

# **MetroLink 110kV Underground Cables**

Volume 3: Environmental Impact Assessment  
Report - Appendices

June 2023

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# **MetroLink 110kV Underground Cables**

**Volume 3: Environmental Impact Assessment  
Report - Appendices**

June 2023

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Appendix A EIAR Team Credentials

# Appendix A EIAR Creditentials

Volume	Chapter Number	Section	Lead Author and Qualifications
Volume 2	7	Population and Human Health	Dr Elaine Bennett, BSc. Biological Science PhD Plant Ecology Chartered Environmentalist (CEnv) Chartered Water and Environmental Manager (C.WEM)
			Elaine has over 15 years of experience in project management, ecological and environmental assessment and reporting. She has supported clients in providing environmental support for a wide variety of large-scale infrastructure, including wastewater treatment plants and pipelines, gas infrastructure, electrical infrastructure, wind farms and cables, solar farms, quarries and greenways. She has an excellent knowledge of environmental and planning legislation and keeps abreast of environmental Case Law which ensures her projects are developed in accordance with legislative requirements. Elaine has excellent management skills exemplified by coordinating multiple projects from successful proposal and tender preparation, liaising with clients and landowners, liaising with statutory and non-statutory organisations through to report writing, submission of planning applications and client feedback.
Volume 2	8	Land, Soils & Hydrogeology	Dr Lindsay McMillan, BSc MSc Hydrogeology PhD Hydrogeology
			Dr Lindsay McMillan (Senior Hydrogeologist) has ten years' experience in hydrogeology including studies in karst aquifers and fractured rock, water quality sampling and interpretation, contaminant transport, water resources, groundwater modelling, groundwater/surface water interactions, catchment management, hydrogeological risk assessment and EIA. Lindsay has conducted EIAs, WFD assessments and hydrogeological risk assessments for a number of linear infrastructure projects including: a 60km underground cable in County Mayo/County Roscommon; HS2; a 60 km water transfer pipeline; and several flood defence schemes. Lindