cables along clifton park into the green space with spurs heading in different directions to the WWTP and Shanganagh estate	Minor
		Commons Road	Primarily overhead lines with underground cable connections into properties along Commons Road	Minor
		N11 Bray Road + HDD Crossing	2 x MV/LV underground cables along Bray Road	Minor
		Cherrywood Road	MV/LV overlines + MV/LV underground cable	Minor
		Brides Glen	MV/LV Overhead Lines. Short section of Mv underground cable under the M50 bridge	Minor
		Ballycorus Road	Primarily MV overhead lines with underground cables into side streets and properties	Minor
		Glenamuck Road South	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kV Cables along CM Retail Access Road	Minor
		Glenamuck Road into Retail Park	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
	Telecoms	Clifton Park	telecom ducts along clifton park	Minor
		Commons Road	Shallow surface telecom ducts <0.3m deep	Minor
		N11 Bray Road + HDD Crossing	Comms	Minor
		Cherrywood Road	Comms	Minor
		Brides Glen	Comms	Minor
		Ballycorus Road	Comms	Minor
		Glenamuck Road South	Comms	Minor
		Glenamuck Road into Retail Park	Traffic Signals Virgin Media - Comms Ducting for both	Minor

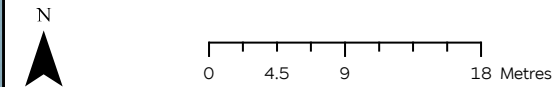
	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 5	Irish Water	Shanganagh Cliffs	Surface water drain, combined foul/surface gravity drain + 6" dia Cast Iron distribution watermain	Minor
		Shanganagh Road South R119	combined sewer main 600mm, 6" CAST IRON distribution potable main + 225mm dia foul conc + surface water pipes	Major
		Dublin Road	6" CAST IRON or Asbestos distribution main, foul sewer main + 375mm surface gravity main	Minor
		Stonebridge Road	Stormwater surface drain + gravity foul main, 6" CAST IRON or Abestos water main pipe	Minor
		Rathmichael	450mm surface water, 300mm uPVC, 24" CAST IRON Distribution Pipe	Minor
		Ballycorus Road	Gravity Foul sewer main, stormwater + CAST IRON or asbestos distribution potable water main	Minor
		Glenamuck Road South	CAST IRON distribution potable water, stormwater surface drain, gravity foul main	Minor
		Glenamuck Road into Retail Park	(Deep + 4m) gravity foul sewer, 375mm surface stormwater drain + 225mm Potable PVC main	Minor
	Gas	Shanganagh Cliffs	125mm 4 bar medium pressure, reducing to 63mm Gas main	Minor
		Shanganagh Road South R119	90mm reducing to 63mm 4 bar medium pressure, along road with service connections into side roads	Minor
		Dublin Road	180mm 4 bar towards Stonebridge road	Minor
		Stonebridge Road	180mm medium pressure, main does not cross through composite bridge	Minor
		Rathmichael	GAS - No GAS Services shown in road from GNI data records	Minor
		Ballycorus Road	No Gas services shown in road from GNI data records	Minor
		Glenamuck Road South	180mm 4 bar medium pressure	Minor
		Glenamuck Road into Retail Park	180mm + 90mm 4 bar medium pressure	Minor
	ESB	Shanganagh Cliffs	MV/LV Underground cable	Minor
		Shanganagh Road South R119	MV/LV underground cable either side of road + MV overhead lines	Minor
		Dublin Road	MV Overhead lines with MV/LV underground cables into side streets and properties + 38kv underground Cable	Minor
		Stonebridge Road	MV Overhead Lines + 38 KV underground cable/connects to Overline to cross over the M11	Minor
		Rathmichael	Short length of MV underground cable continues from Ferndale Road. Sections of MV Overhead lines	Minor
		Ballycorus Road	primarily MV overhead lines with underground cable connections into side streets and properties	Minor
		Glenamuck Road South	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
	Telecoms	Glenamuck Road into Retail Park	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
		Shanganagh Cliffs	Comms	Minor
		Shanganagh Road South R119	Comms	Minor
		Dublin Road	Comms Ducts for Traffic Signals and Virgin media	Minor
		Stonebridge Road	Comms ducts for Traffic Signals and Virgin Media	Minor
		Rathmichael	Comms Ducts for Virgin Media TBC	Minor
		Ballycorus Road	Comms ducts for Virgin media TBC	Minor
		Glenamuck Road South	Comms ducts for Virgin Media TBC	Minor
		Glenamuck Road into Retail Park	Comms Ducting for Traffic Signals and Virgin Media	Minor

	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 6	Irish Water	Shanganagh Cliffs	525mm dia surface water pipe, 2 no either side of road 225mm dia foul pipe, 6" PVC potable water main	Major
		Shanganagh Road South R119	600mm dia surface water pipe, 6" CAST IRON potable water, sections of water utilities along southern part of Shanganagh rd. NEW 350mm HDPE distribution pipe. Abandoned section of water main	Major
		Allies River Road	NEW 450mm HDPE distribution pipe, abandoned section of watermain	Major
		Ferndale Road	24" CAST IRON distribution water pipe + 6" CAST IRON dis pipe. 225mm uPVC water pipe. 100mm uPVC water pipe. Intermitent braches where surface drains and disribution pipe cross ferndale rd. 375mm surface water drain	Minor
		Rathmichael Road	450mm surface water drain. 300mm uPVC dis water pipe. 1050mm sewer pipe. 20" ABESTOS along Rathmichael Rd. Section of 100mm CAST IRON jct with Ballycorus Rd	Major
		Ballycorus Road	Gravity foul sewer. surface stormwater. CAST IRON or asbestos distribution pipe	Minor
		Glenamuck Road South into CM Retail Park	Deep Gravity Foul Sewer. 375mm surface/stormwater. 225mm uPVC potable water	Minor
	Gas	Shanganagh Cliffs	125mm reducing to 63mm medium pressure	Minor
		Shanganagh Road South R119	90mm reducing to 63mm along road, with service connection into side streets	Minor
		Allies River Road	No Gas services shown in road from GNI data records	Minor
		Ferndale Road	No Gas services shown in road from GNI data records	Minor
		Rathmichael Road	No Gas services shown in road from GNI data records	Minor
		Ballycorus Road	No Gas services shown in road from GNI data records	Minor
		Glenamuck Road South into CM Retail Park	180mm 4 bar medium pressure into CM retail park + 90mm medium pressure main along access road into retail park	Minor
	ESB	Shanganagh Cliffs	MV/LV underground cable	Minor
		Shanganagh Road South R119	MV/LV underground cables either side of road + MV overhead lines	Minor
		Allies River Road	Overhead MV Lines only	Minor
		Ferndale Road	MV/LV underground cable + MV Overhead lines	Minor
		Rathmichael Road	Short length of MV underground cable continues from Ferndale Road. Sections of MV Overhead lines	Minor
		Ballycorus Road	Primarily MV Overhead lines. MV underground cables connections from pole transformers into side streets and properties	Minor
		Glenamuck Road South into CM Retail Park	Primarily MV Overhead lines. MV underground cable from Cairnbrook up into CM Retail Park access road + 2 x 38 kv Cables along CM Retail Access Road	Minor
	Telecoms	Shanganagh Cliffs	Comms	Minor
		Shanganagh Road South R119	Comms	Minor
		Allies River Road	Comms	Minor
		Ferndale Road	Comms	Minor
		Rathmichael Road	Comms	Minor
		Ballycorus Road	Comms	Minor
		Glenamuck Road South into CM Retail Park	Comms	Minor

	Utility Service	Location	Infrastructure Details	Major/ Minor
Route Option 7	Irish Water	Allies River Road	NEW 450mm HDPE distribution pipe, abandoned section of watermain	Major
		Ferndale Road	24" CAST IRON distribution water pipe + 6" CAST IRON dis pipe. 225mm uPVC water pipe. 100mm uPVC water pipe. intermittent braches where surface drains and disribution pipe cross ferndale rd. 375mm surface water drain.	Minor
		Rathmichael Road	450mm surface water drain. 300mm uPVC dis water pipe. 1050mm sewer pipe. 20" ABESTOS along Rathmichael Rd. Section of 100mm CAST IRON jct with Ballycorus Rd	Major
		Ballycorus Road	Gravity foul sewer. surface stormwater. CAST IRON or asbestos distribution pipe	Minor
		Glenamuch Road South into CM Retail Park	Deep Gravity Foul Sewer. 375mm surface/stormwater. 225mm uPVC potable water	Minor
	Gas	Allies River Road	No GAS service shown in road from GNI data records	Minor
		Ferndale Road	No GAS services shown in road from GNI data records	Minor
		Rathmichael Road	No GAS services shown in road from GNI data records	Minor
		Ballycorus Road	No GAS services shown in road from GNI data records	Minor
		Glenamuch Road South into CM Retail Park	180mm 4 bar medium pressure along Glenamuck South continues into retail park + 90mm medium pressure along retail park access road	Minor
	ESB	Allies River Road	Over head MV lines only	Minor
		Ferndale Road	MV/LV underground cable + MV overhead lines	Minor
		Rathmichael Road	Short length of MV/LV underground cable continues from Ferndale road. Sections of MV overhead lines	Minor
		Ballycorus Road	Primarily MV overhead lines, No underground services shown on ESB data records	Minor
		Glenamuch Road South into CM Retail Park	Primarily MV overhead lines. MV/LV cable underground cable from Cairnbrook into CM retail park. 2 x 38kV underground cables along CM Retail Park access road	Minor
	Telecoms	Allies River Road	Comms	Minor
		Ferndale Road	Comms	Minor
		Rathmichael Road	Comms	Minor
		Ballycorus Road	Comms	Minor
		Glenamuch Road South into CM Retail Park	Comms	Minor



- Route 1 - Segment
- A
 - B
 - Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: A**

VER	DATE	REMARKS	Drawn	Checked
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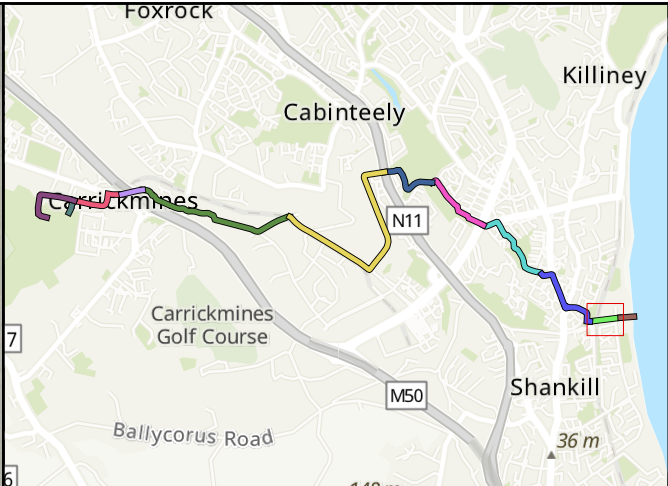
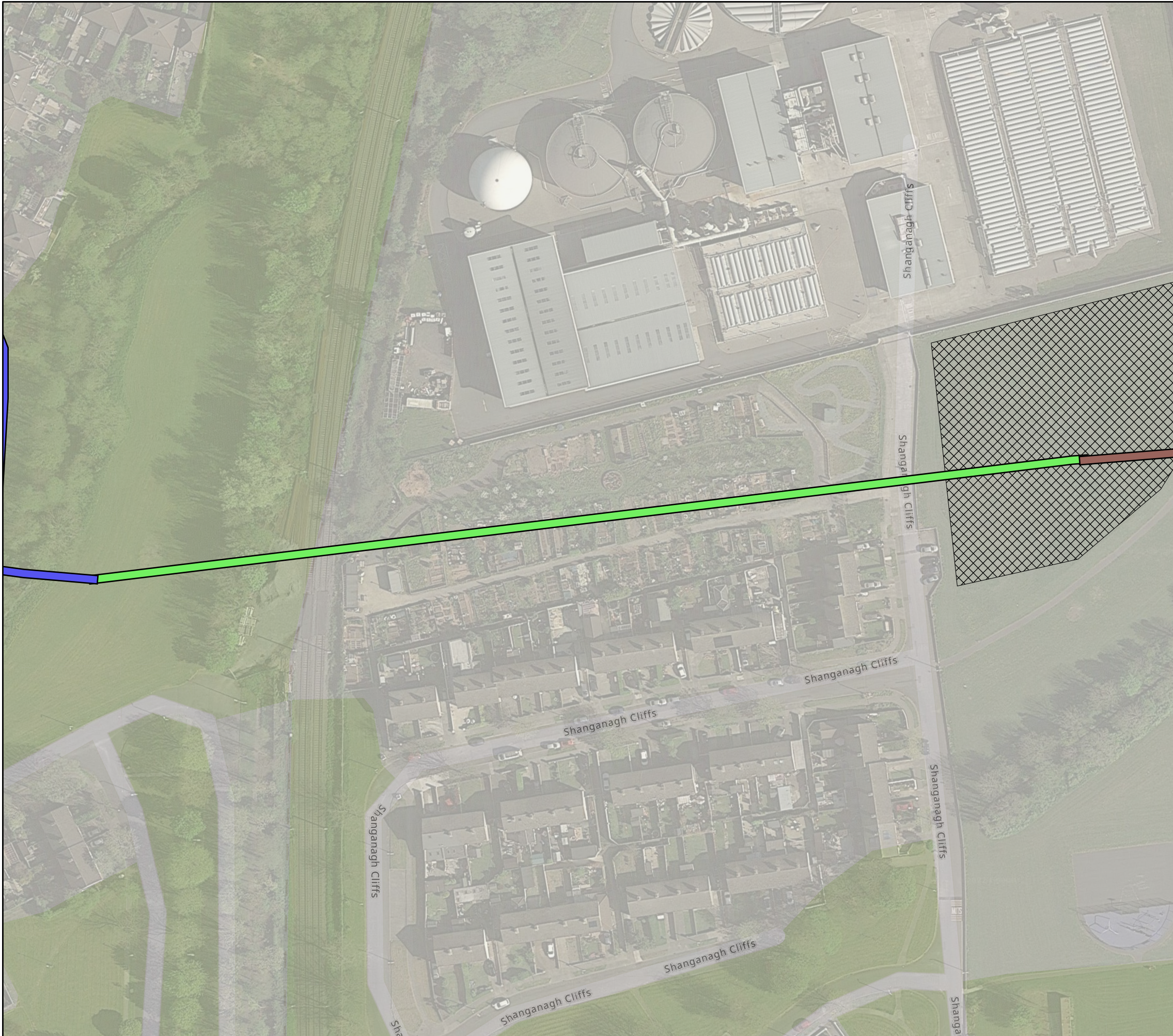
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Offshore
Wind

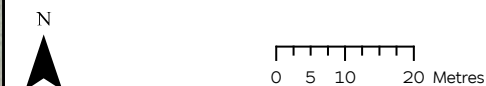
BRAY
Offshore
Wind

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Route 1 - Segment

- A
- B
- C
- Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

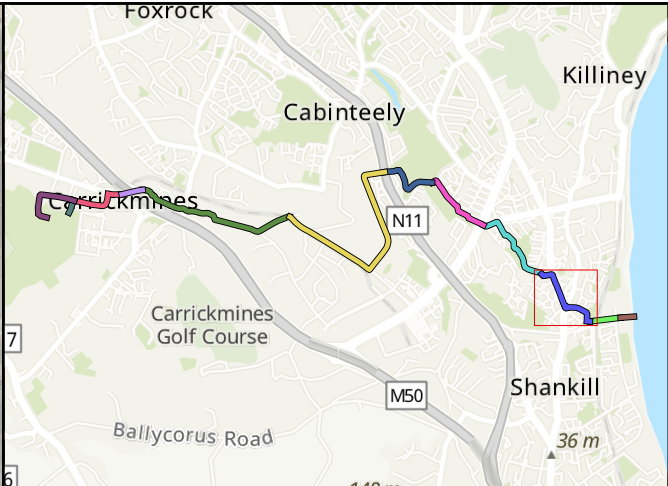
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

DublinArray
Generation for generations

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Route 1 - Segment

- B
- C
- D



0 15 30 60 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

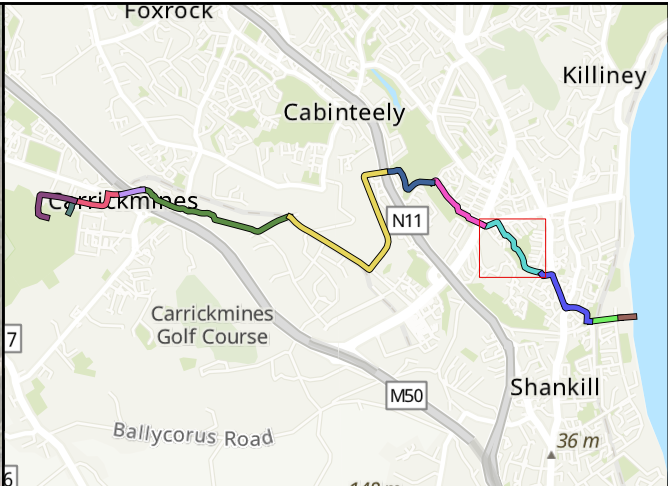
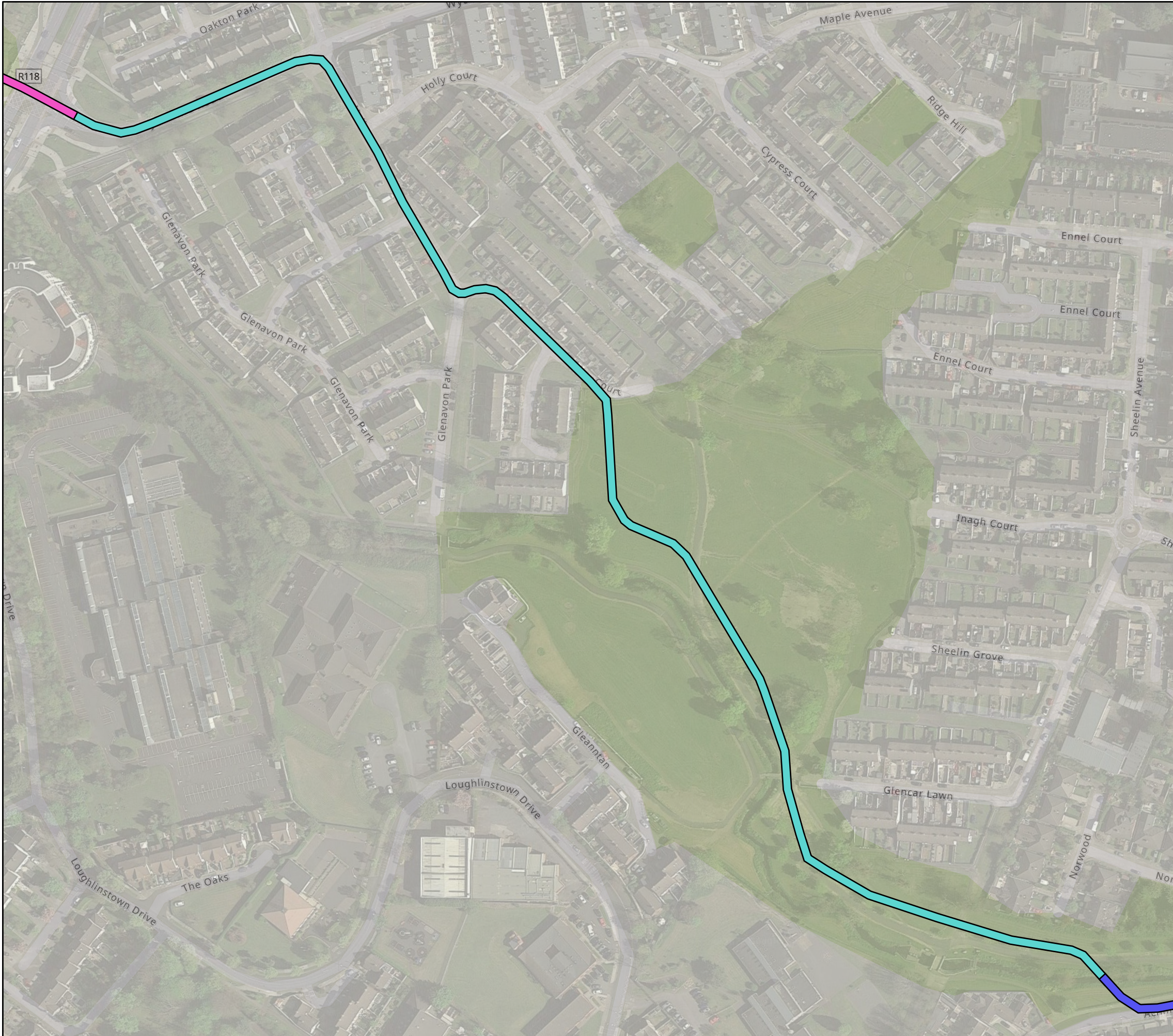
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,900	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

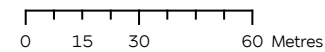
BRAY
Offshore
Wind

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Route 1 - Segment

- C
- D
- E



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

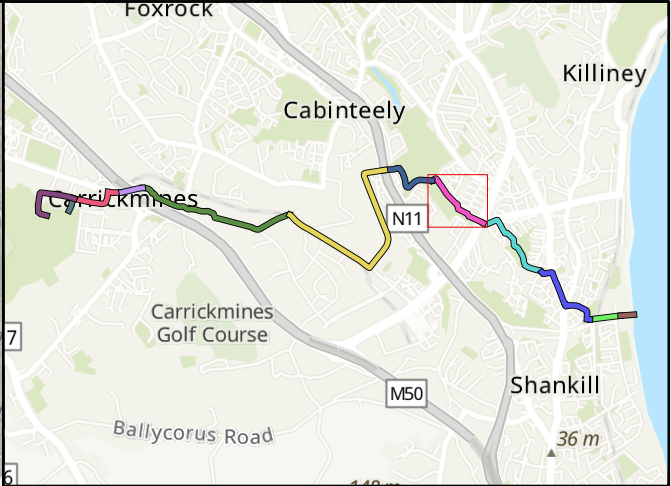
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,000	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

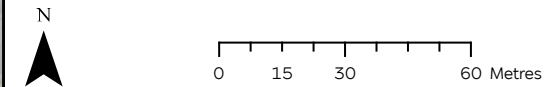
BRAY
Offshore
Wind

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Route 1 - Segment

- D
- E
- F



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: E**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

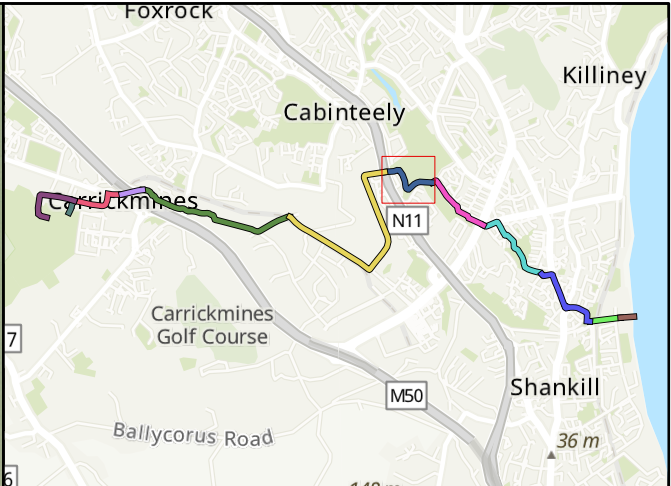
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,800	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

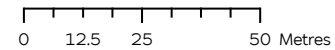
DublinArray
Generation for generations

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Route 1 - Segment

- E
- F
- G



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

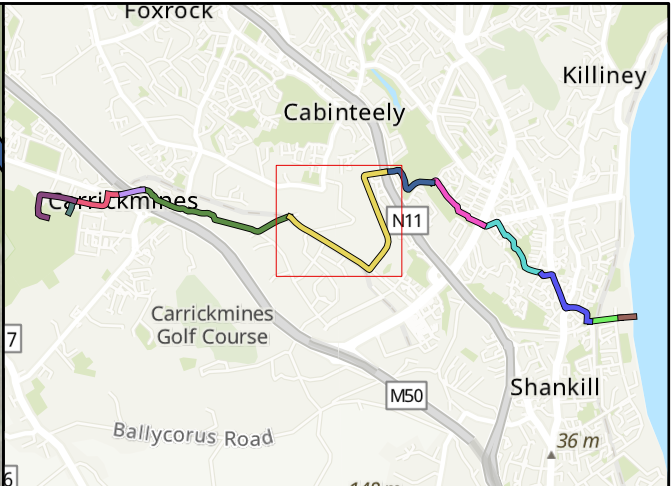
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

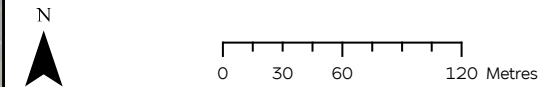


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Route 1 - Segment

- F
- G
- H



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: G**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

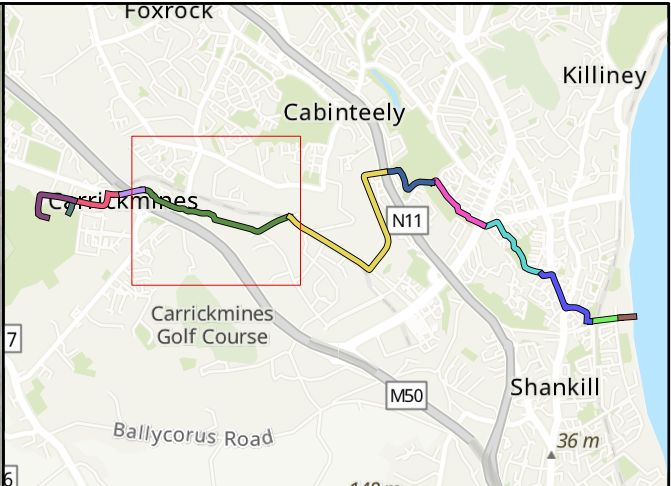
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,800	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

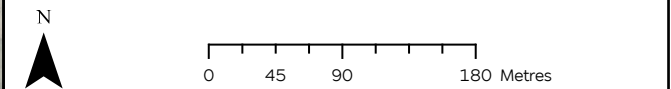
BRAY
Offshore
Wind

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Route 1 - Segment

- G
- H
- I



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PROJECT TITLE
Dublin Array

DRAWING TITLE
Onshore Cable Route Options
Route 1 - Segment: H

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

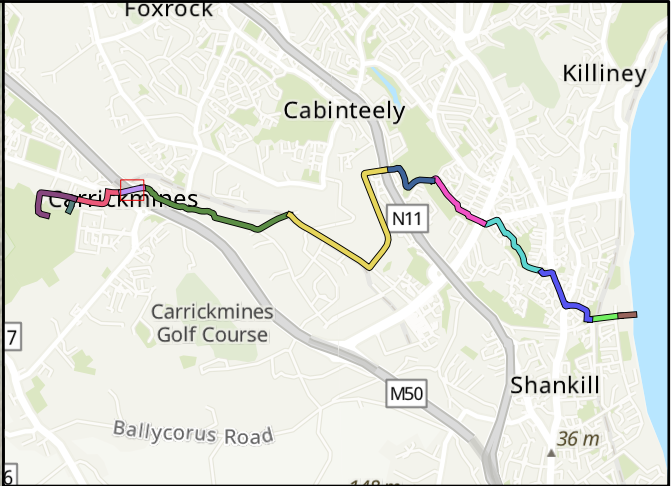
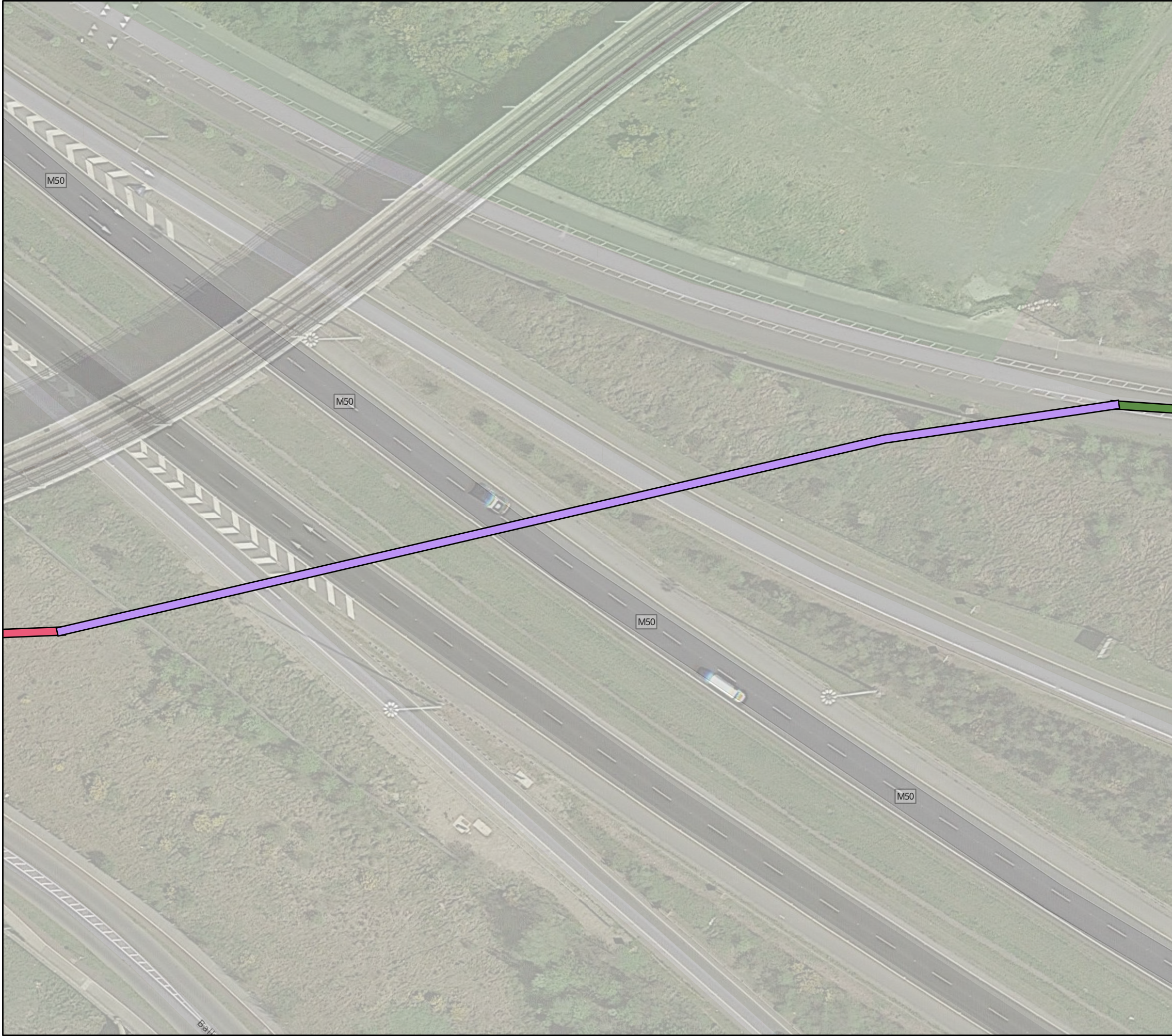
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:5,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

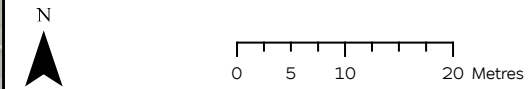
BRAY
Offshore
Wind

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Route 1 - Segment

- H
- I
- K



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: I**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

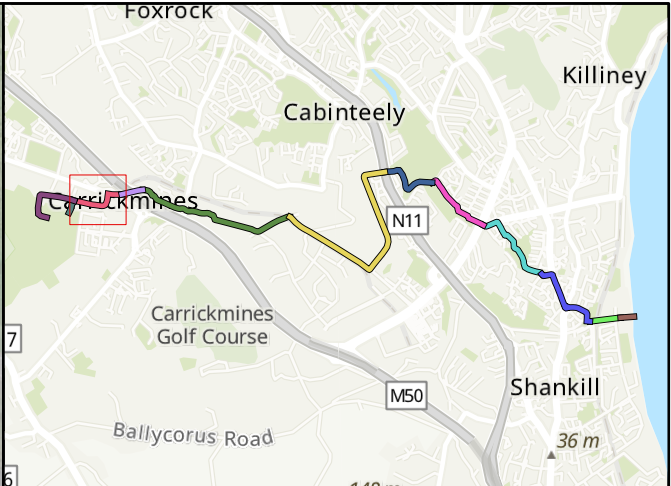
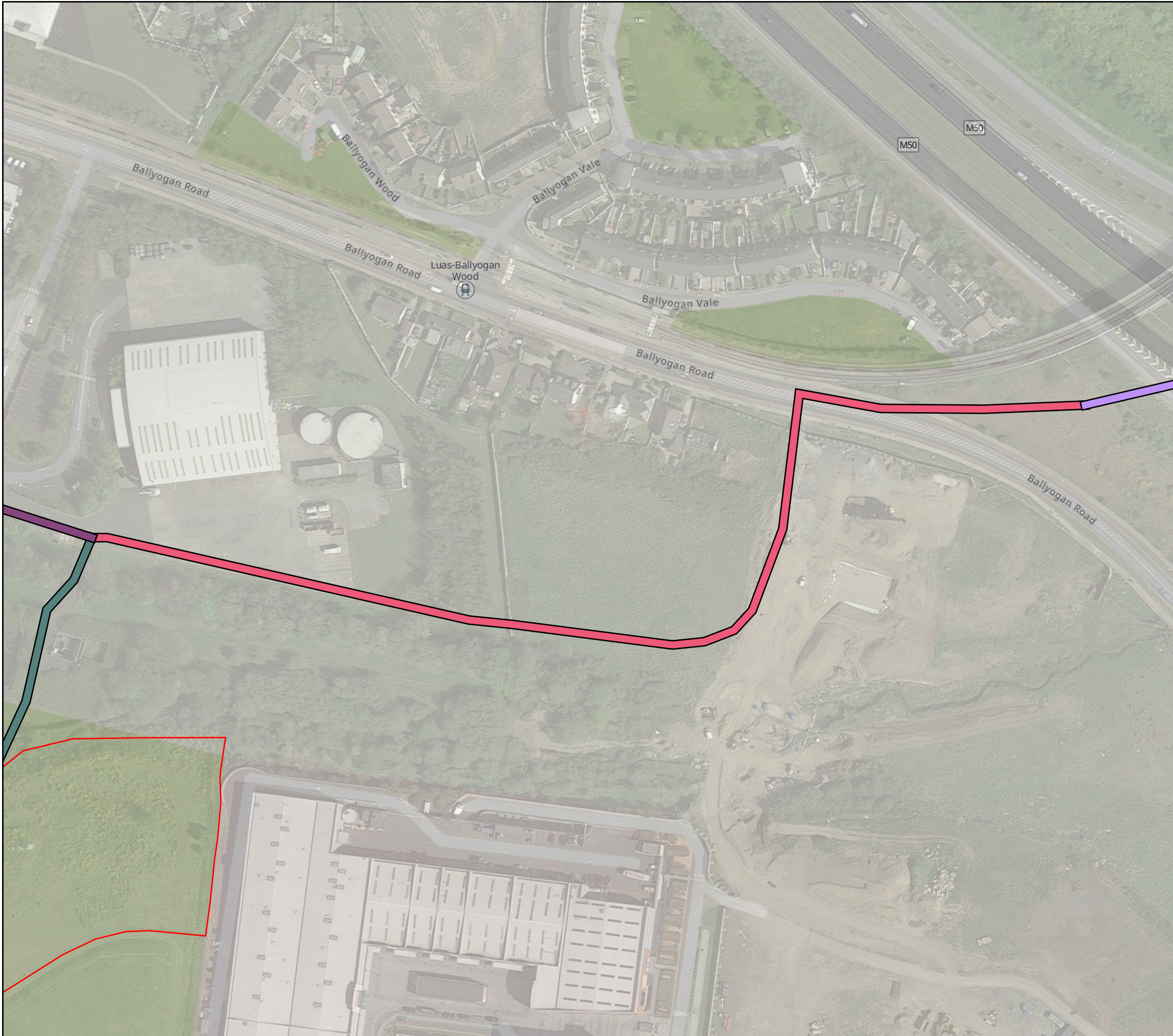
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:700	A3	IRENET95	IRENET95 Irish Transverse Mercator

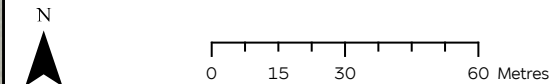
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 1 - Segment
- I
 - K
 - L1
 - L2
- Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: K**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

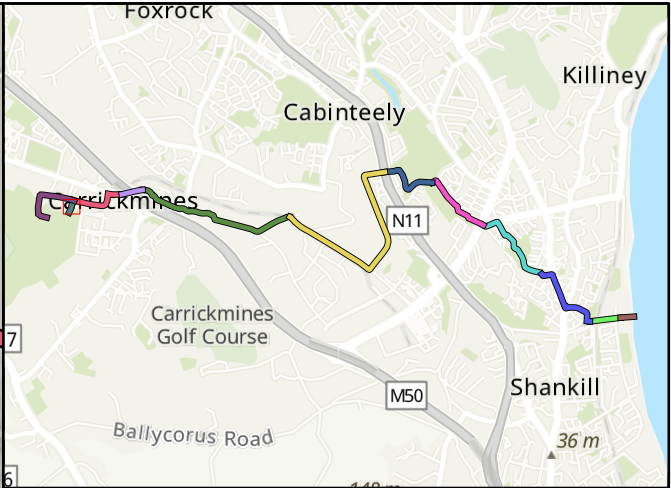
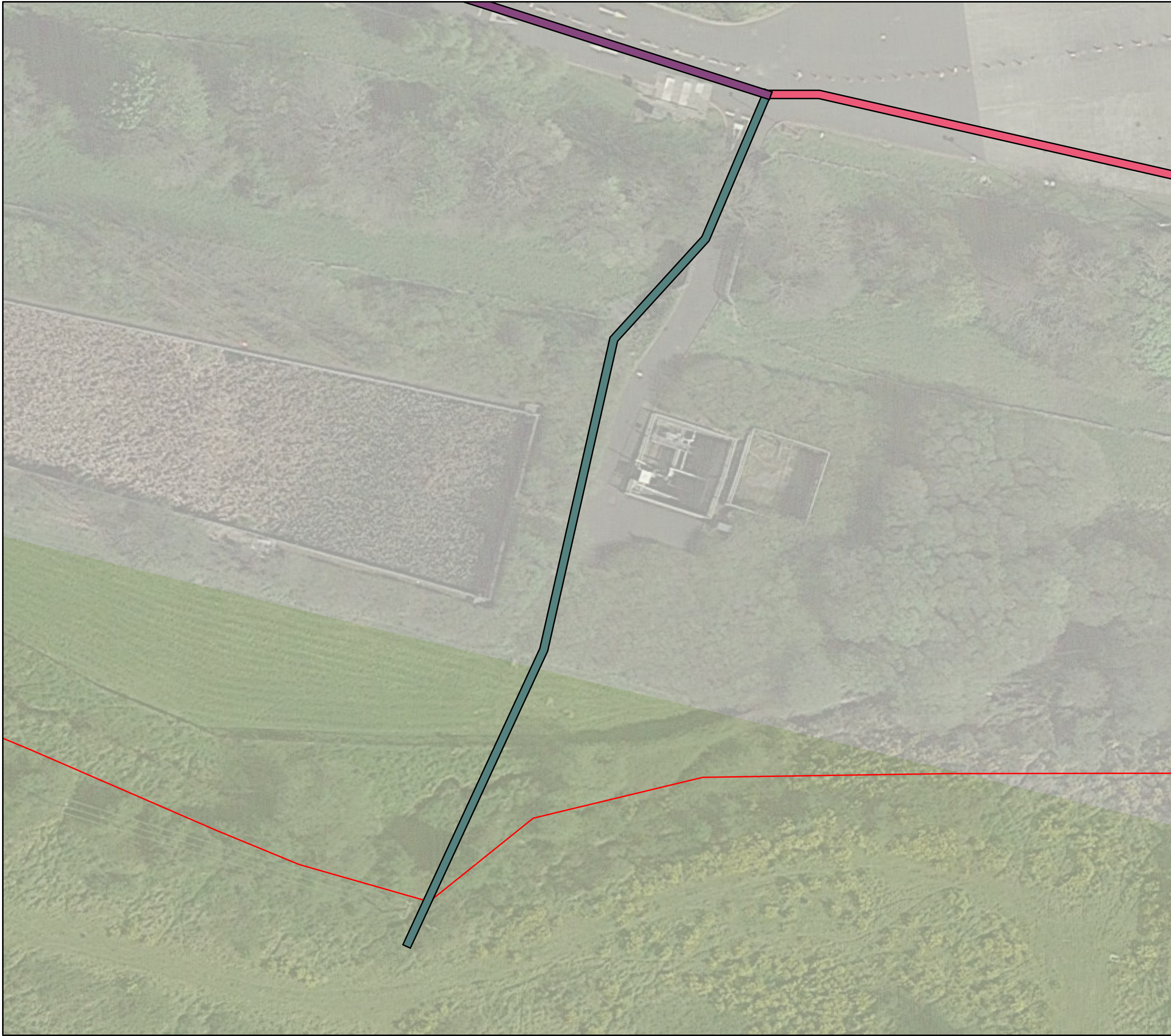
DRAWING NUMBER:
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SCALE 1:1,700	PLOT SIZE A3	DATUM IRENET95	PROJECTION IRENET95 Irish Transverse Mercator
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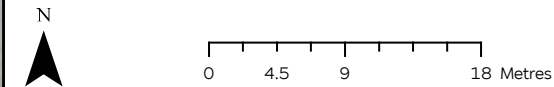
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 1 - Segment
- K
 - L1
 - L2
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: L1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

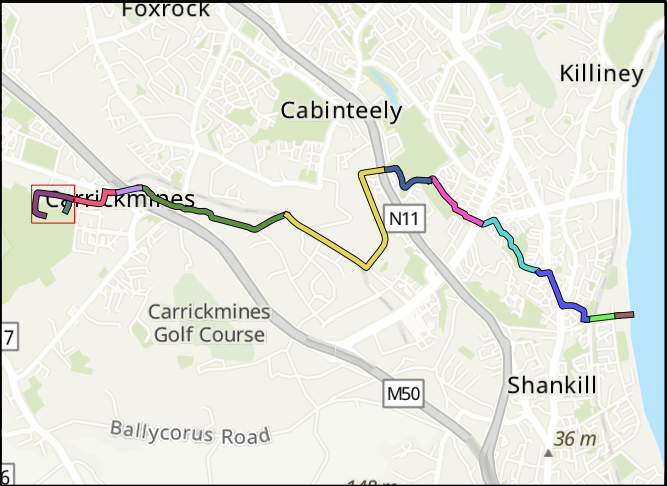
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

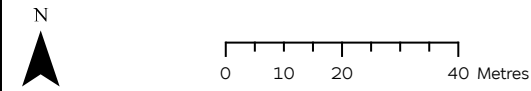
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 1 - Segment
- K
 - L1
 - L2
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 1 - Segment: L2**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

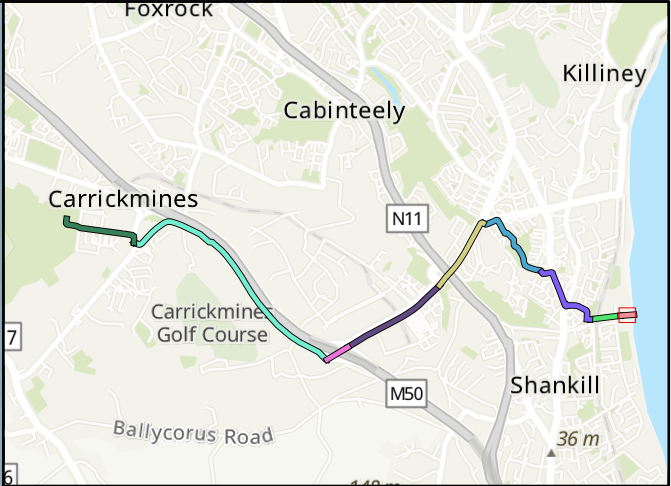
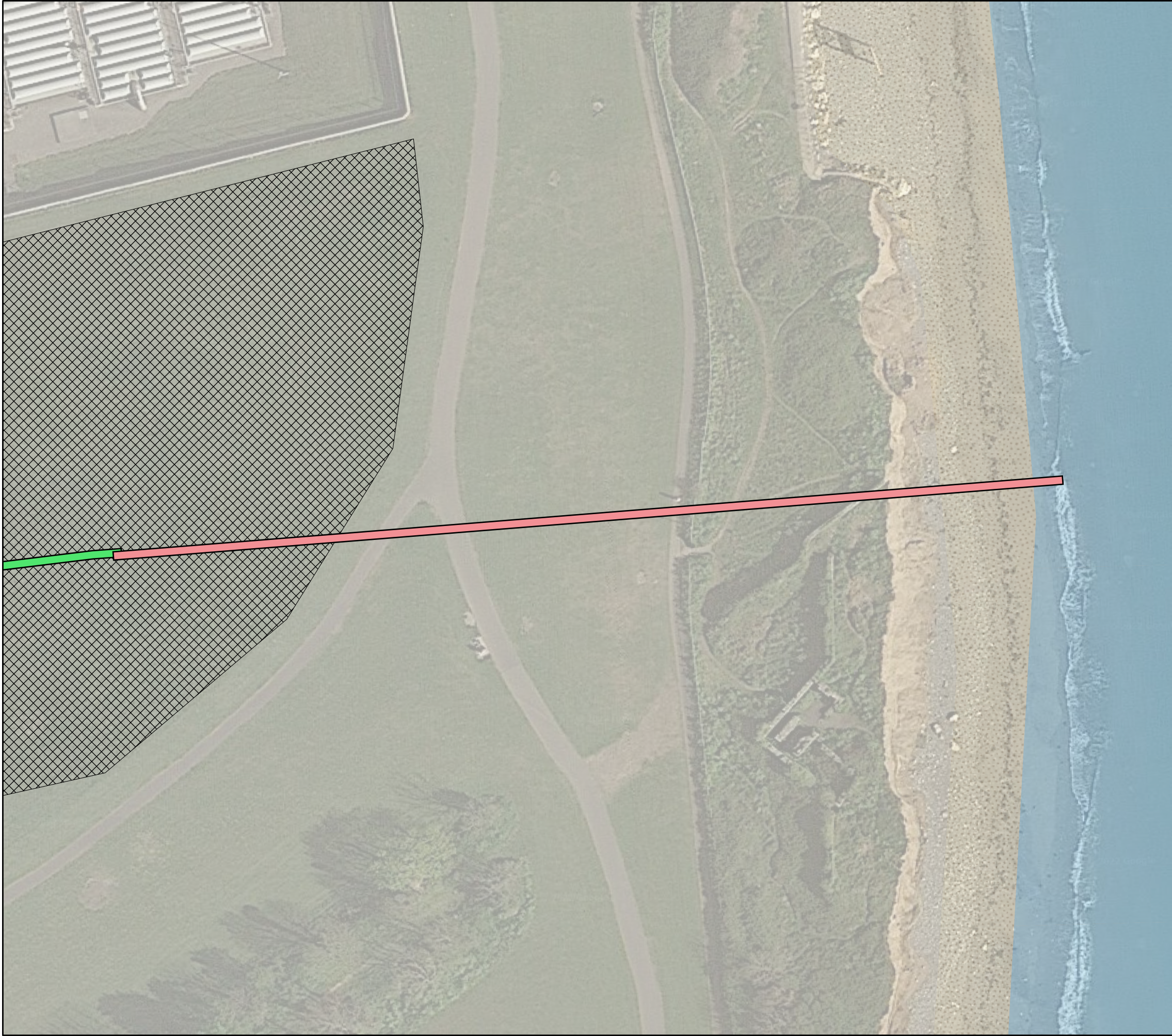
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
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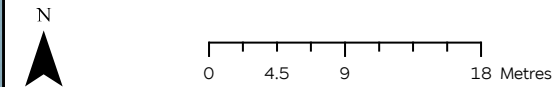
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 2 - Segment
- A
 - B
 - Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: A**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

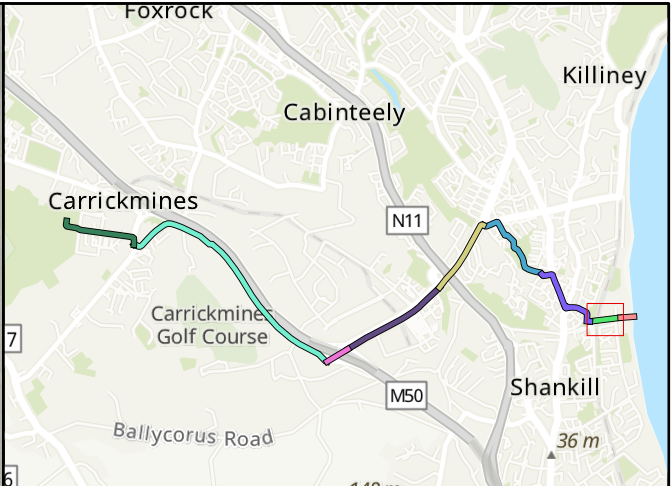
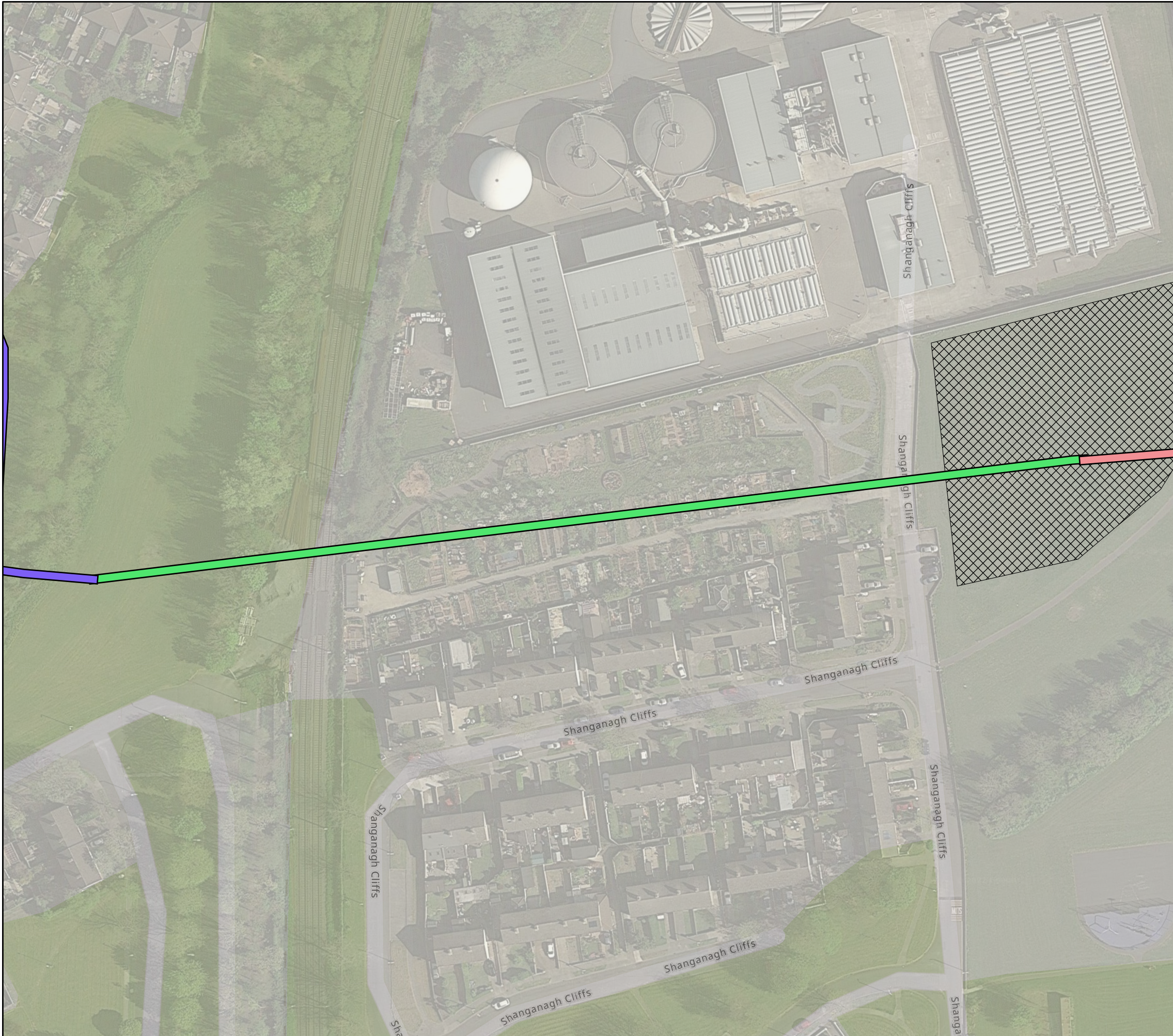
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
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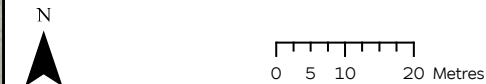
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 2 - Segment
- A
 - B
 - C
- Temporary Construction Compound
(Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

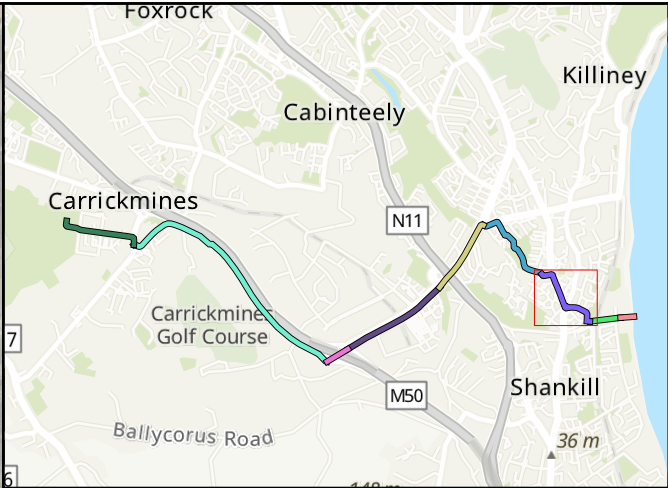
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 2 - Segment

- B
- C
- D



0 15 30 60 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

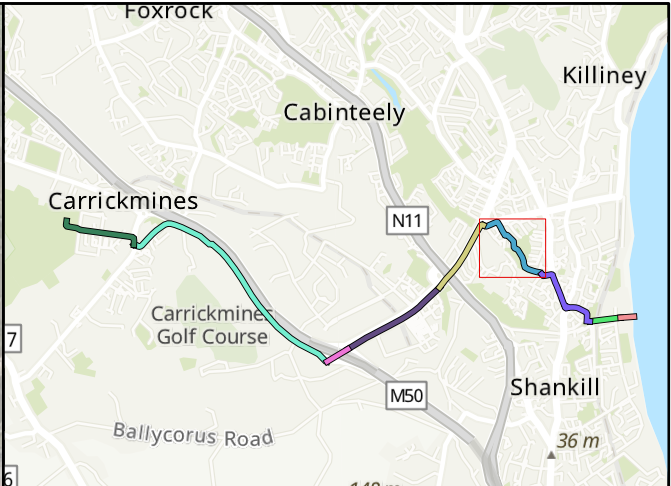
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,900	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 2 - Segment

- C
- D
- E



0 15 30 60 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

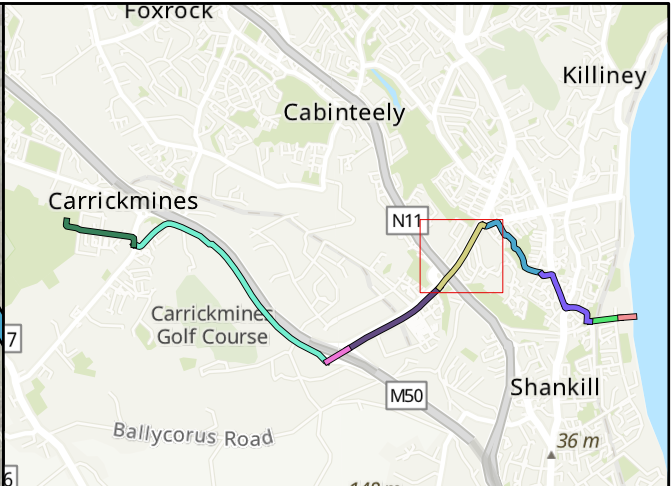
SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,000	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 2 - Segment

- D
- E
- F



0 20 40 80 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: E**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

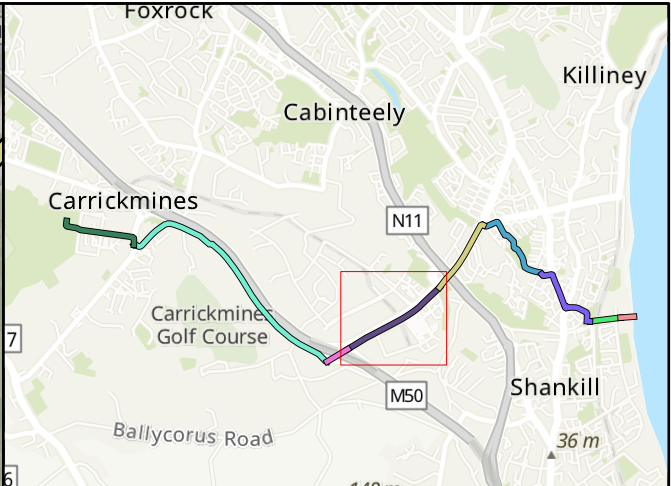
SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 2 - Segment

- E
- F
- G



0 25 50 100 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

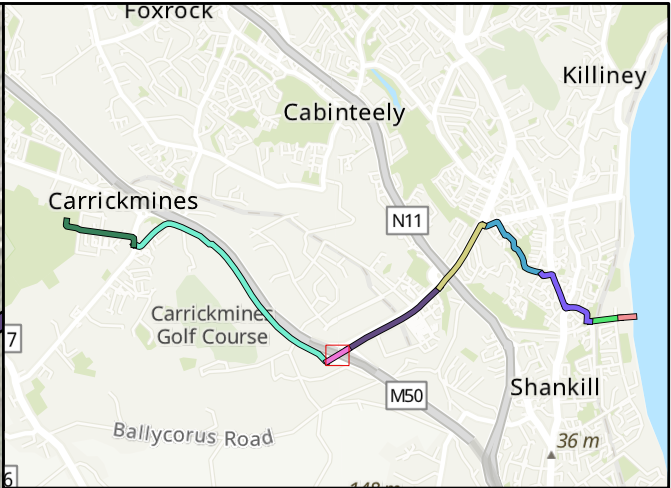
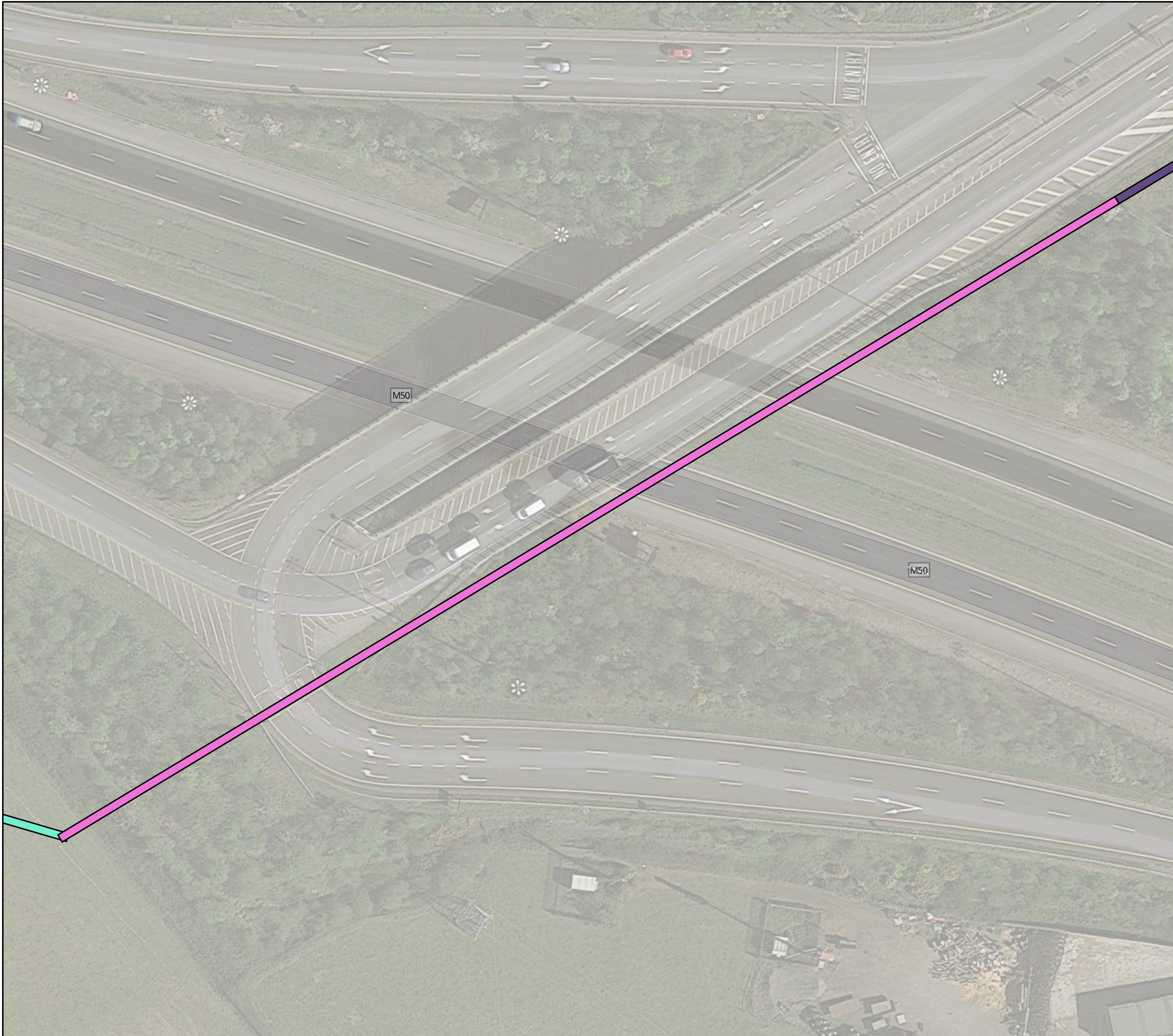
SCALE	PLOT SIZE	DATUM	PROJECTION
1:5,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 2 - Segment

- F
- G
- H



0 5 10 20 Metres

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Onshore Cable Route Options
Route 2 - Segment: G

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:

004424933-01

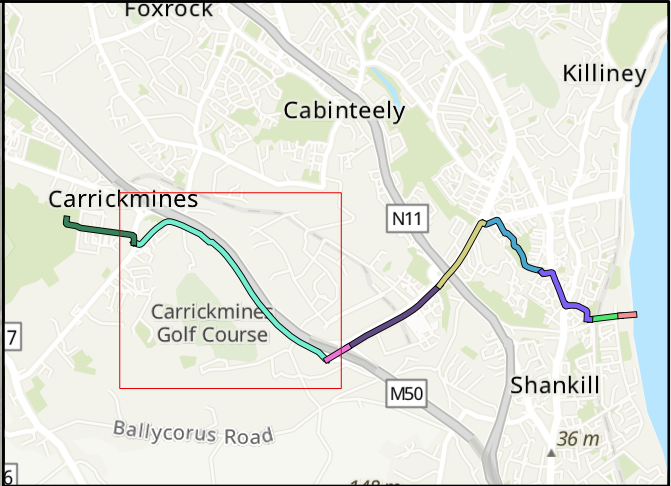
SCALE	PLOT SIZE	DATUM	PROJECTION
1:700	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 2 - Segment

- G
- H
- I

N

0 55 110 220 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: H**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

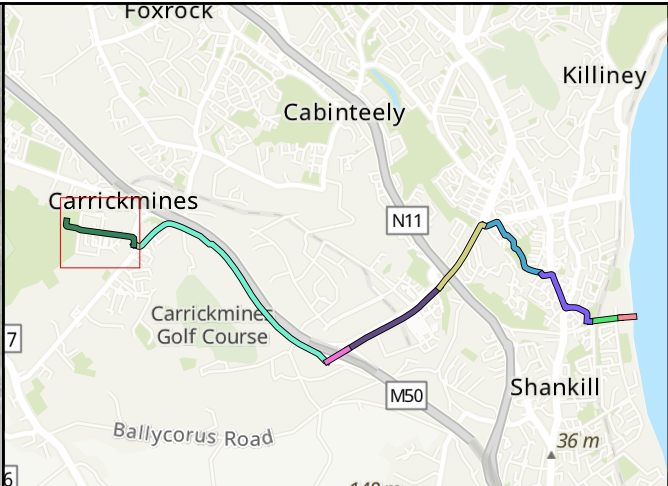
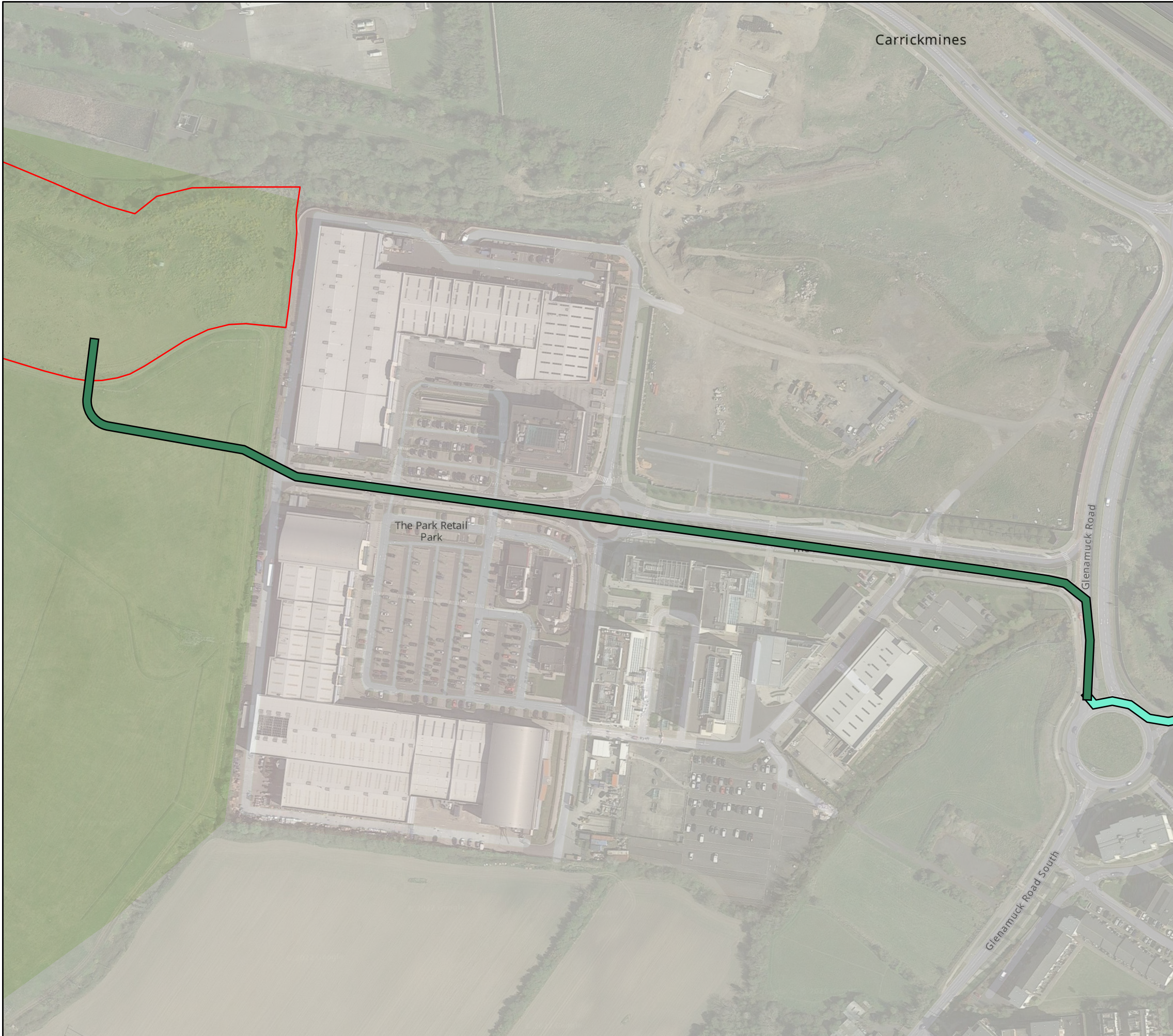
SCALE	PLOT SIZE	DATUM	PROJECTION
1:6,700	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

DublinArray
Generation for generations

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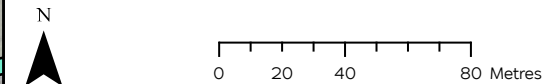


Ballyogan Substation Site boundary

Route 2 - Segment

H

I



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 2 - Segment: I**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

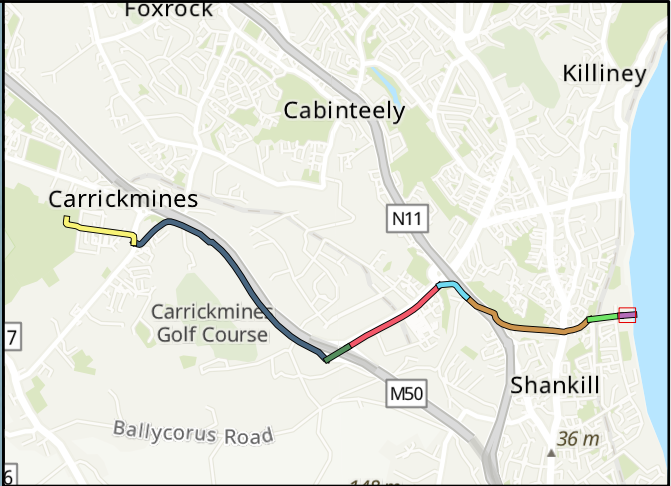
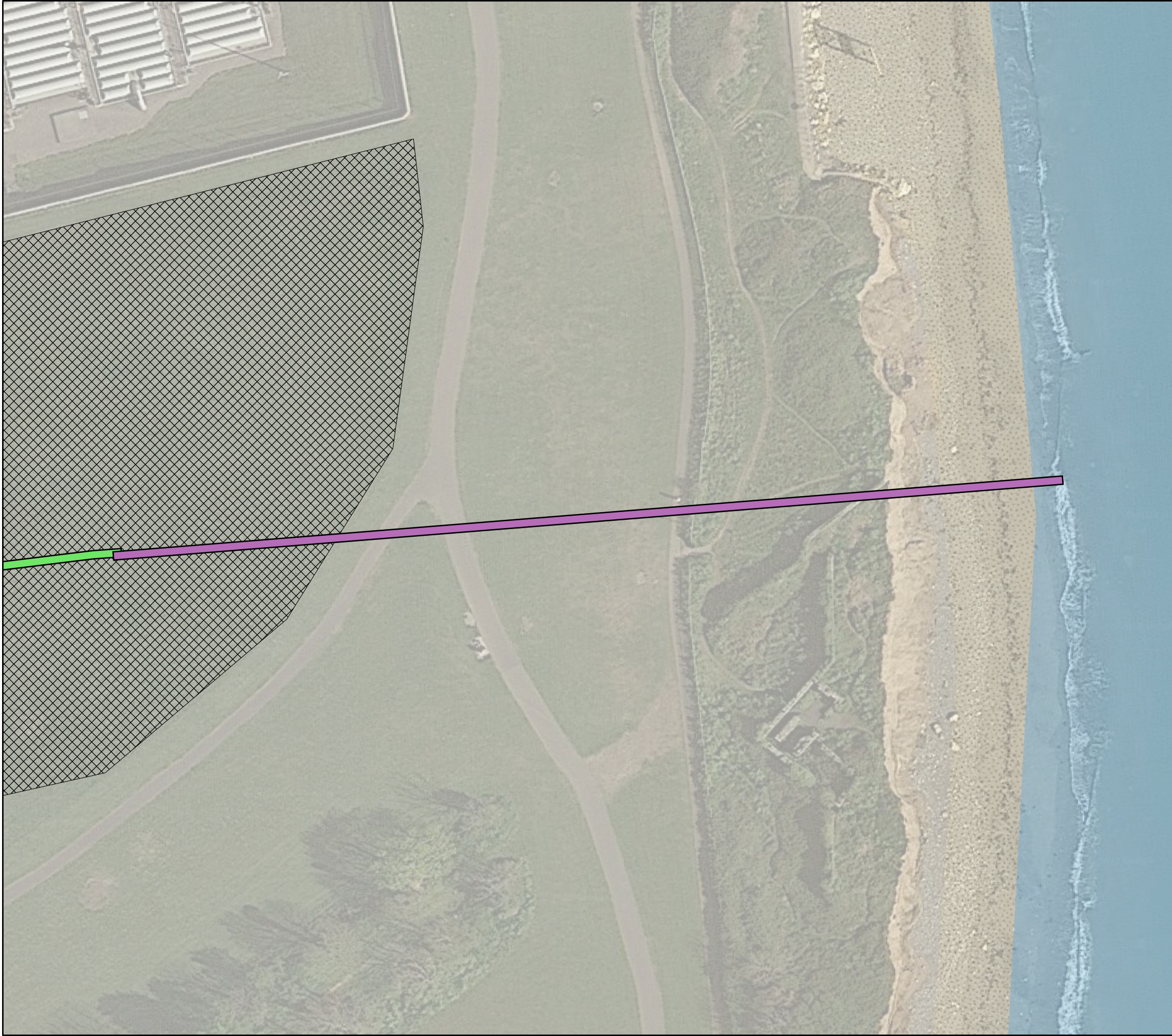
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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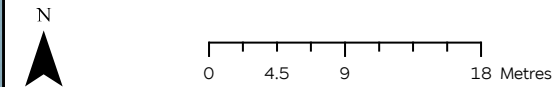


Route 3 - Segment

A

B

Temporary Construction Compound
(Indicative Area)



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PROJECT TITLE

Dublin Array

DRAWING TITLE

Onshore Cable Route Options
Route 3 - Segment: A

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:

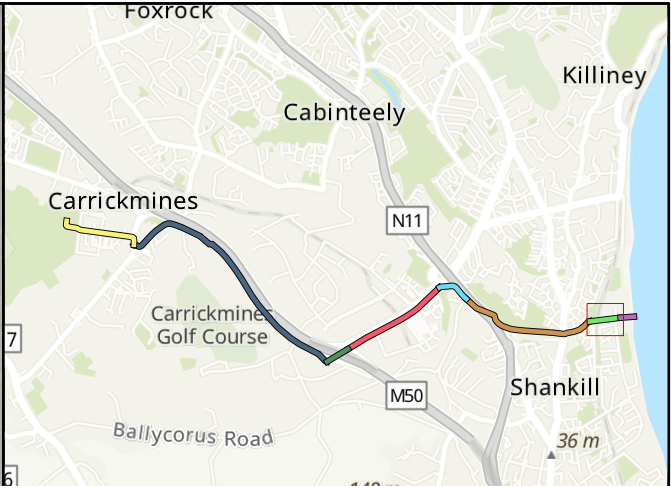
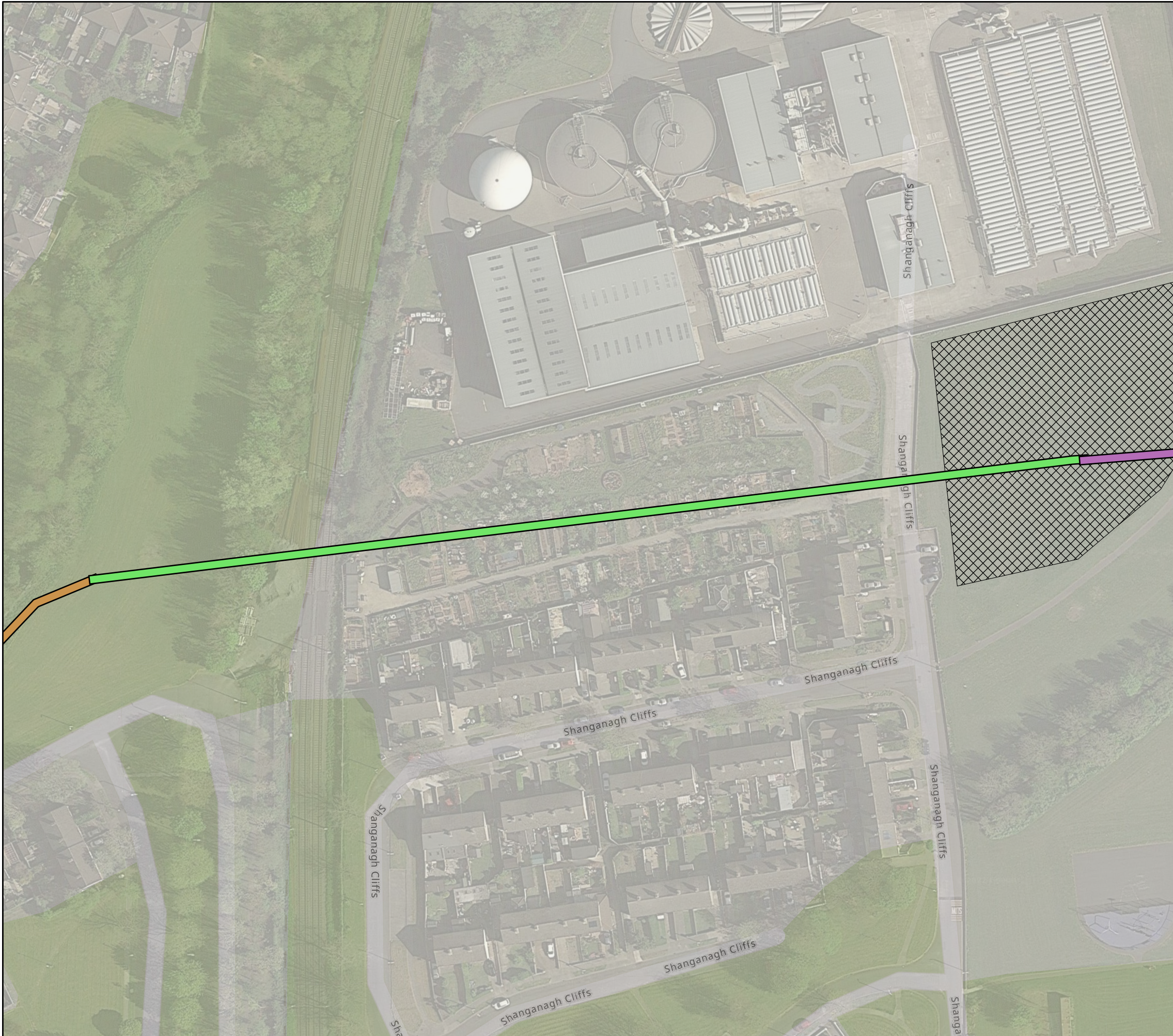
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

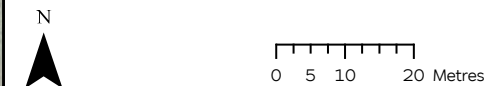
BRAY
Offshore
Wind

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Route 3 - Segment

- A
- B
- C
- Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

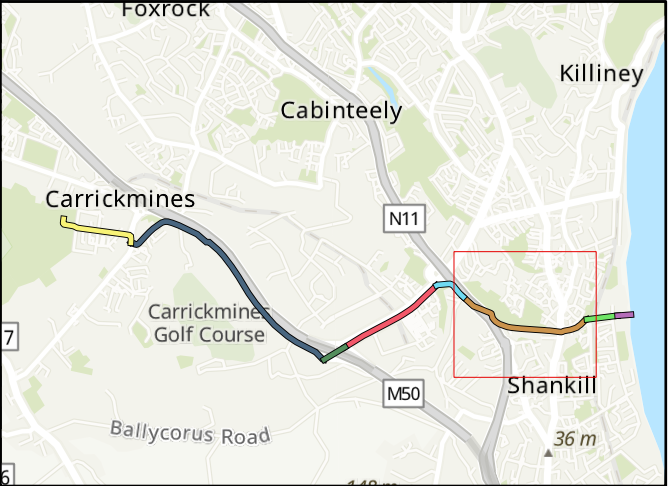
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

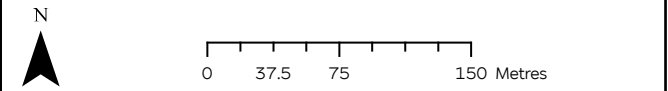
DublinArray
Generation for generations

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Route 3 - Segment

- B
- C
- D



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

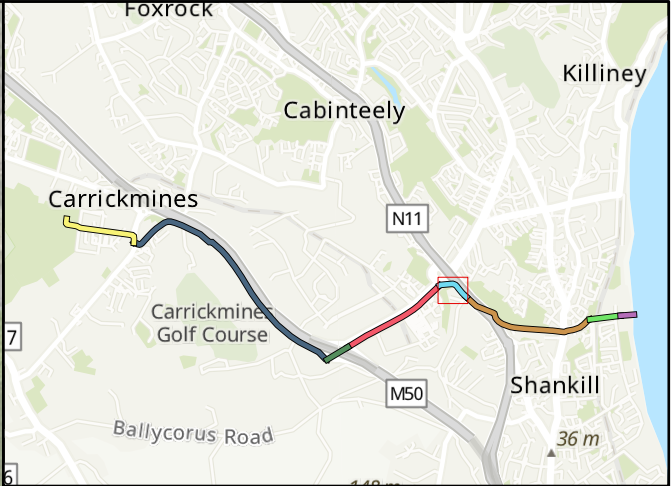
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:4,300	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 3 - Segment

- C
- D
- E



0 5 10 20 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

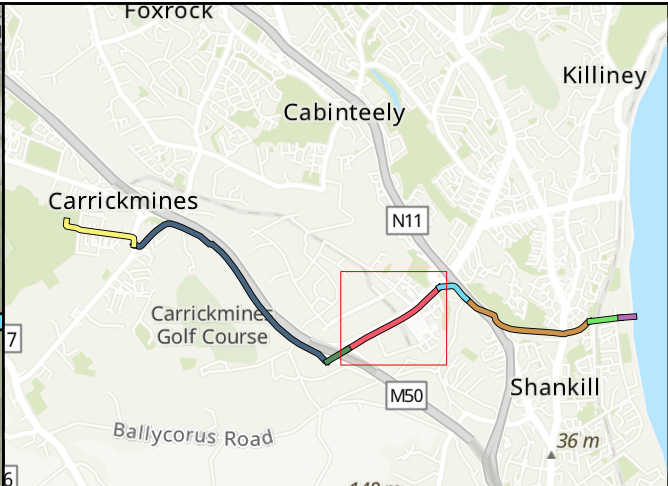
SCALE	PLOT SIZE	DATUM	PROJECTION
1:900	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

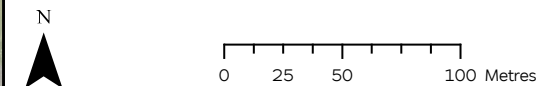


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Route 3 - Segment

- D
- E
- F



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: E**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

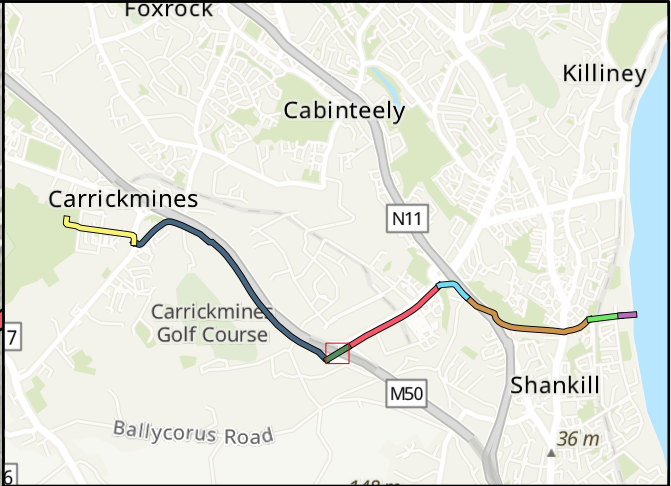
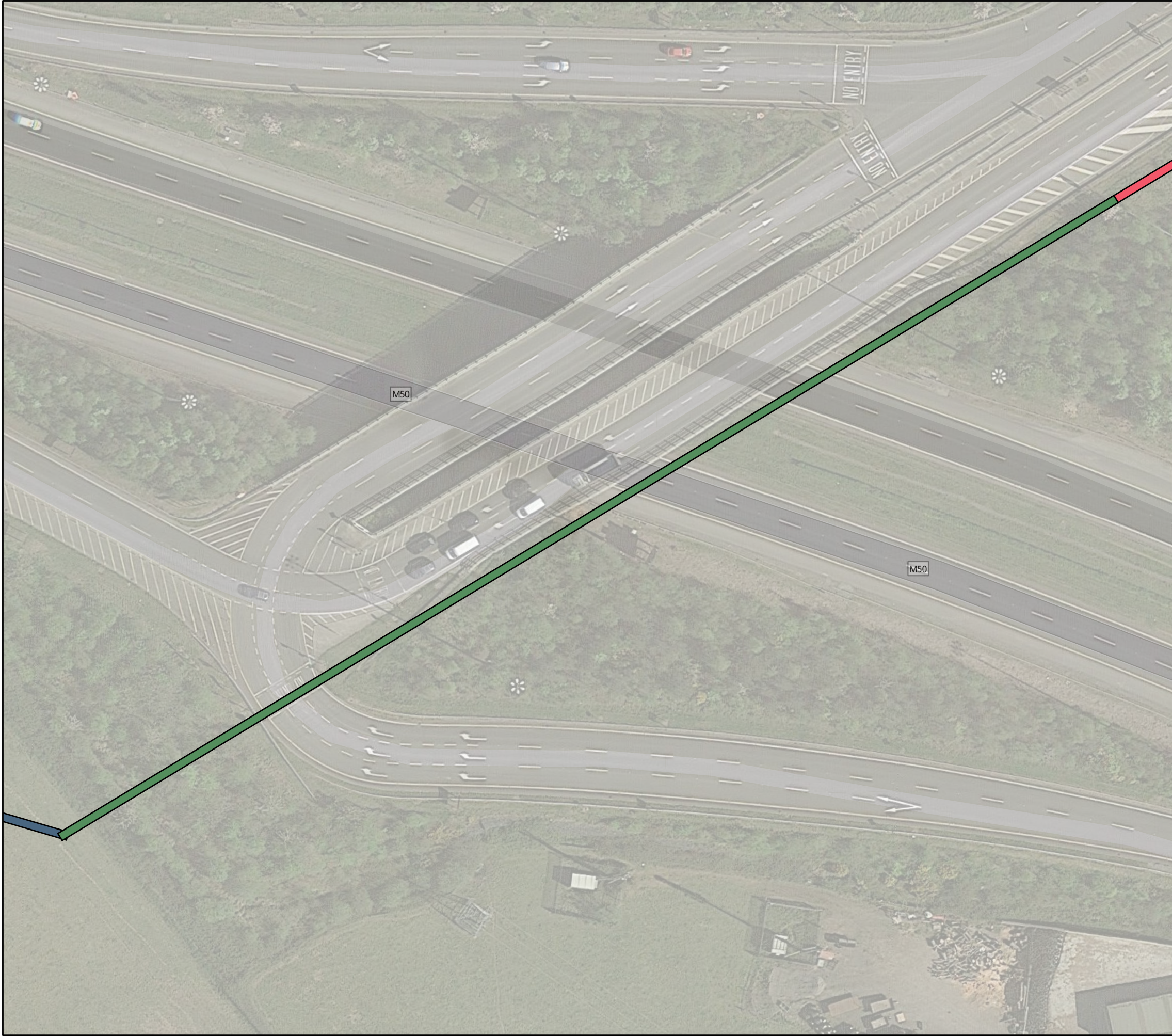
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 3 - Segment

- E
- F
- G



0 5 10 20 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

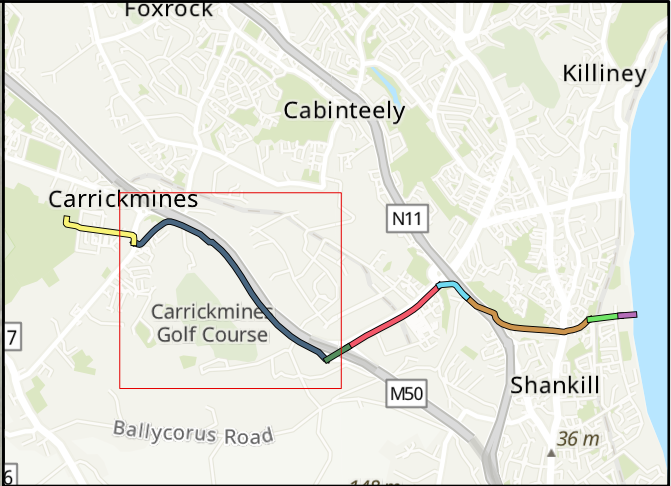
SCALE	PLOT SIZE	DATUM	PROJECTION
1:700	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind




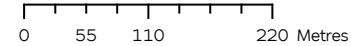
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Route 3 - Segment

█	F
█	G
█	H

 N



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: G**


VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

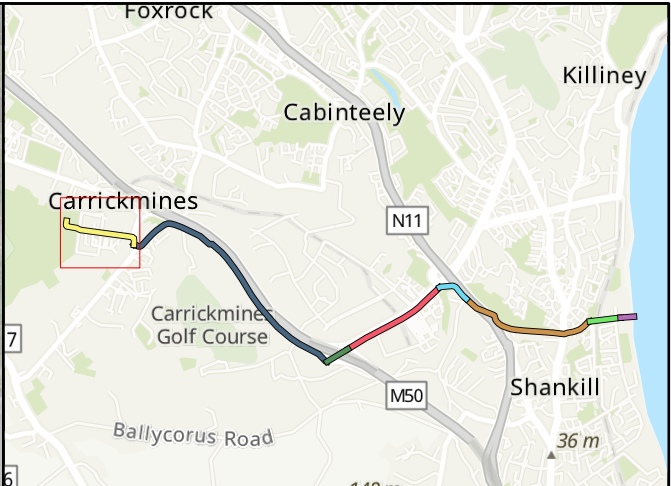
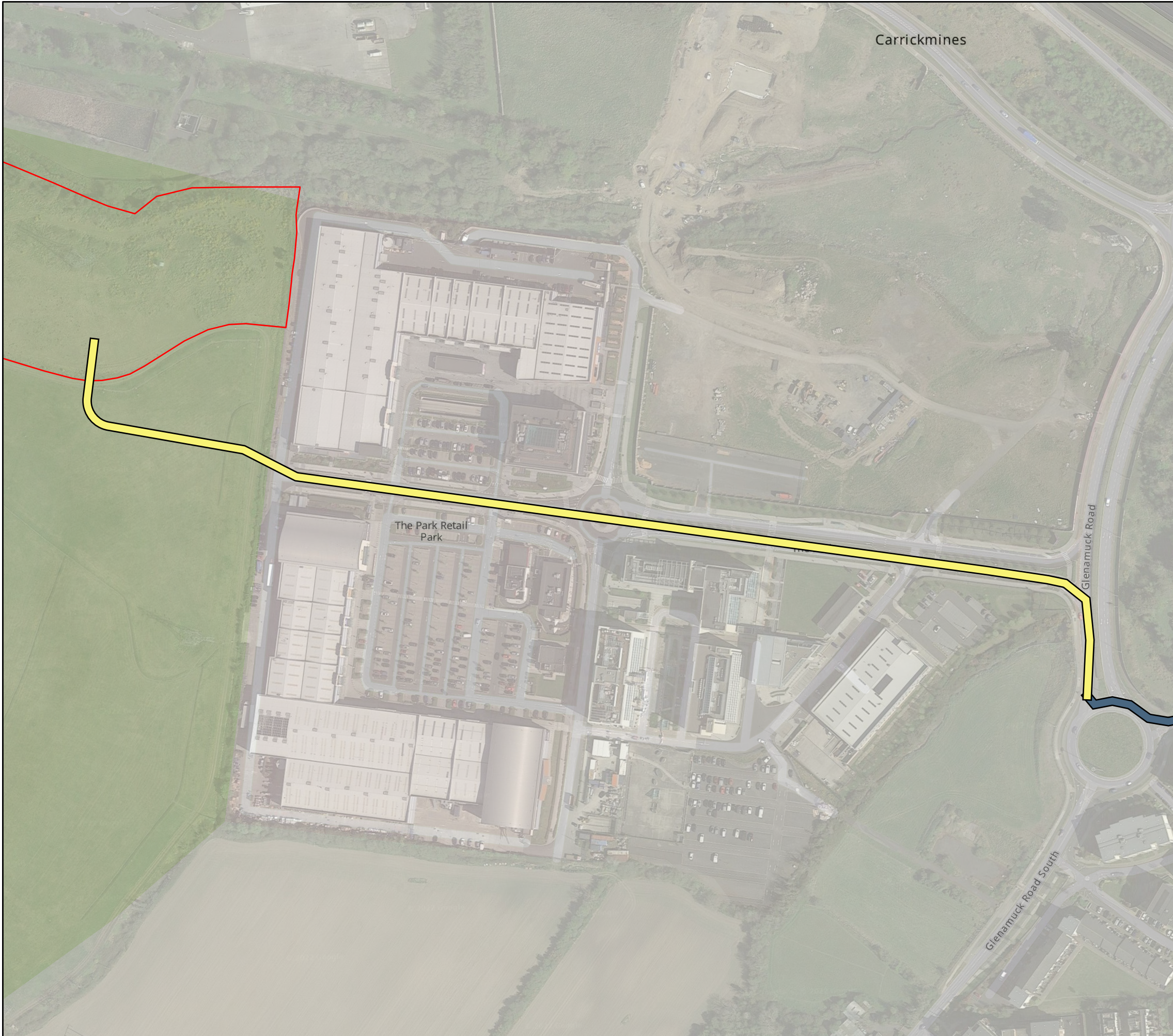
SCALE	PLOT SIZE	DATUM	PROJECTION
1:6,700	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

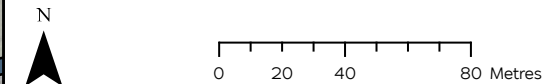


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Route 3 - Segment

- G
- H
- Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 3 - Segment: H**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

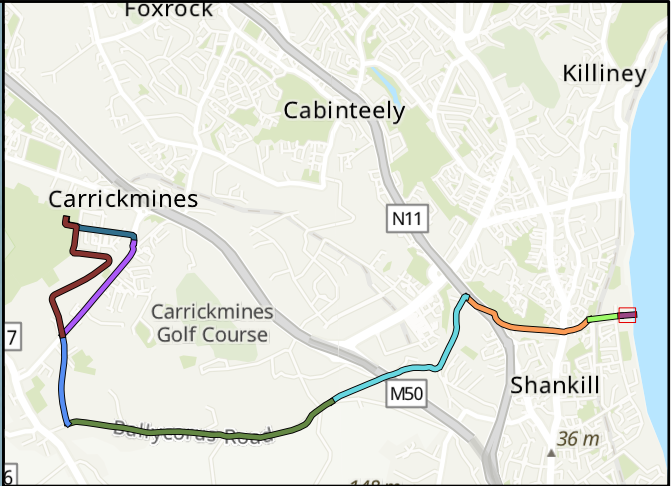
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

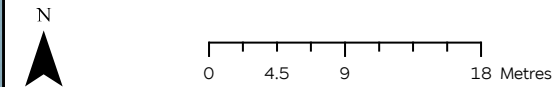
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 4 - Segment
- A
 - B
 - Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: A**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

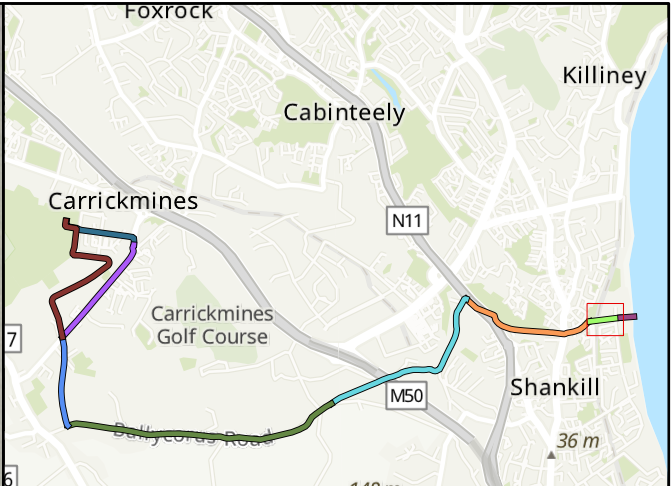
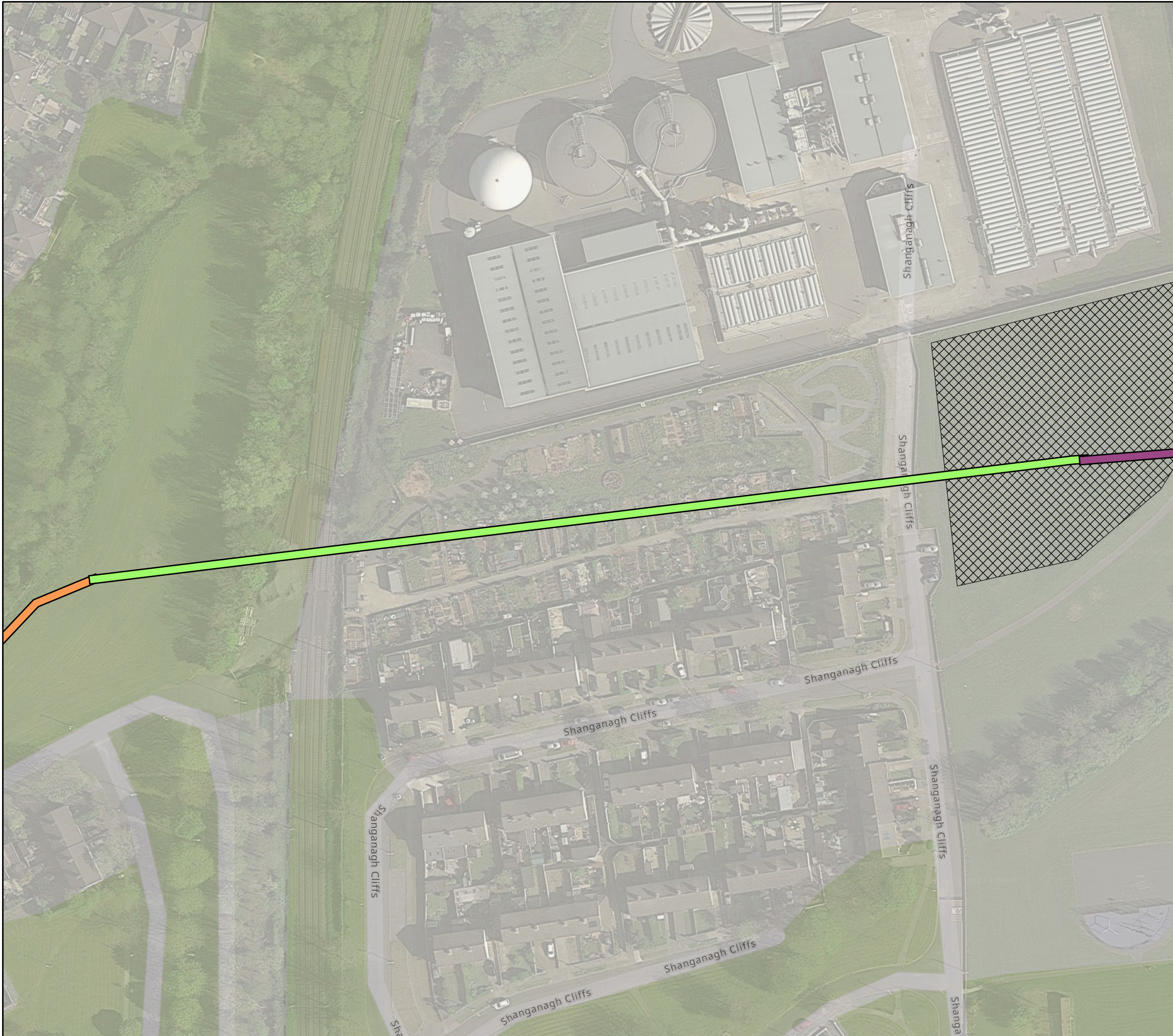
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

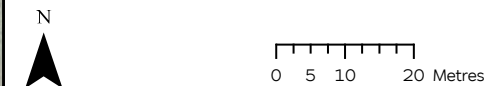
BRAY
Offshore
Wind

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Route 4 - Segment

- A
- B
- C
- Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: B**

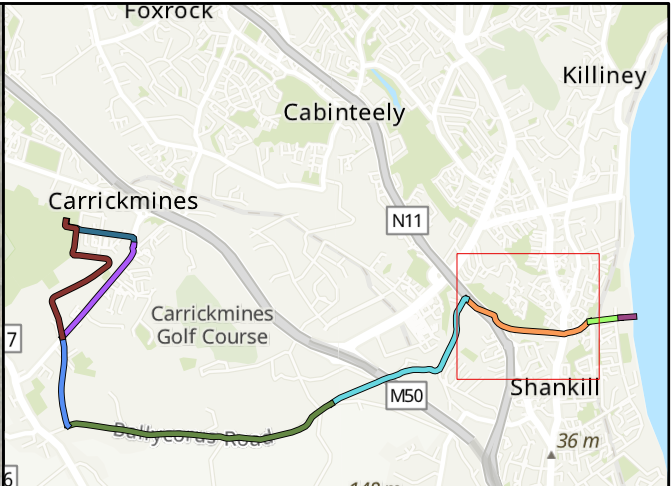
VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

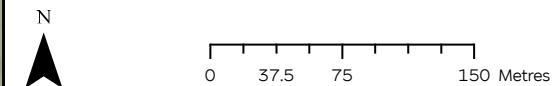
KISH Offshore Wind
BRAY Offshore Wind
DublinArray
Generation for generations

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Route 4 - Segment

- B
- C
- D



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

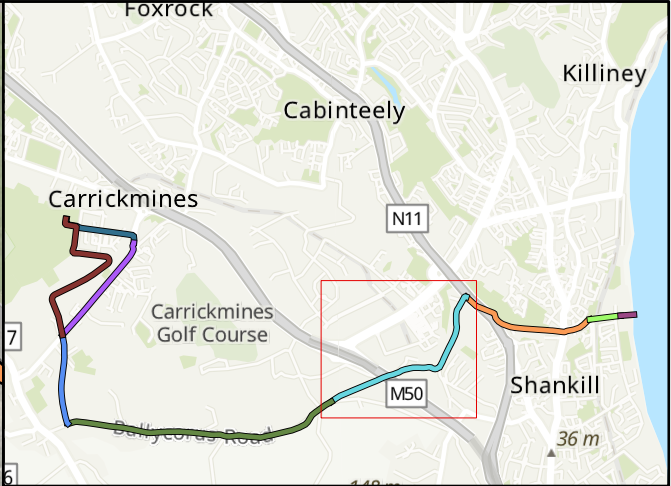
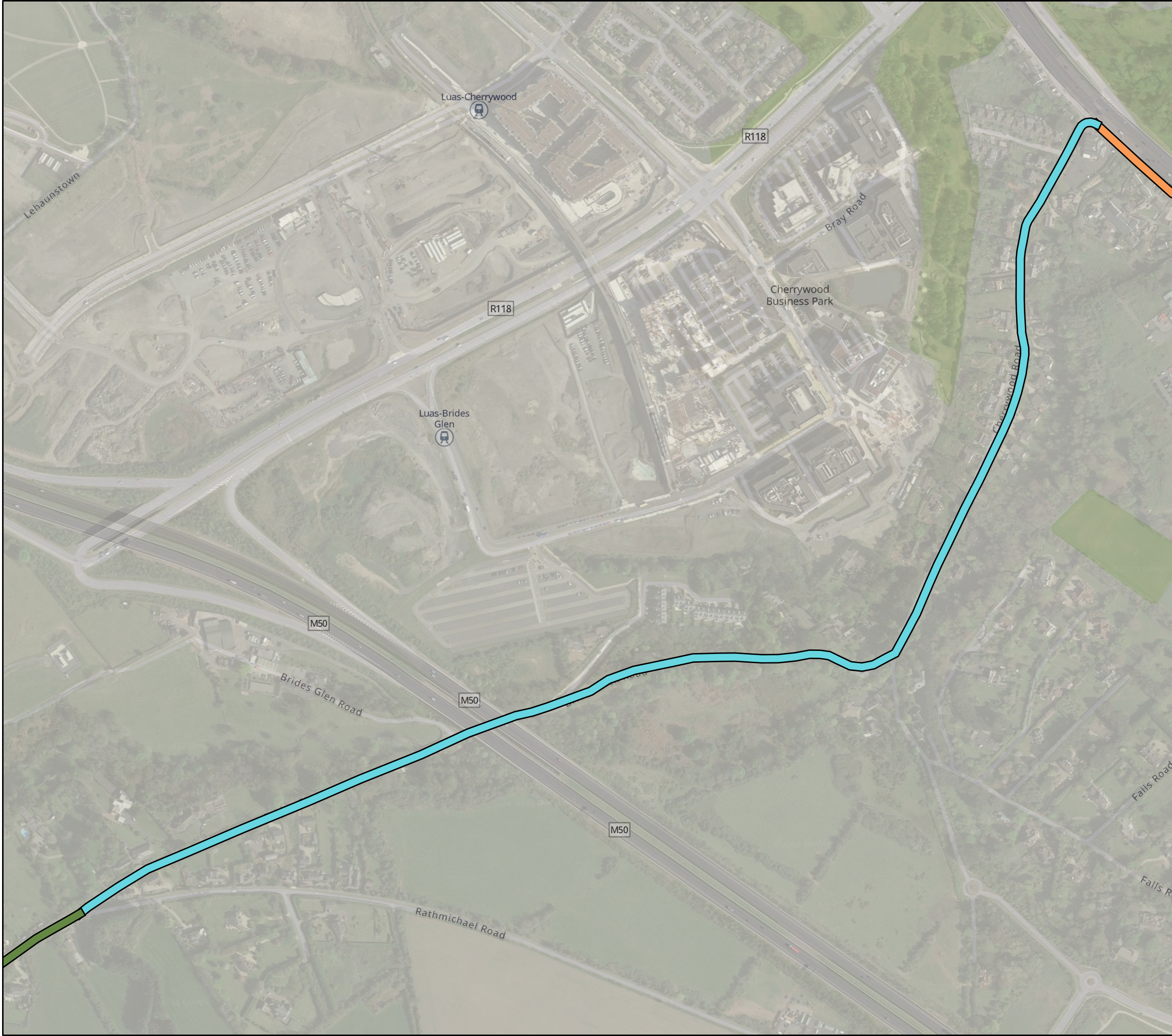
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:4,300	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

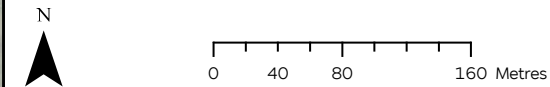
BRAY
Offshore
Wind

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Route 4 - Segment

- C
- D
- E



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

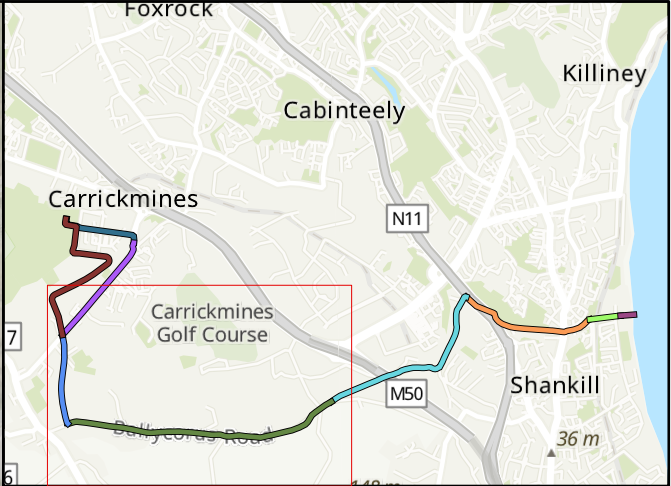
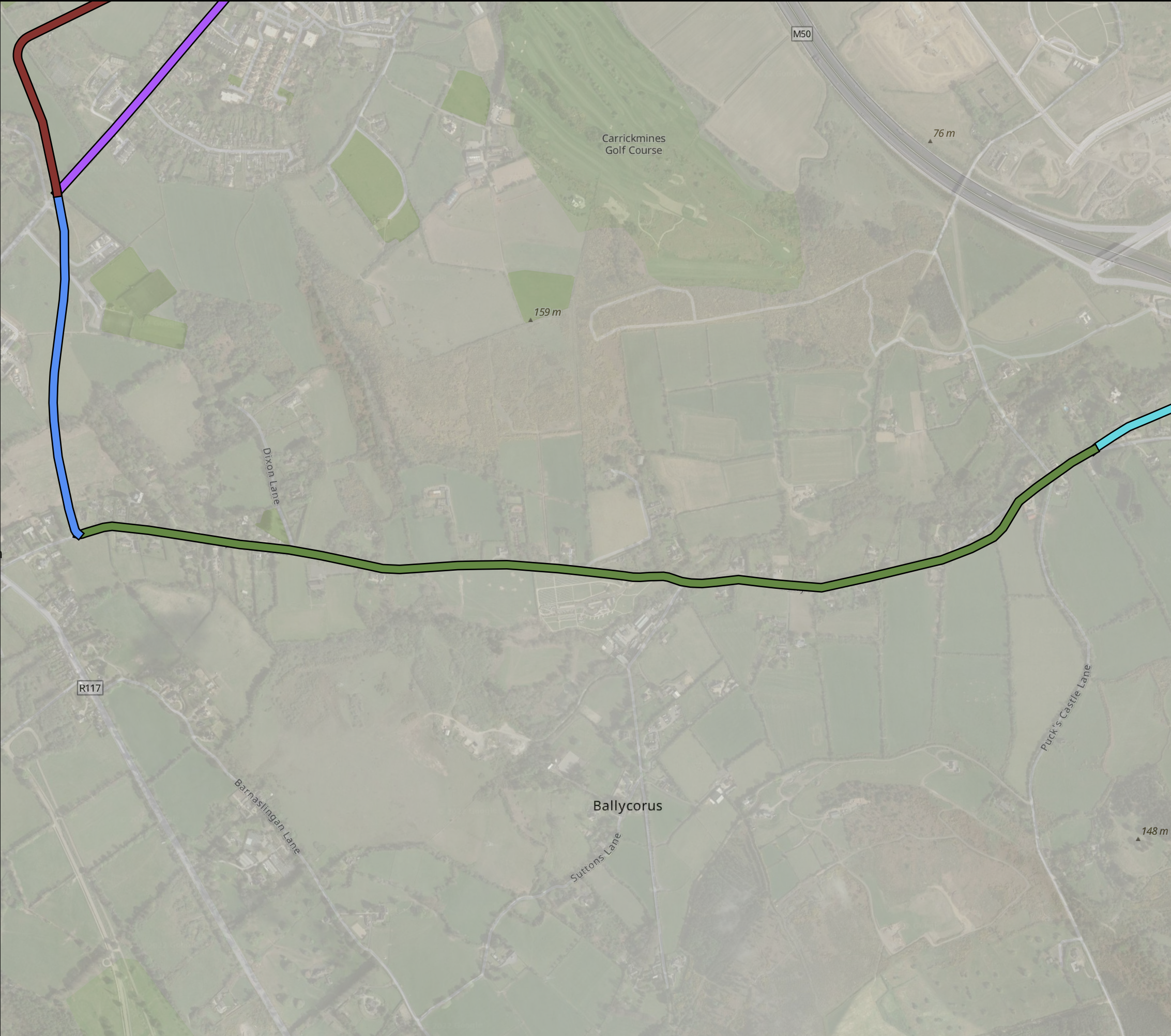
SCALE	PLOT SIZE	DATUM	PROJECTION
1:4,700	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

DublinArray
Generation for generations

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Route 4 - Segment

- D
- E
- F
- G1
- G2



0 80 160 320 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: E**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

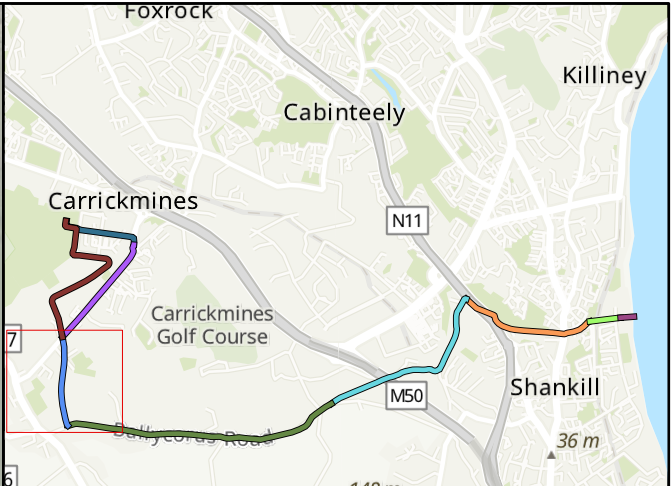
SCALE	PLOT SIZE	DATUM	PROJECTION
1:9,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 4 - Segment

- E
- F
- G1
- G2



0 30 60 120 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

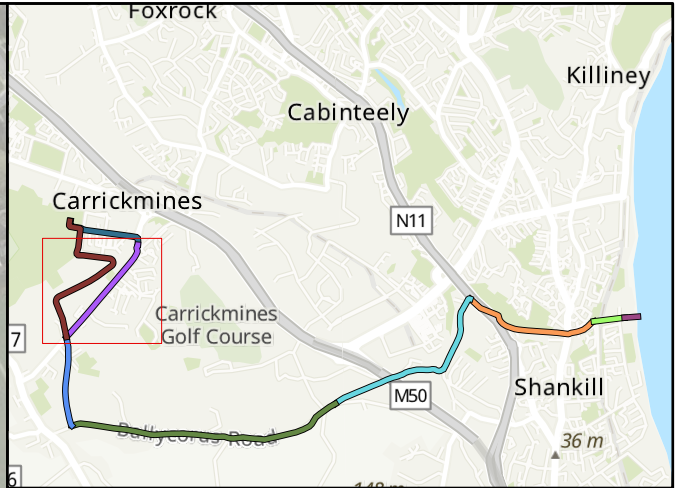
SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

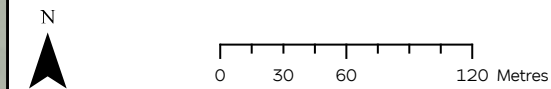


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Route 4 - Segment

- F
- G1
- G2
- H1



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: G1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

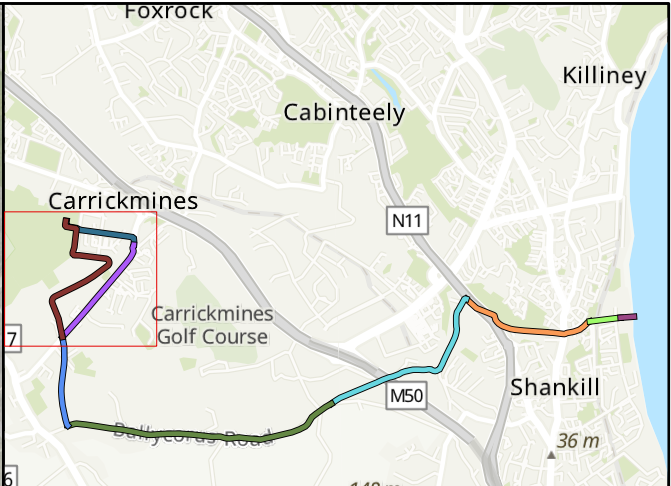
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SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

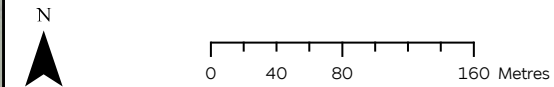
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 4 - Segment
- F
 - G1
 - G2
 - H1
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: G2**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

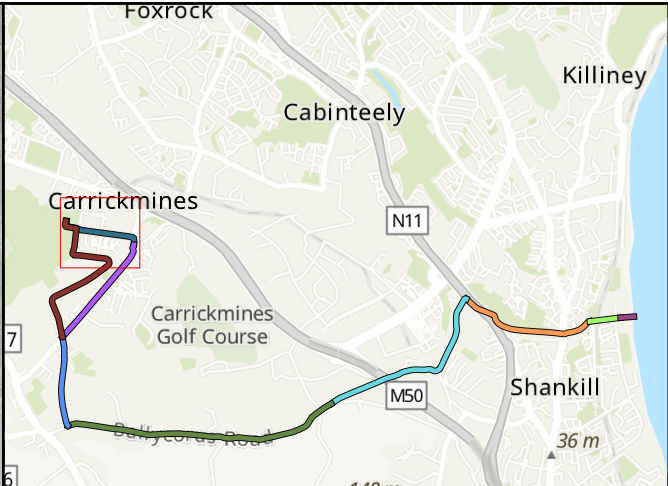
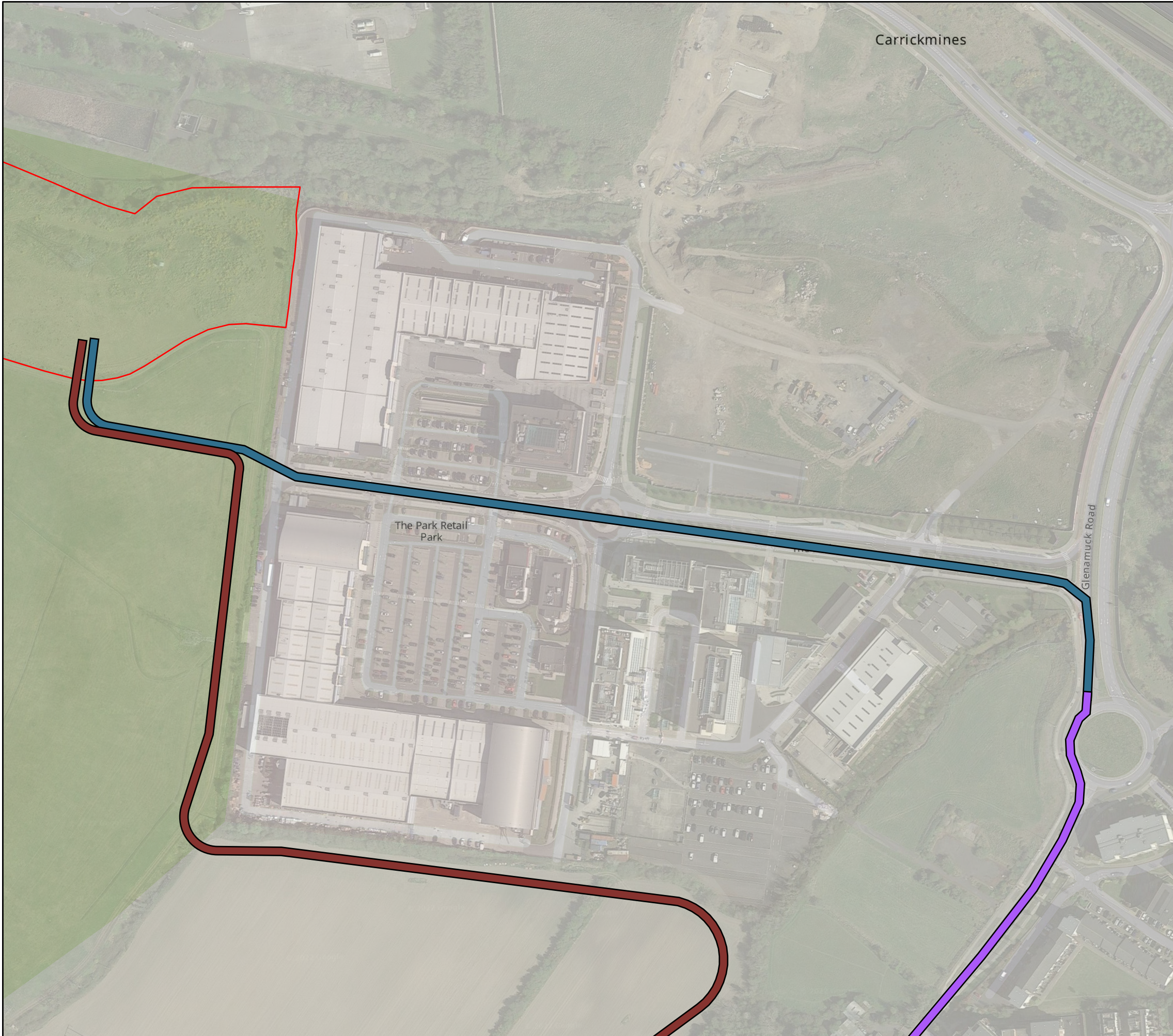
DRAWING NUMBER:
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SCALE	PLOT SIZE	DATUM	PROJECTION
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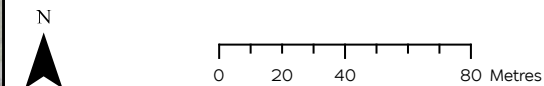
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 4 - Segment
- G1
 - G2
 - H1
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 4 - Segment: H1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

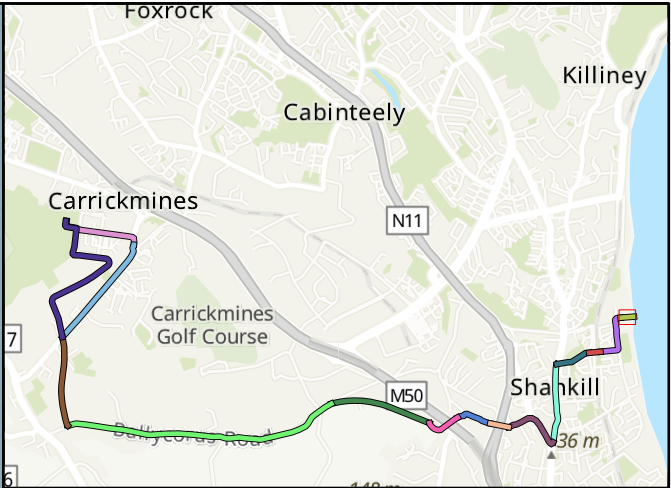
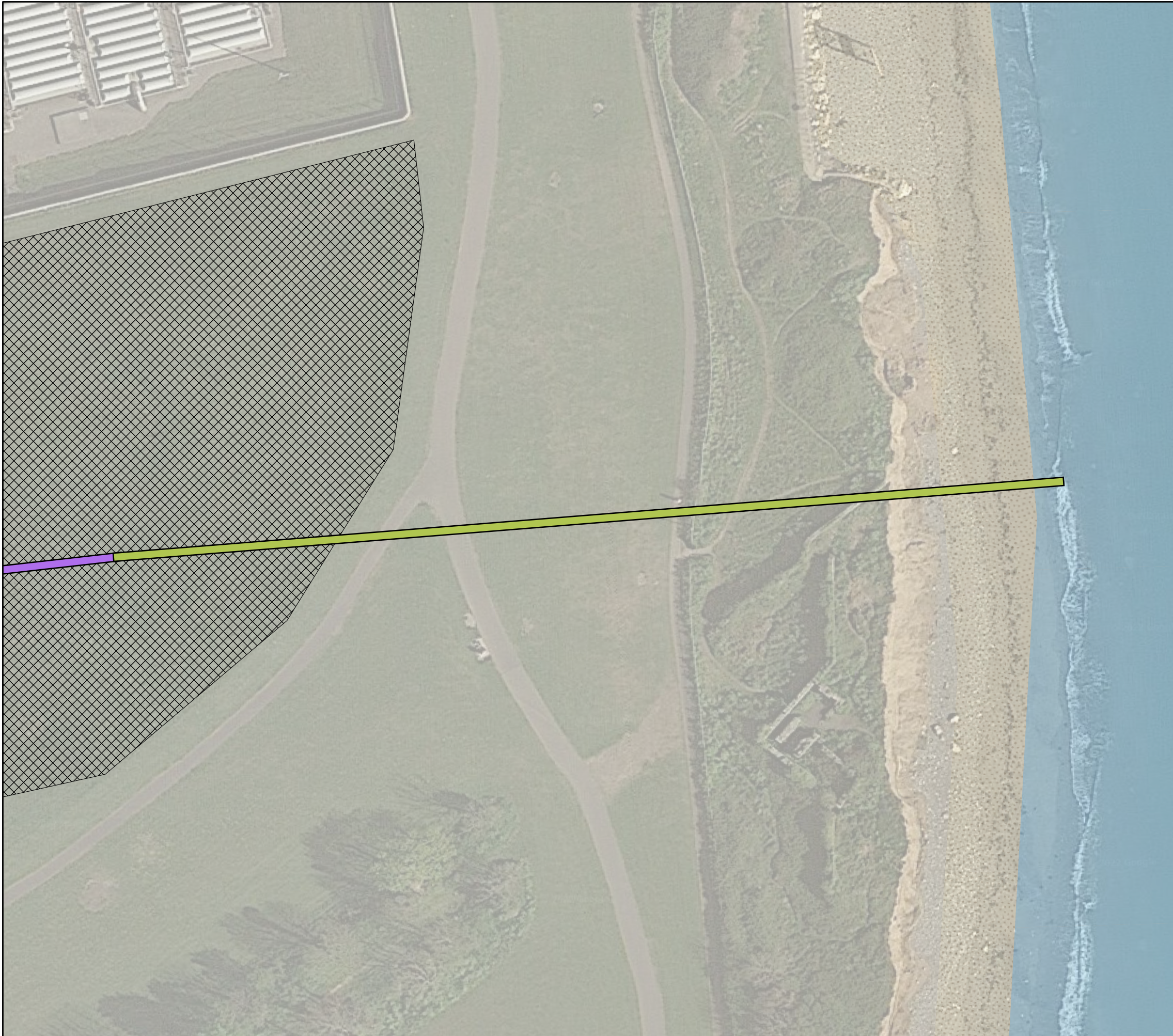
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SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

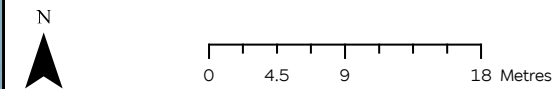
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Route 5 - Segment
- A
 - B
 - Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: A**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

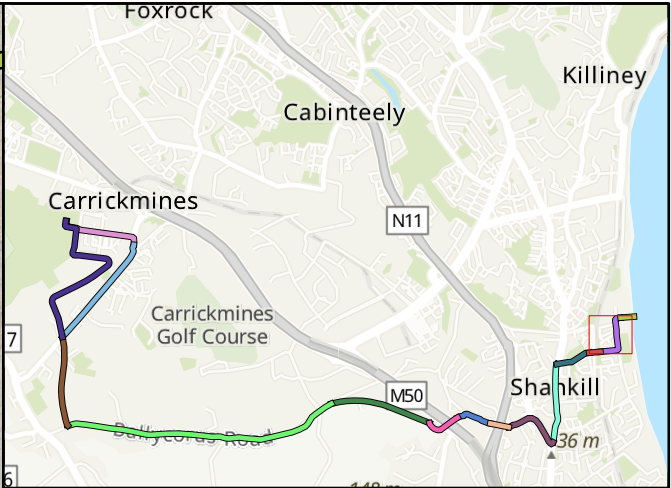
DRAWING NUMBER:
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SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

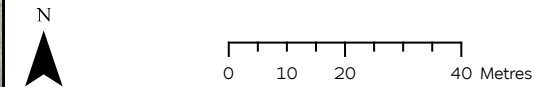
BRAY
Offshore
Wind

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Route 5 - Segment

- A
 - B
 - C
 - D
- Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

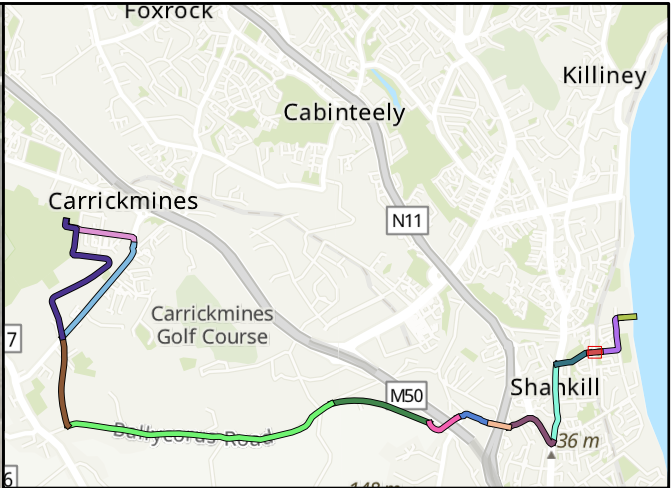
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,300	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

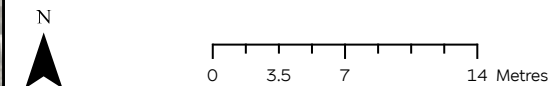
BRAY
Offshore
Wind

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Route 5 - Segment

- B
- C
- D



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

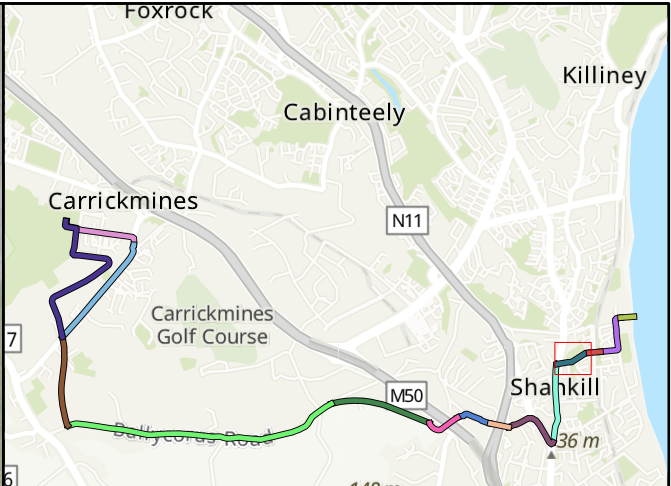
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

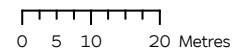
BRAY
Offshore
Wind

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Route 5 - Segment

- C
- D
- E



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DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

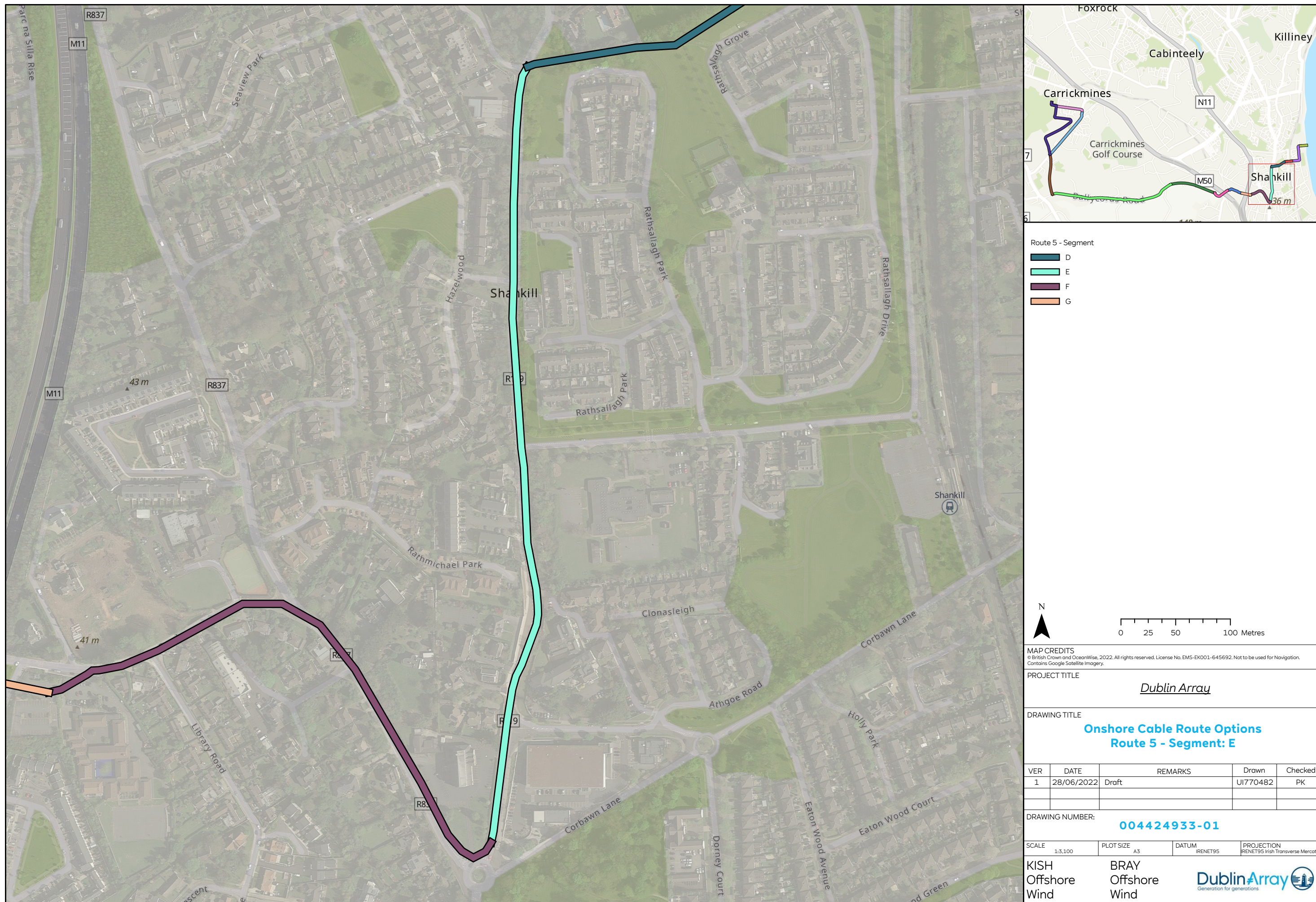
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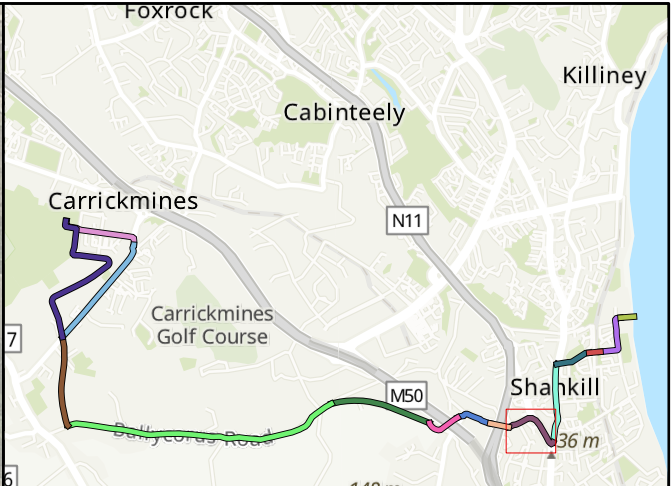
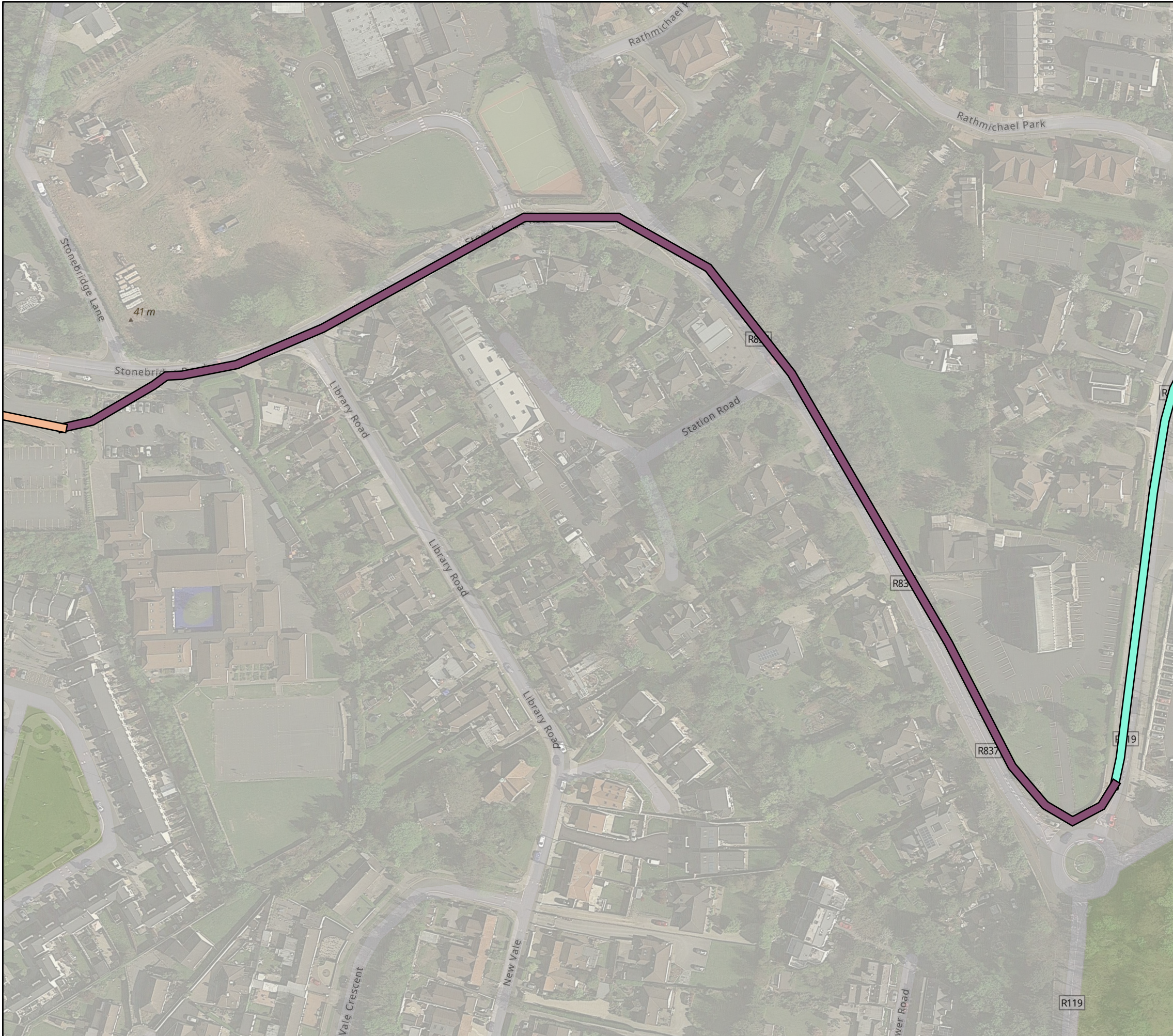
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

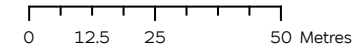
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Route 5 - Segment

- E
- F
- G



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

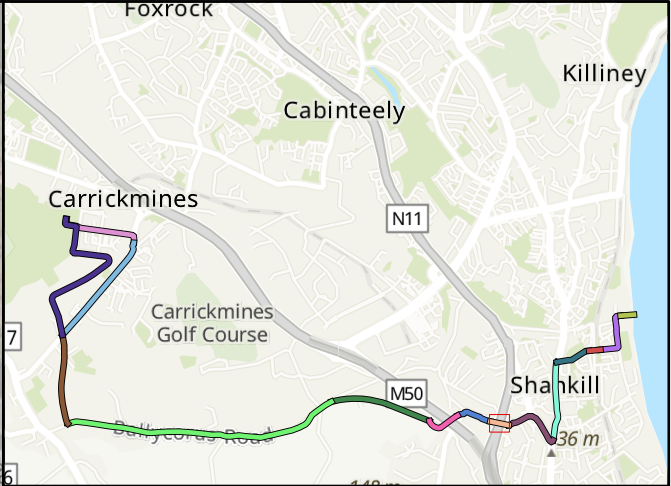
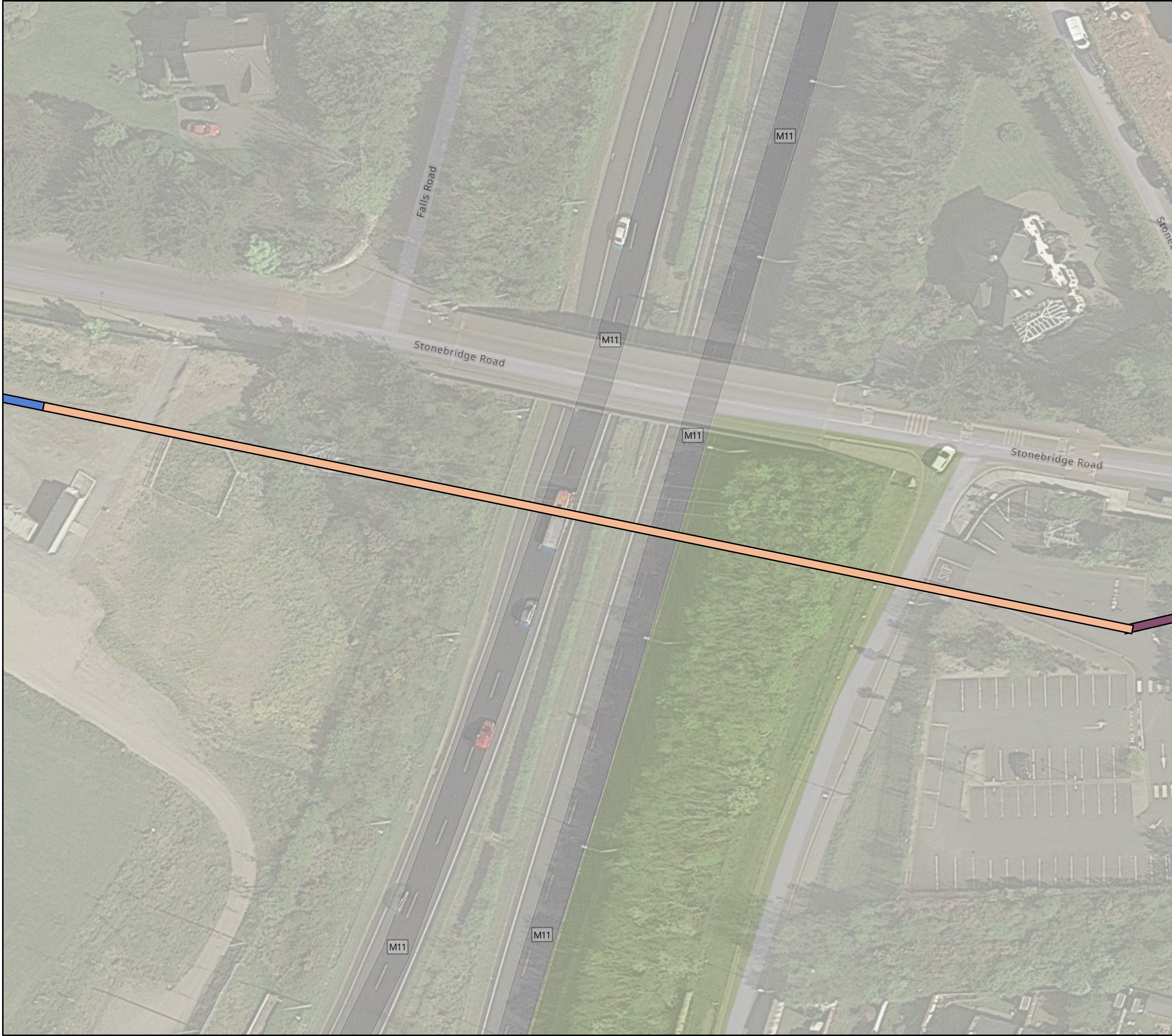
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

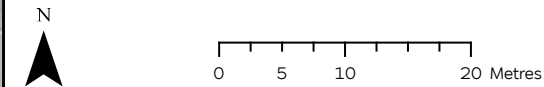
BRAY
Offshore
Wind

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Route 5 - Segment

- F
- G
- H



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: G**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

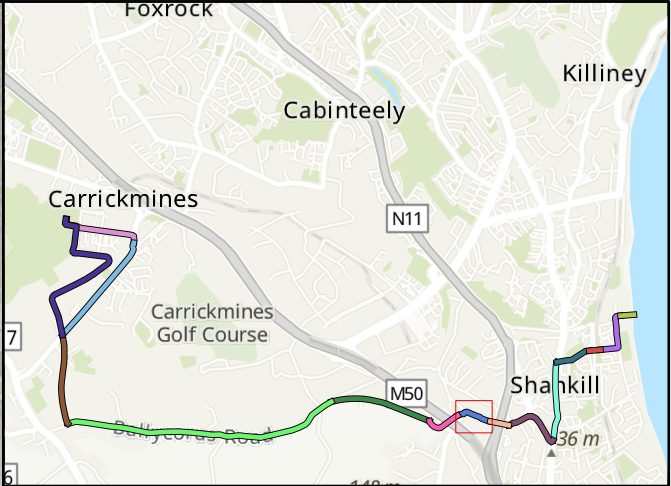
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SCALE	PLOT SIZE	DATUM	PROJECTION
1:600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 5 - Segment

- G
- H
- I



0 5 10 20 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: H**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

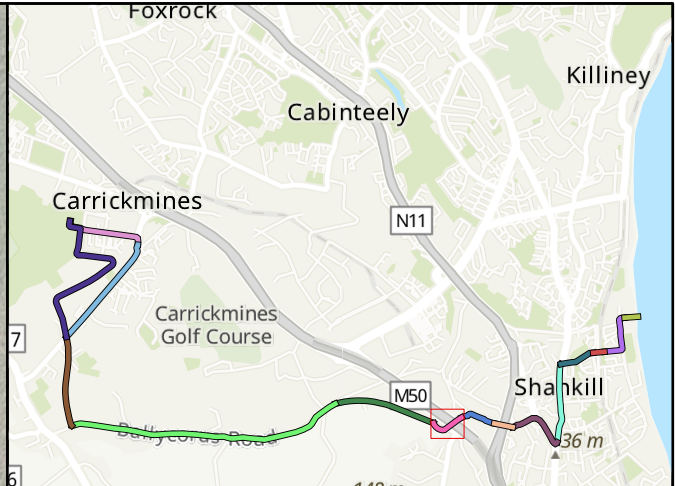
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 5 - Segment

- H
- I
- J

N

0 5 10 20 Metres

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PROJECT TITLE

Dublin Array

DRAWING TITLE

**Onshore Cable Route Options
Route 5 - Segment: I**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:

004424933-01

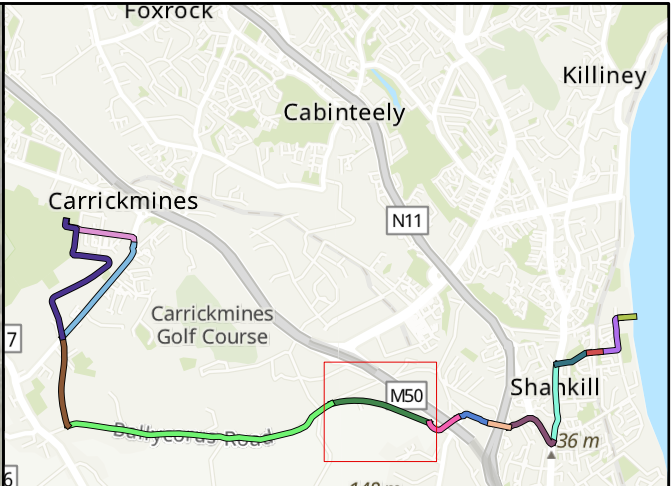
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,000	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

DublinArray
Generation for generations

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Route 5 - Segment

- I
- J
- K



0 30 60 120 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: J**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

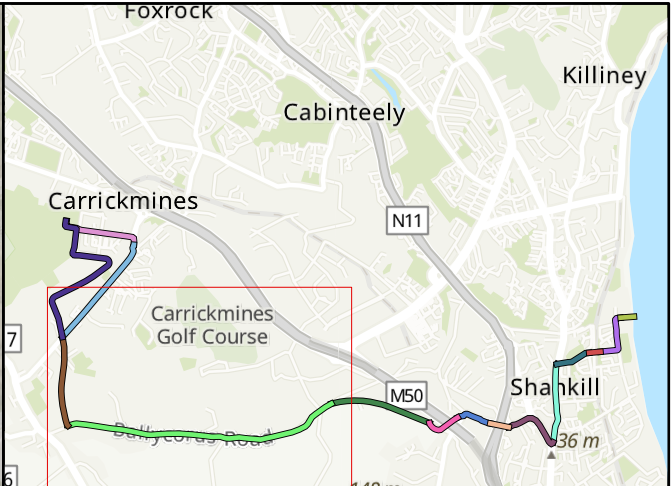
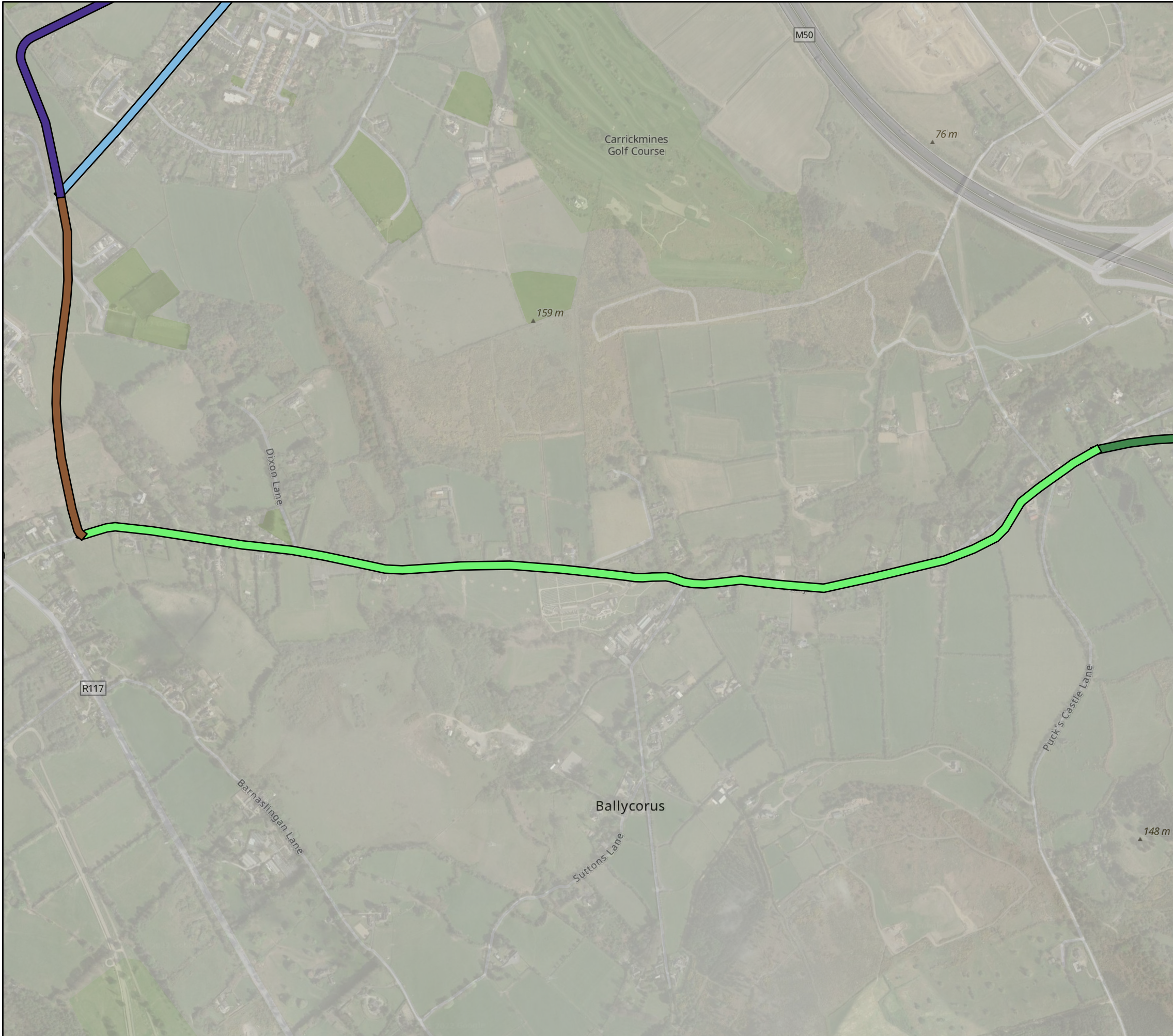
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 5 - Segment

- J
- K
- L
- M1
- M2



0 80 160 320 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: K**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

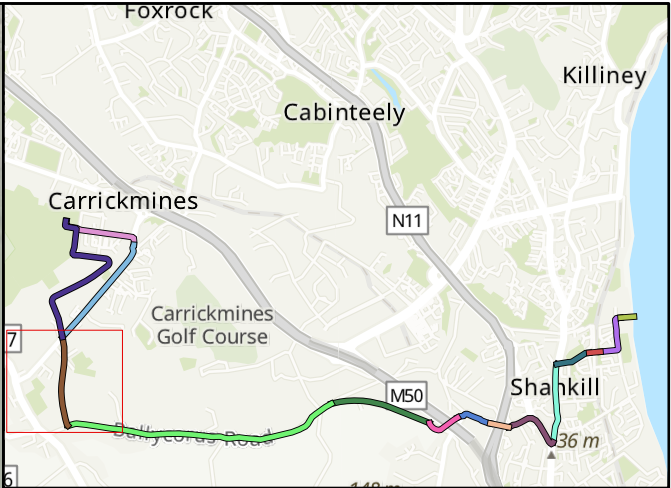
DRAWING NUMBER:
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SCALE	PLOT SIZE	DATUM	PROJECTION
1:9,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 5 - Segment

- K
- L
- M1
- M2



0 30 60 120 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: L**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

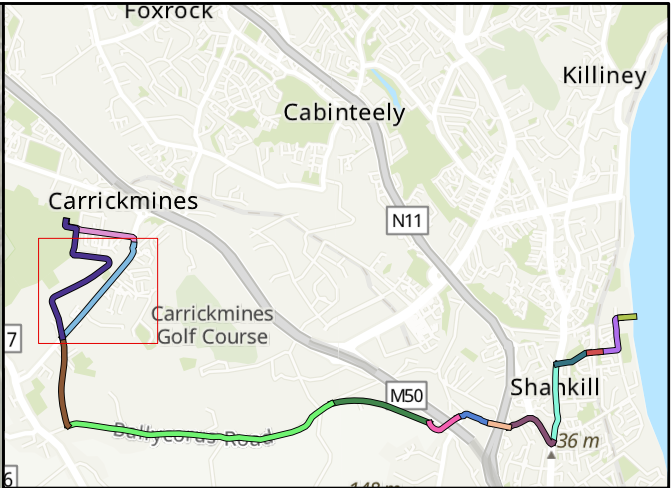
SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind



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Route 5 - Segment

- L
- M1
- M2
- N1



0 30 60 120 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: M1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

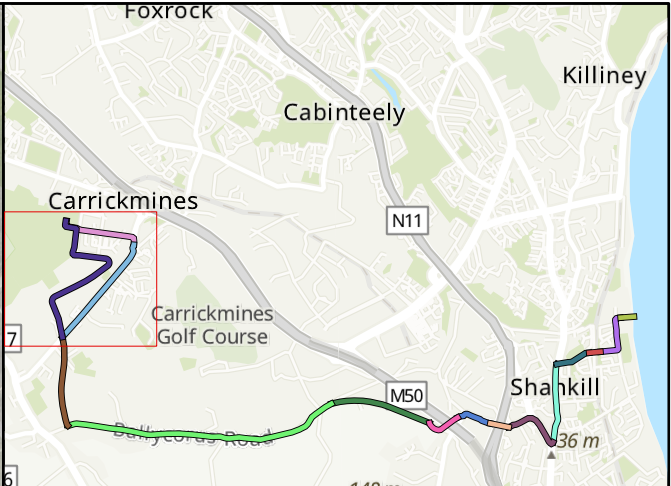
SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

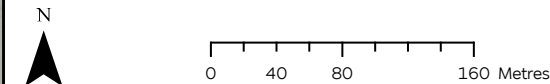
BRAY
Offshore
Wind



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- Route 5 - Segment
- L
 - M1
 - M2
 - N1
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: M2**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

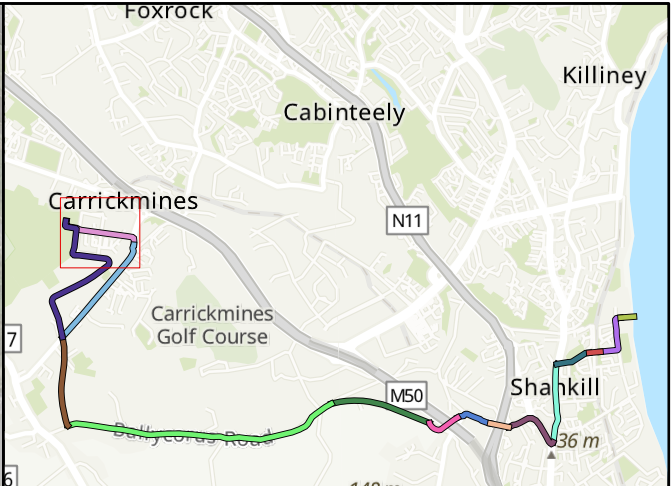
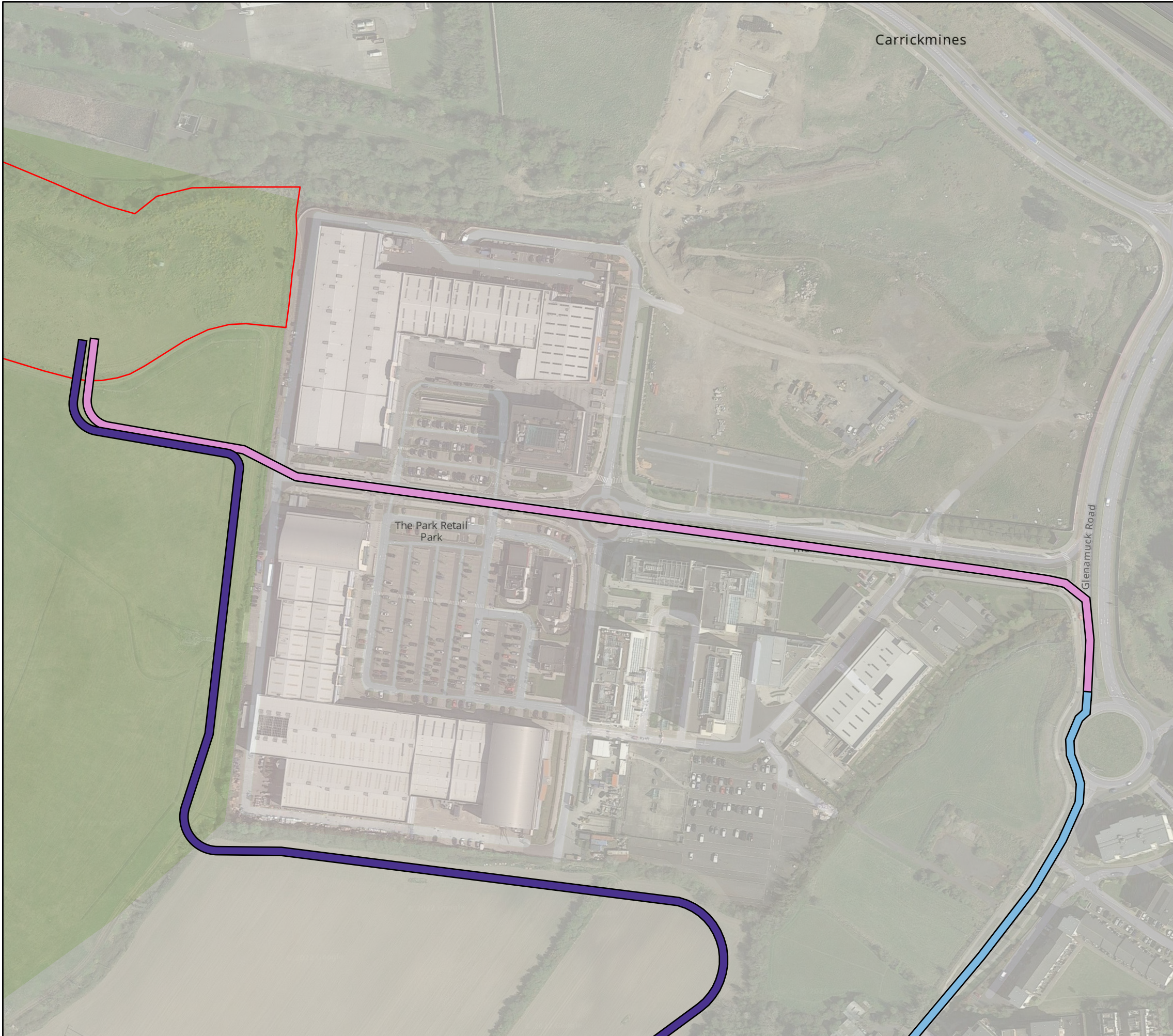
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1:4,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

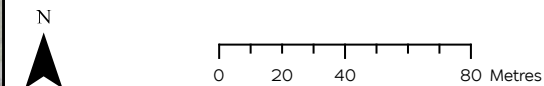
BRAY
Offshore
Wind

DublinArray
Generation for generations

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- Route 5 - Segment
- M1
 - M2
 - N1
 - Ballyogan Substation Site boundary



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 5 - Segment: N1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

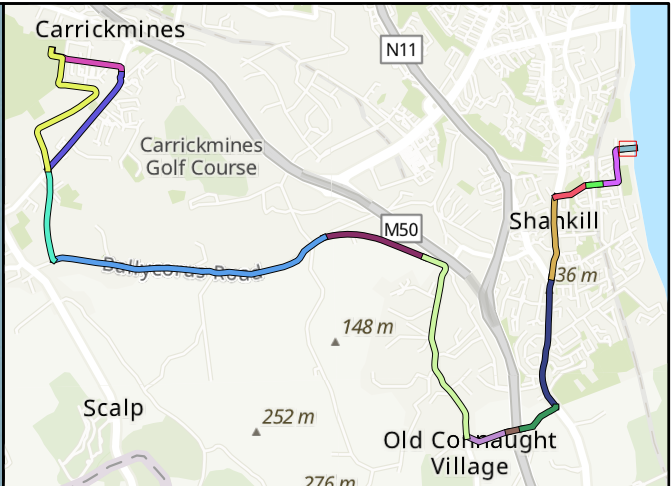
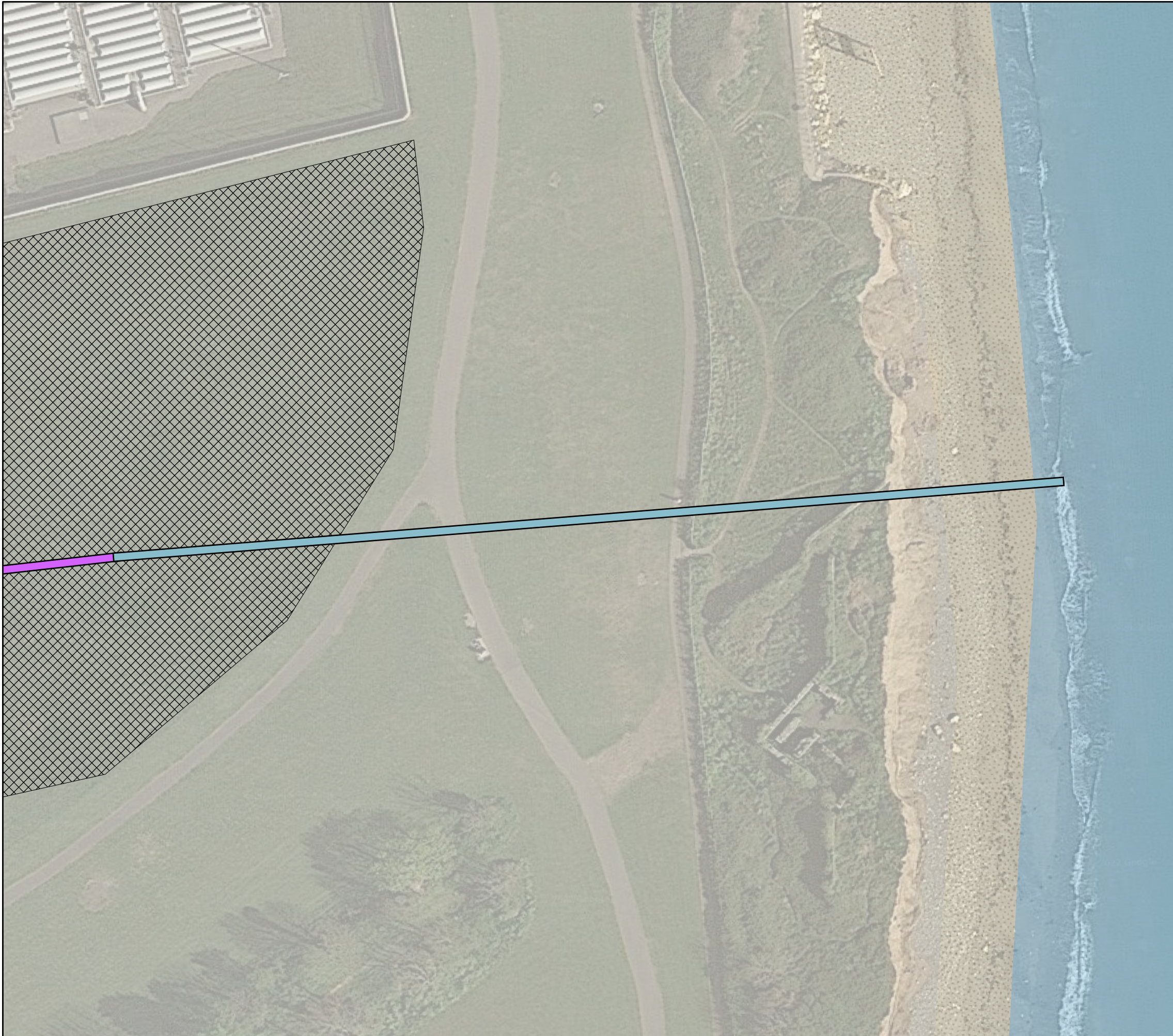
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1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

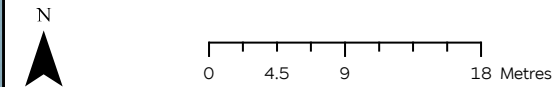
BRAY
Offshore
Wind

DublinArray
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- Route 6 - Segment
- A
 - B
 - Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: A**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

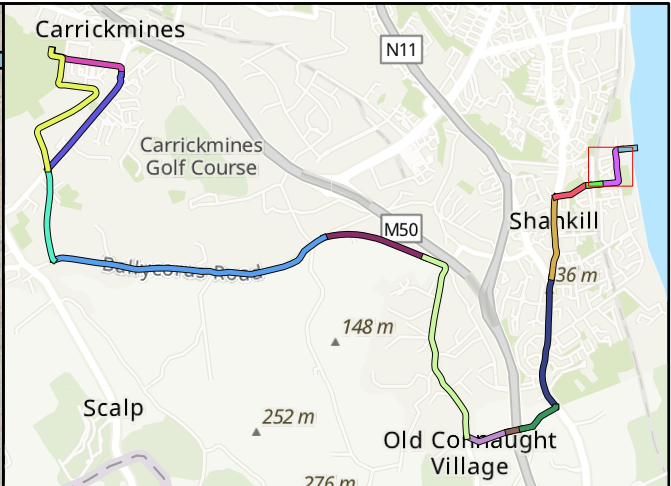
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
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KISH
Offshore
Wind

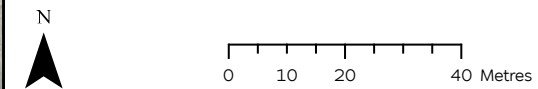
BRAY
Offshore
Wind

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Route 6 - Segment

- A
 - B
 - C
 - D
- Temporary Construction Compound (Indicative Area)



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

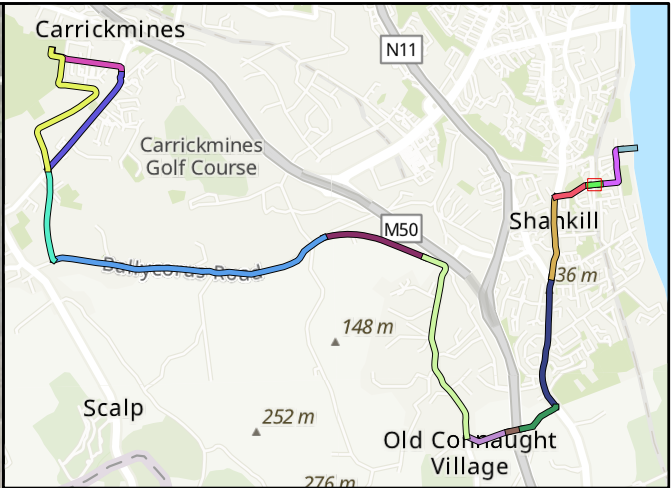
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
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KISH Offshore Wind

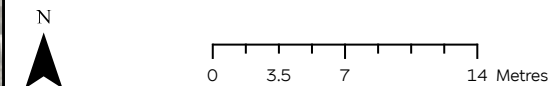
BRAY Offshore Wind

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Route 6 - Segment

- B
- C
- D



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

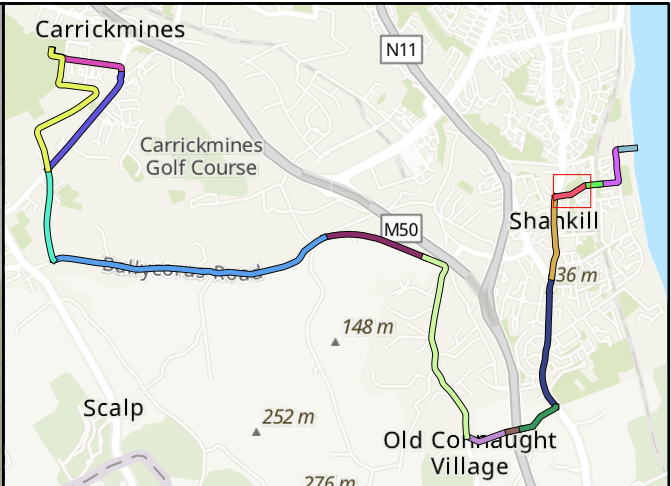
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

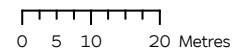
BRAY
Offshore
Wind

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Route 6 - Segment

- C
- D
- E



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

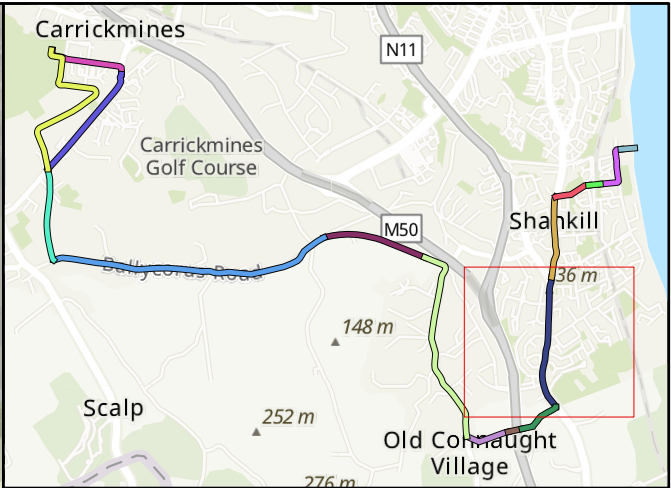
SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

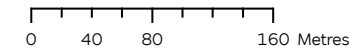


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Route 6 - Segment

- E
- F
- G
- J



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PROJECT TITLE
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DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

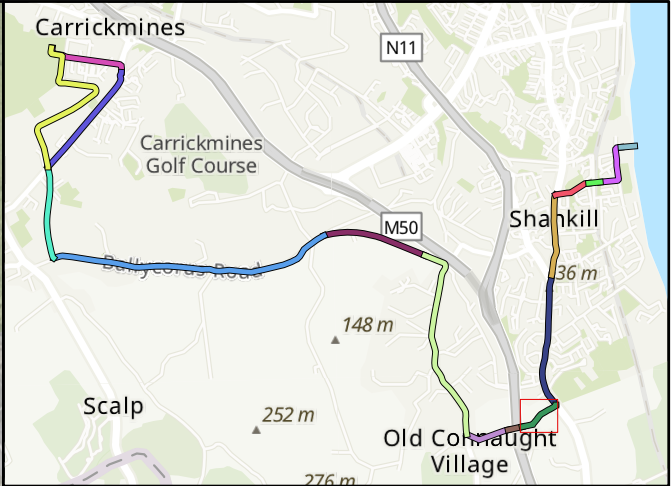
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:5,000	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

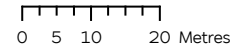
BRAY
Offshore
Wind

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Route 6 - Segment

- F
- G
- H



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: G**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

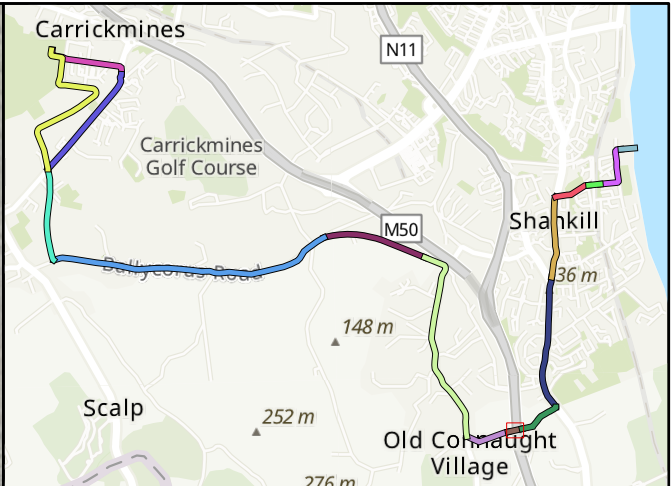
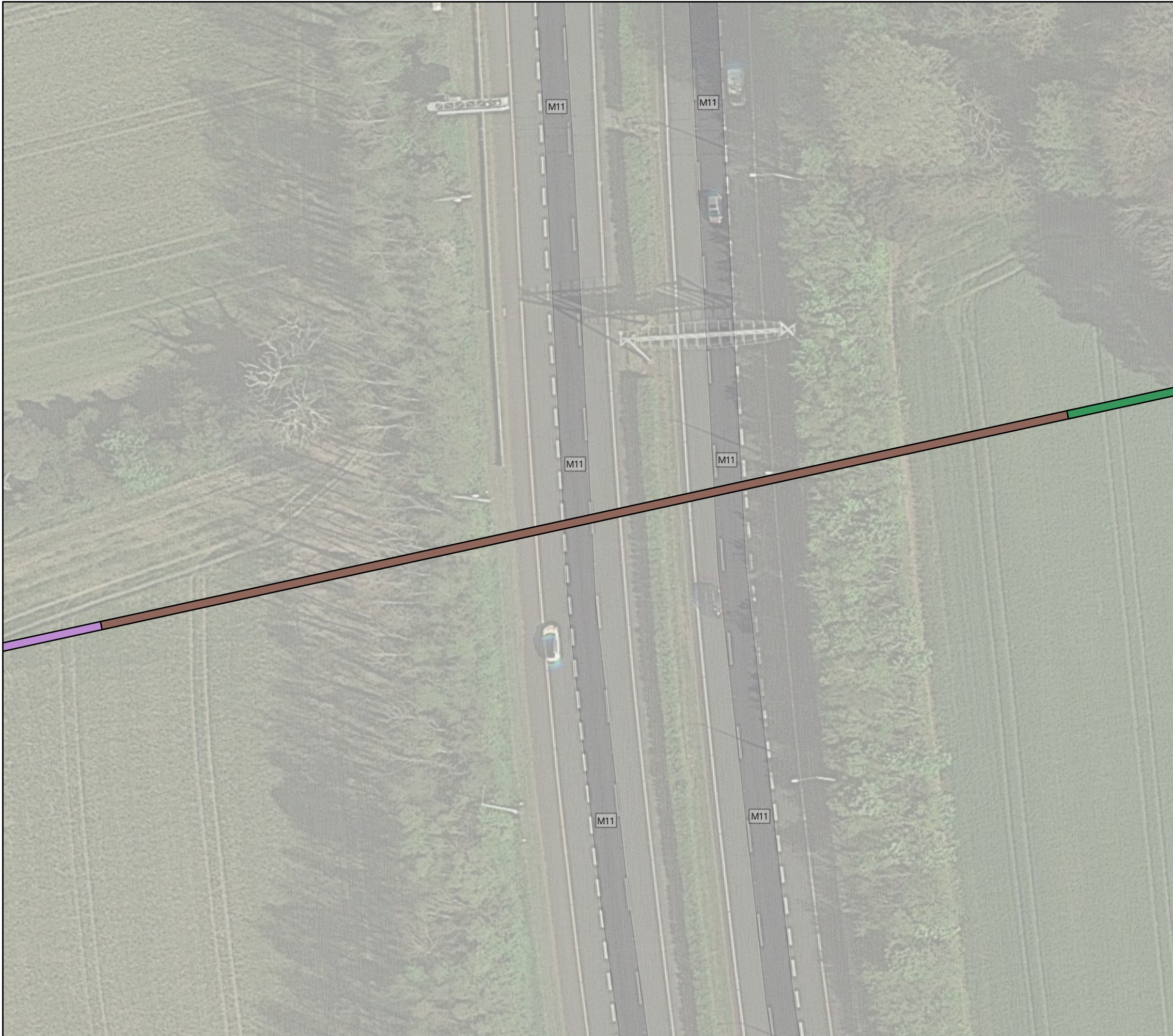
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

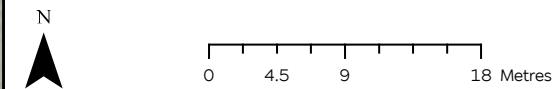
BRAY
Offshore
Wind

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Route 6 - Segment

- G
- H
- I



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PROJECT TITLE
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DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: H**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

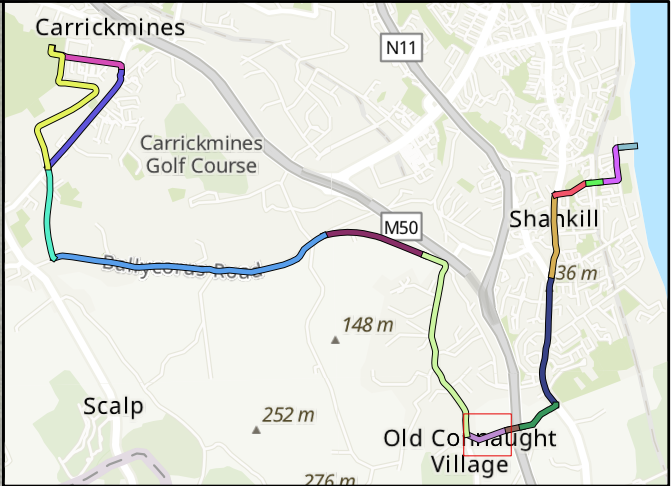
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

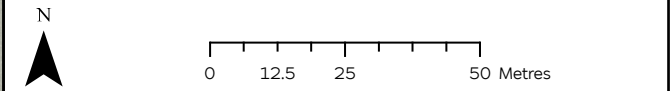
BRAY
Offshore
Wind

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Route 6 - Segment

- H
- I
- J



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PROJECT TITLE
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DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: I**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

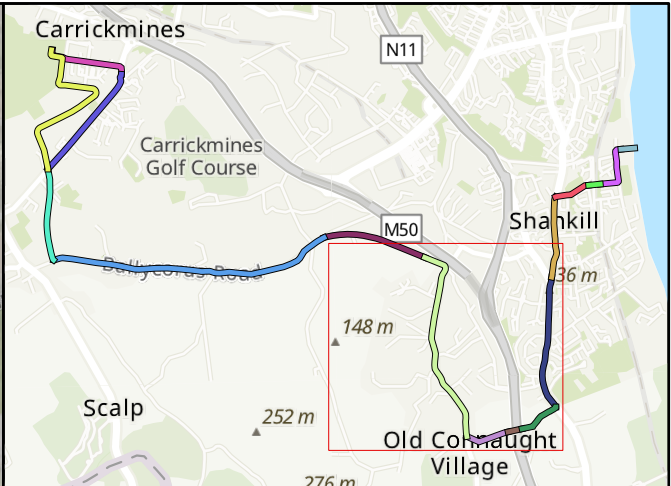
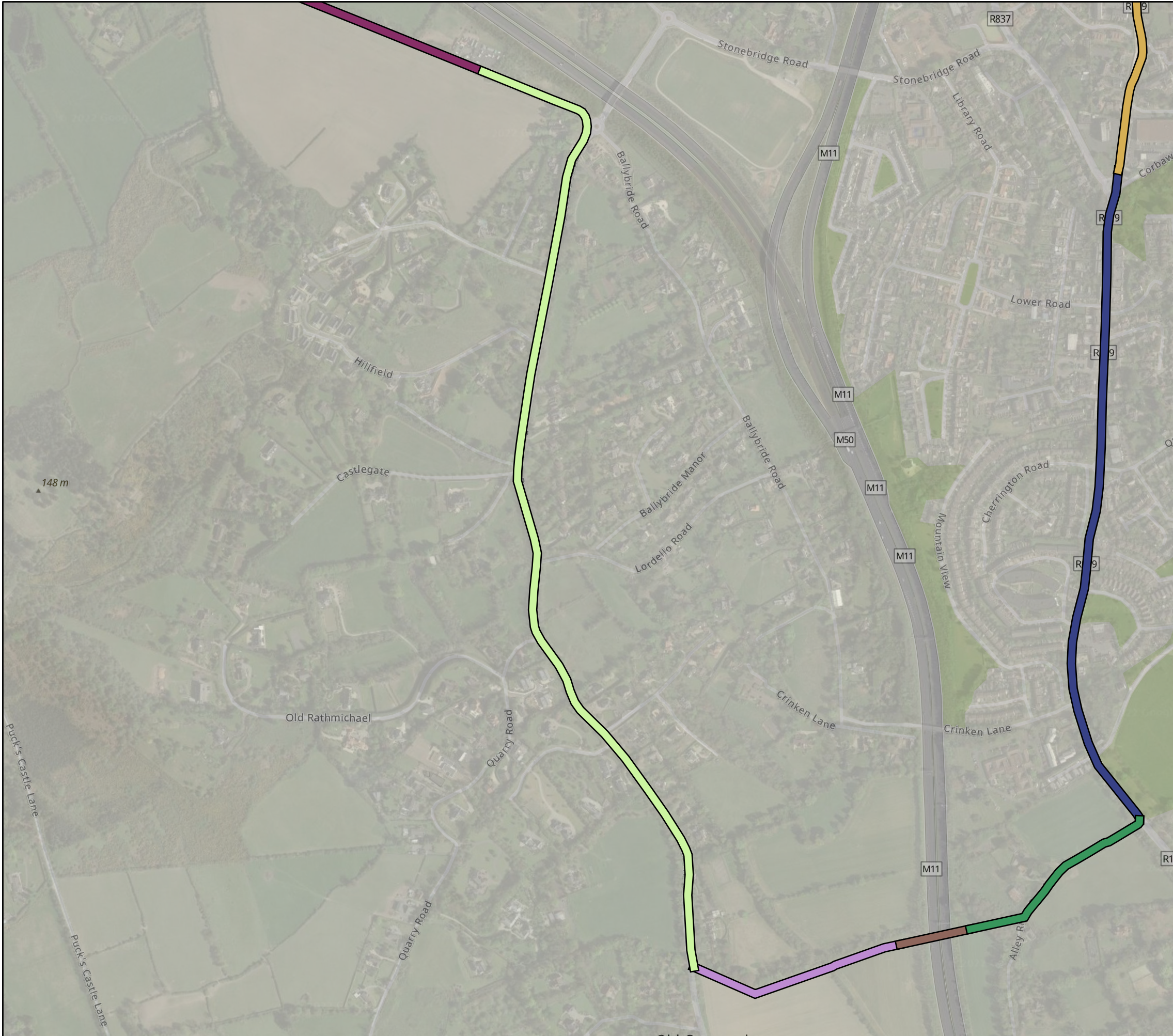
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 6 - Segment

- E
- F
- G
- H
- I
- J
- K



0 60 120 240 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: J**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:6,900	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

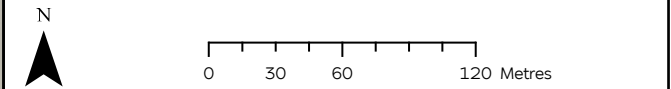
BRAY
Offshore
Wind

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Route 6 - Segment

- J
- K
- L



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: K**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

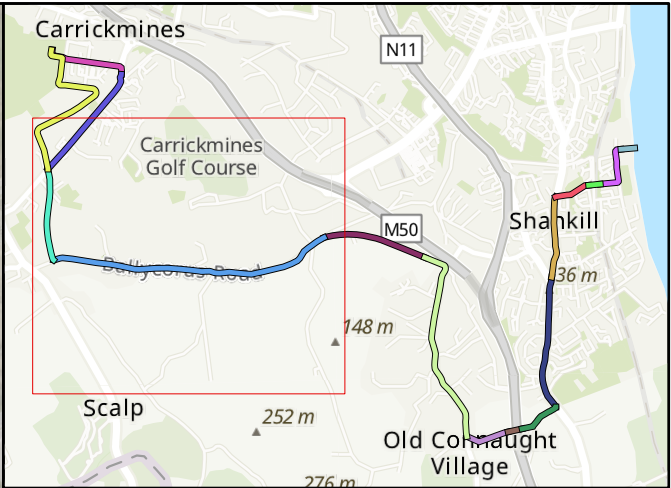
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 6 - Segment

- K
- L
- M
- N1
- N2



0 80 160 320 Metres

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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: L**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

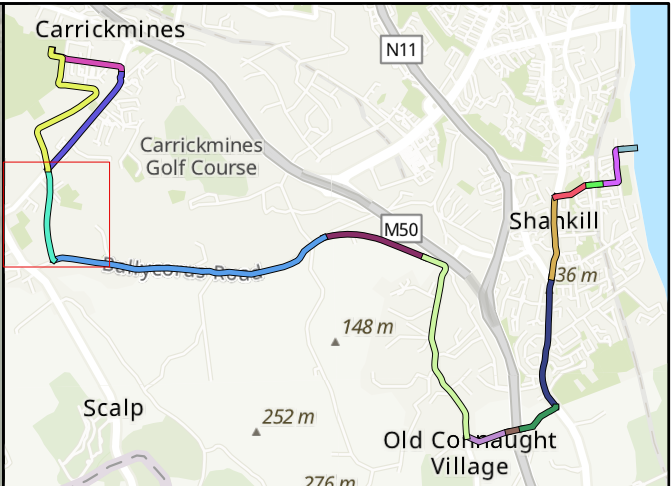
SCALE	PLOT SIZE	DATUM	PROJECTION
1:9,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

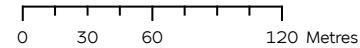


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Route 6 - Segment

- L
- M
- N1
- N2



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: M**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
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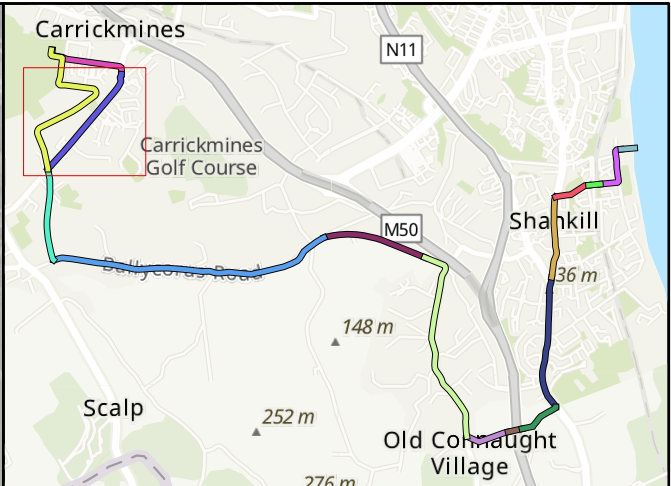
SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

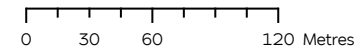


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Route 6 - Segment

- M
- N1
- N2
- O1



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PROJECT TITLE
Dublin Array

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**Onshore Cable Route Options
Route 6 - Segment: N1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

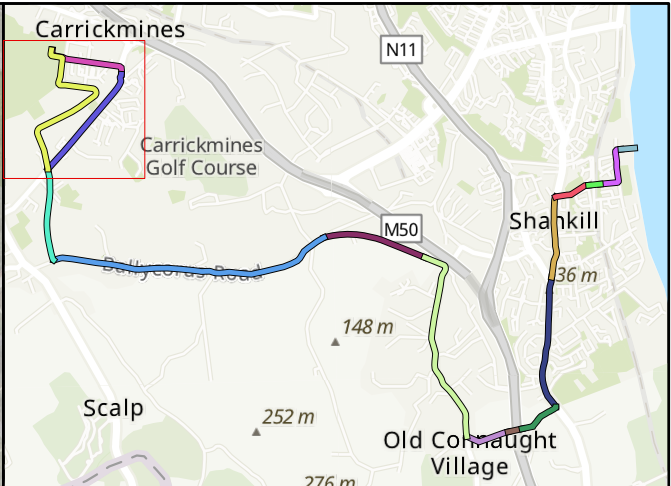
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

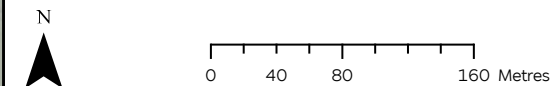
KISH
Offshore
Wind

BRAY
Offshore
Wind

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- Ballyogan Substation Site boundary
- Route 6 - Segment
- M
 - N1
 - N2
 - O1



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: N2**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

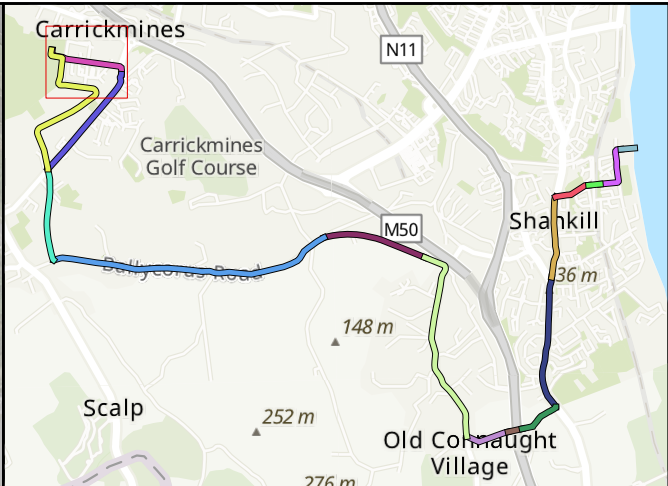
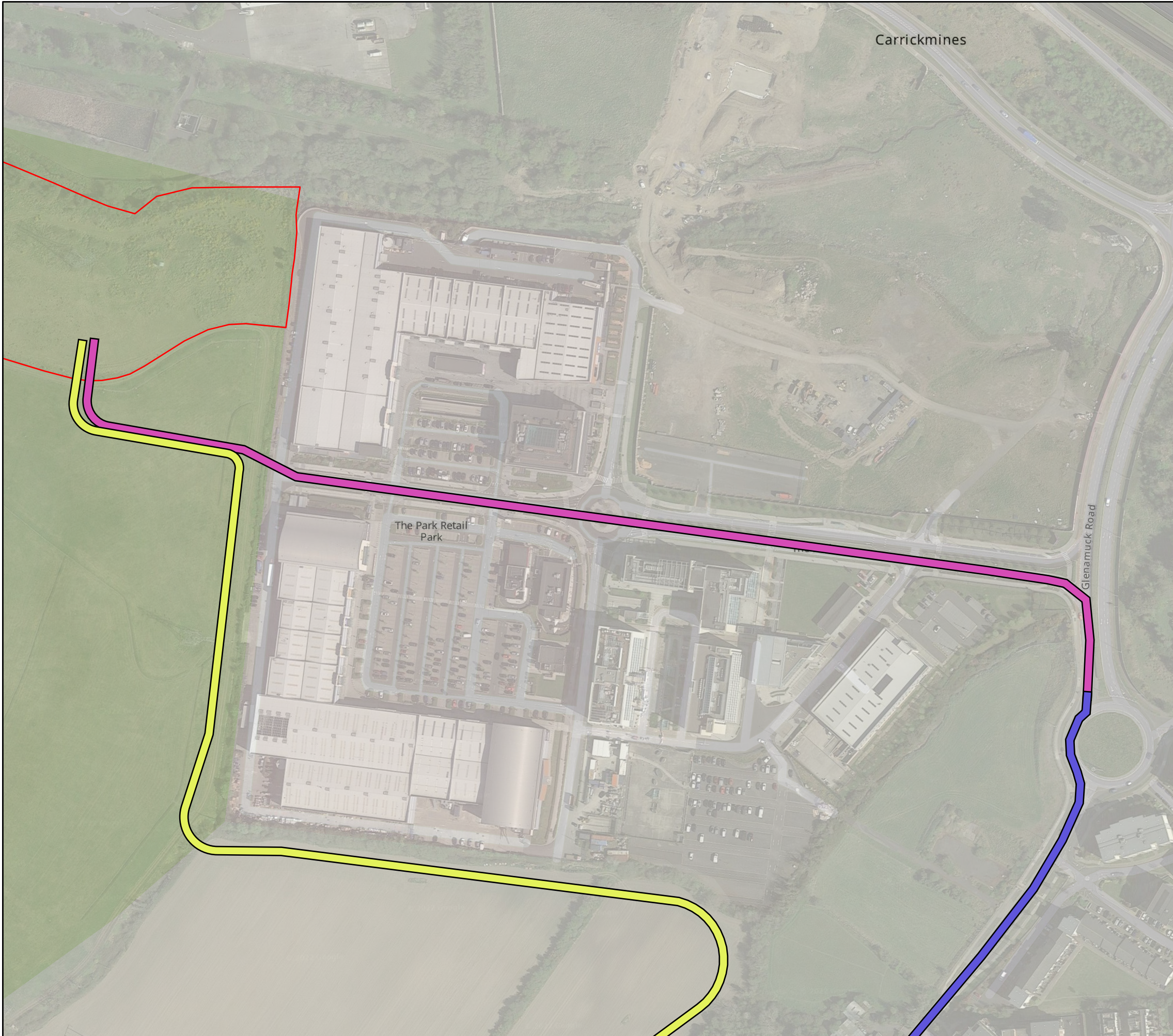
SCALE	PLOT SIZE	DATUM	PROJECTION
1:4,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

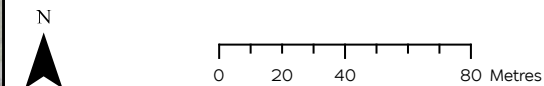
BRAY
Offshore
Wind

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- Ballyogan Substation Site boundary
- Route 6 - Segment
- N1
 - N2
 - O1



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DRAWING TITLE
**Onshore Cable Route Options
Route 6 - Segment: O1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

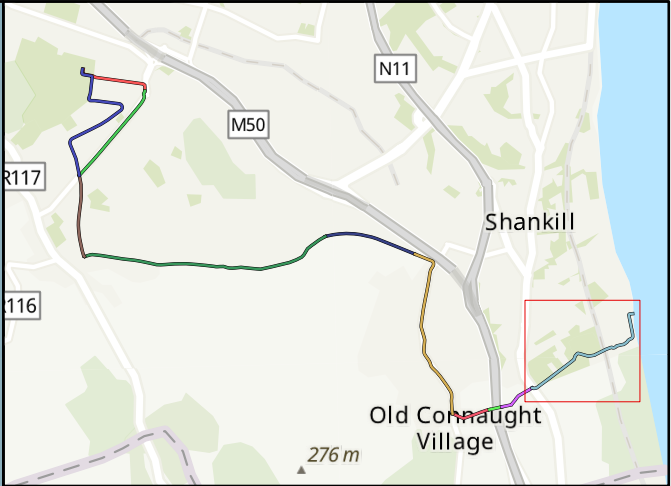
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

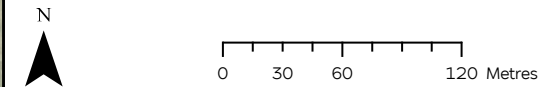
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Route 7 - Segment

A

B



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PROJECT TITLE

Dublin Array

DRAWING TITLE

Onshore Cable Route Options
Route 7 - Segment: A

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:

004424933-01

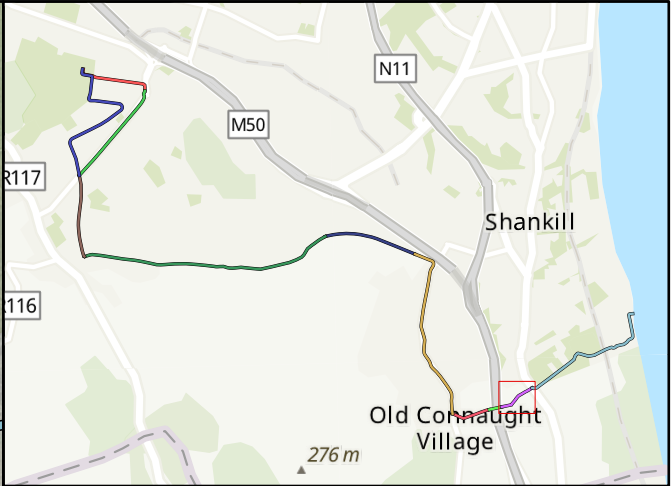
SCALE	1:3,800	PLOT SIZE	A3	DATUM	IRENET95	PROJECTION	IRENET95 Irish Transverse Mercator
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KISH
Offshore
Wind

BRAY
Offshore
Wind

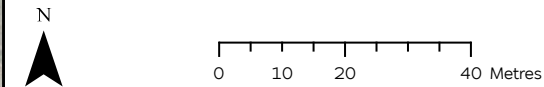
DublinArray
Generation for generations

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Route 7 - Segment

- A
- B
- C



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: B**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

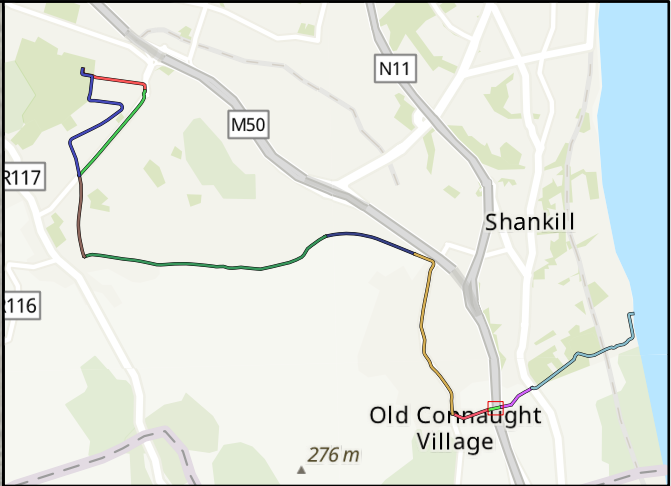
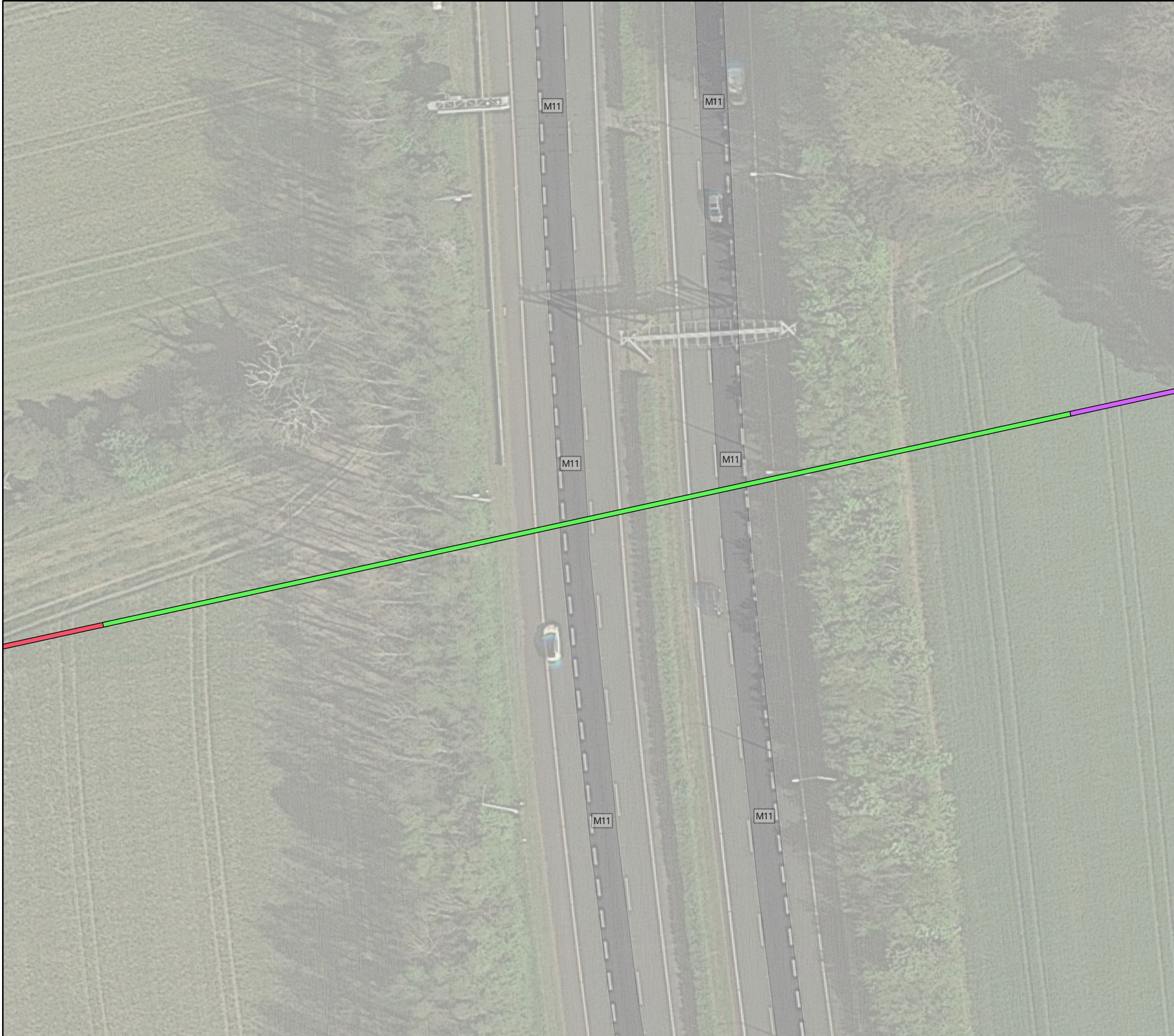
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Route 7 - Segment

- B
- C
- D



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: C**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

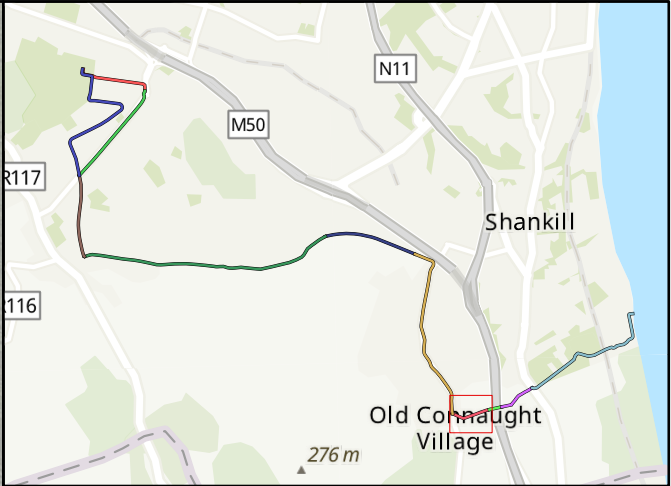
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

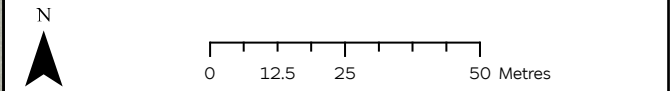
BRAY
Offshore
Wind

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Route 7 - Segment

- C
- D
- E



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: D**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

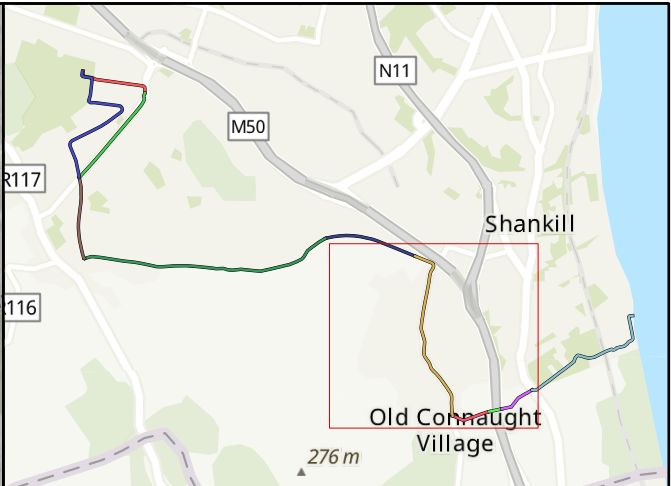
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

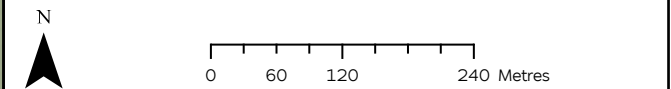
BRAY
Offshore
Wind

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Route 7 - Segment

- A
- B
- C
- D
- E
- F



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Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: E**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

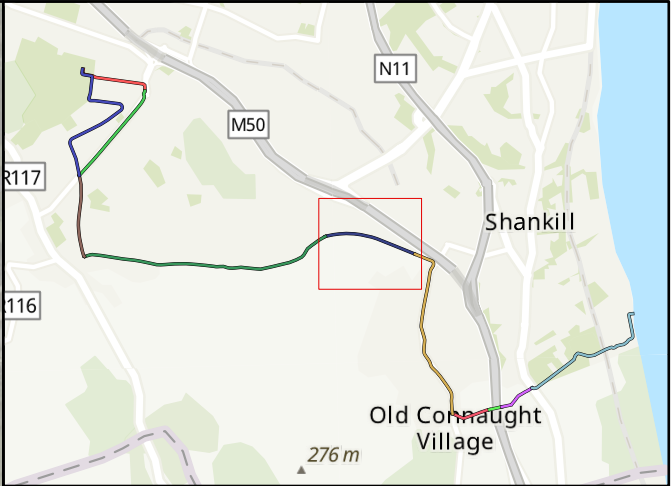
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:6,900	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

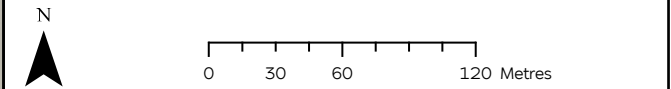
BRAY
Offshore
Wind

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Route 7 - Segment

- E
- F
- G



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: F**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

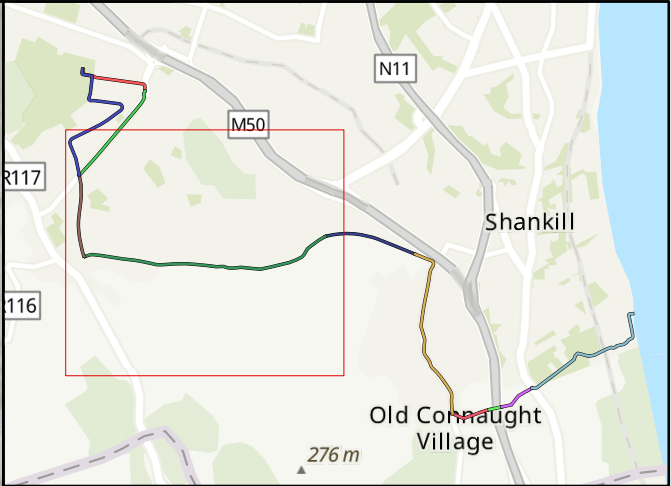
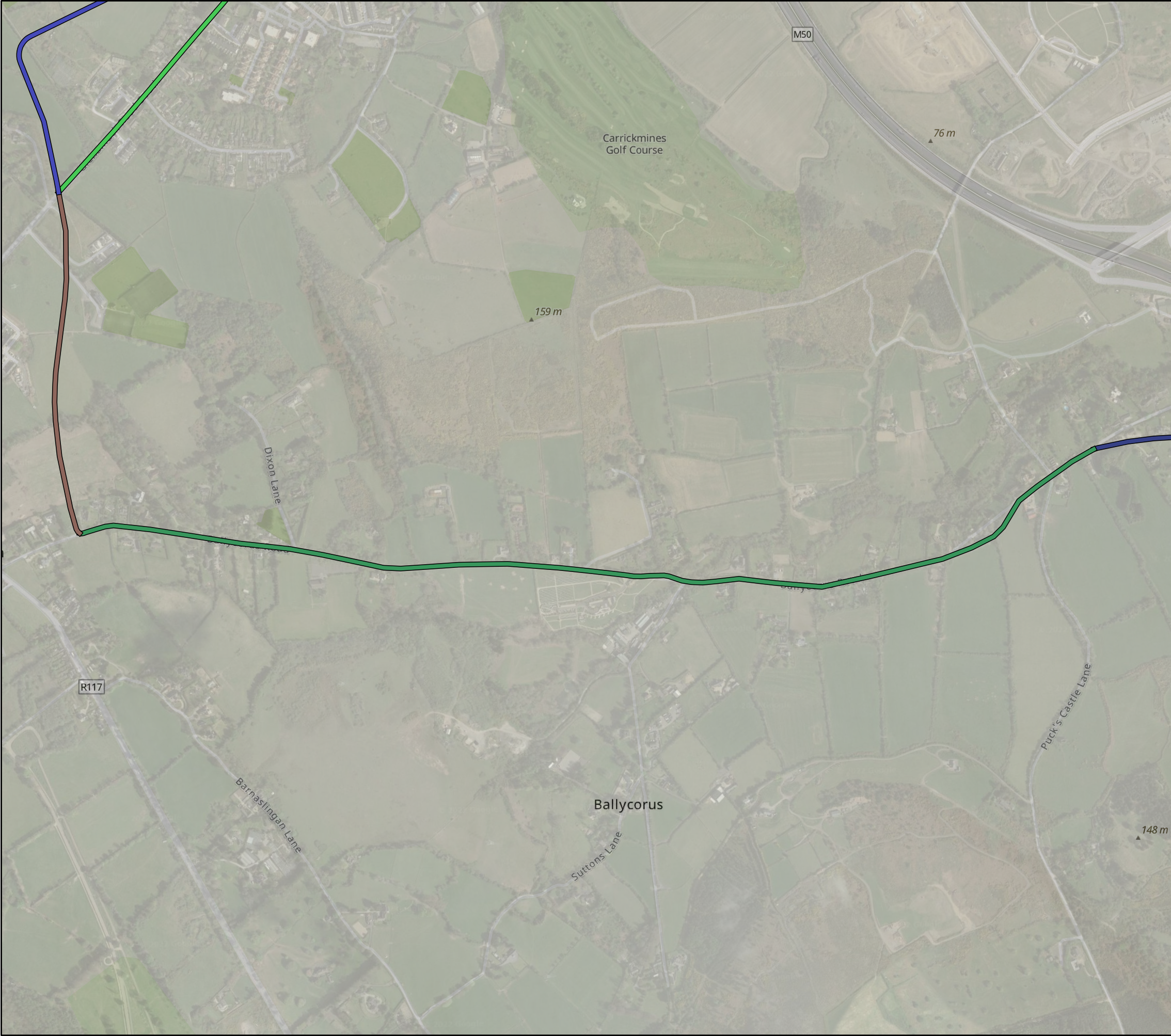
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

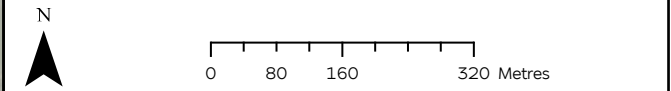
BRAY
Offshore
Wind

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Route 7 - Segment

- F
- G
- H
- I1
- I2



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: G**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

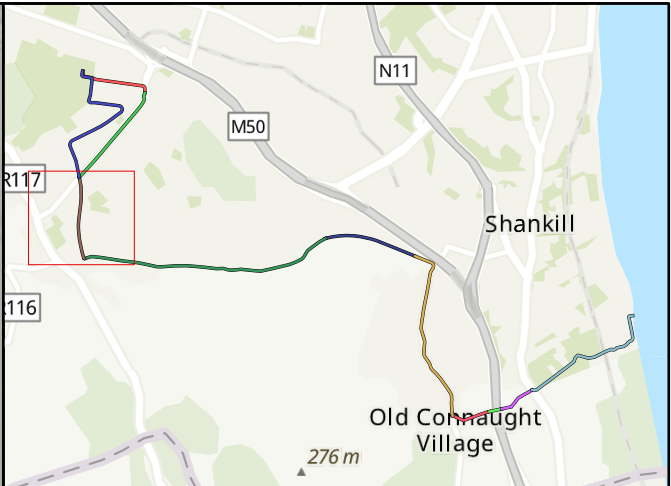
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:9,200	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

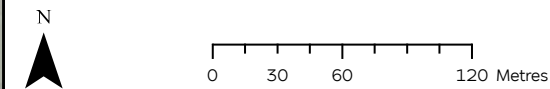
BRAY
Offshore
Wind

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Route 7 - Segment

- G
- H
- I1
- I2



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: H**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

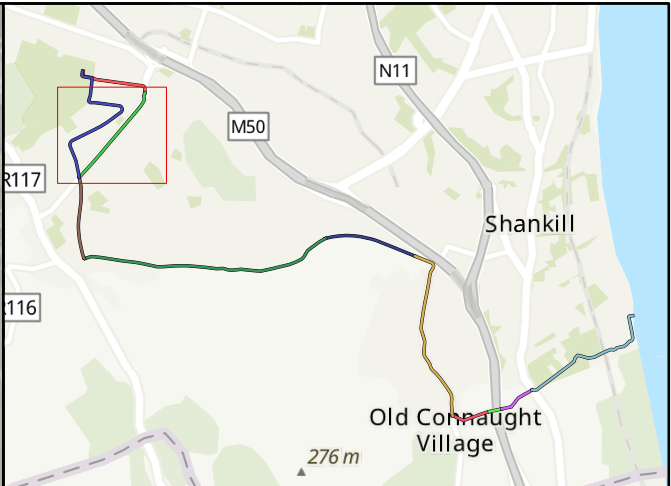
DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,500	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

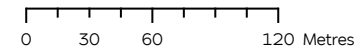
BRAY
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Wind

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Route 7 - Segment

- H
- I1
- I2
- J1



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Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: I1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

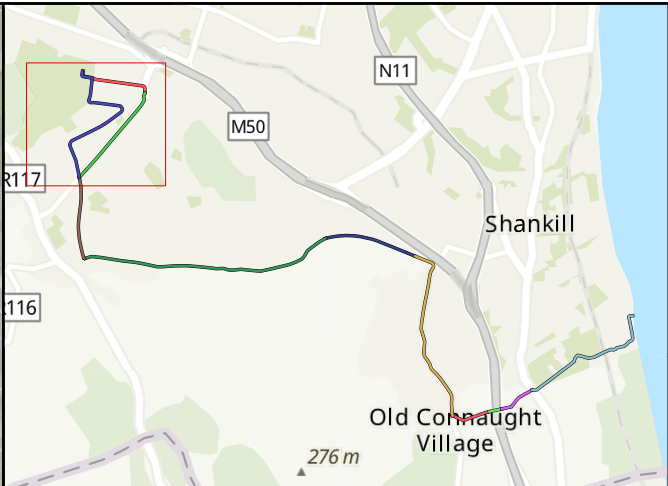
SCALE	PLOT SIZE	DATUM	PROJECTION
1:3,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

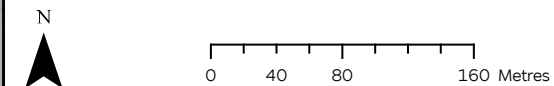
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- Ballyogan Substation Site boundary
- Route 7 - Segment
- H
 - I1
 - I2
 - J1



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: I2**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

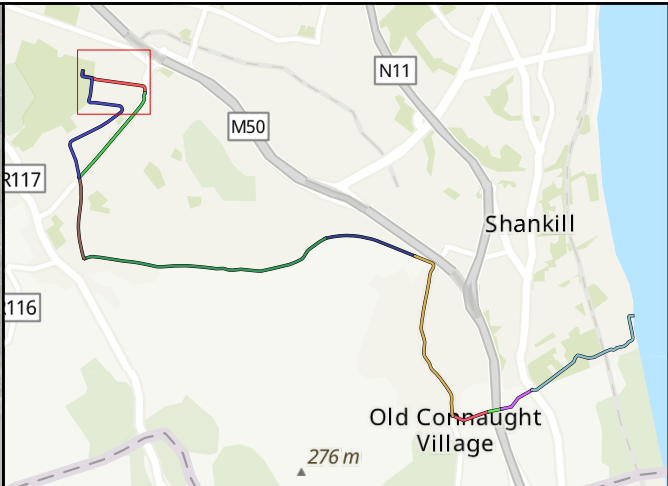
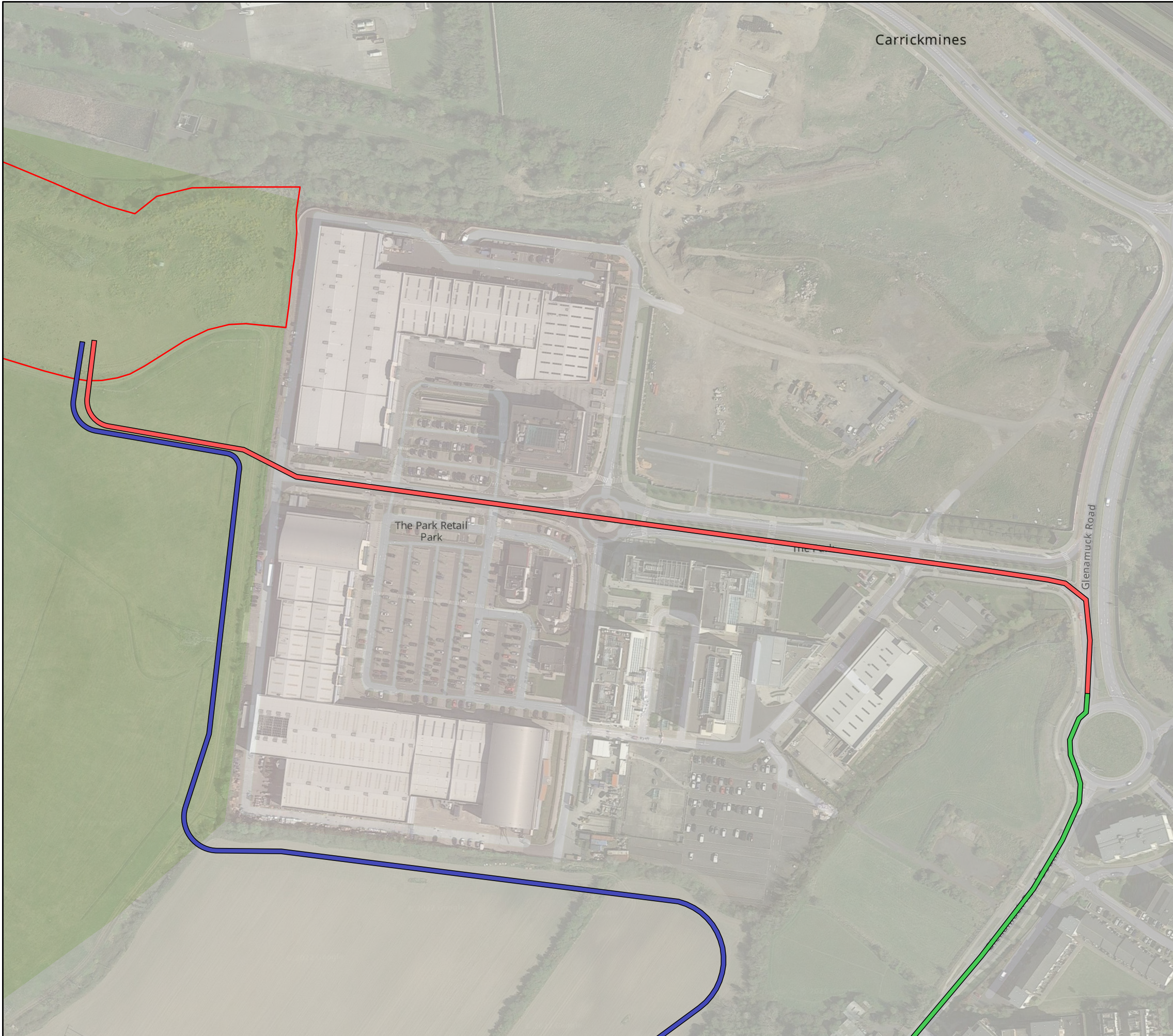
SCALE	PLOT SIZE	DATUM	PROJECTION
1:4,600	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

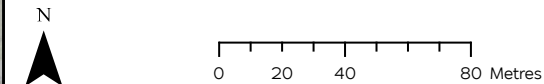
BRAY
Offshore
Wind

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- Ballyogan Substation Site boundary
- Route 7 - Segment
- I1
 - I2
 - J1



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PROJECT TITLE
Dublin Array

DRAWING TITLE
**Onshore Cable Route Options
Route 7 - Segment: J1**

VER	DATE	REMARKS	Drawn	Checked
1	28/06/2022	Draft	UI770482	PK

DRAWING NUMBER:
004424933-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:2,400	A3	IRENET95	IRENET95 Irish Transverse Mercator

KISH
Offshore
Wind

BRAY
Offshore
Wind

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Desart House,
Lower New Street,
Kilkenny
www.RWE.com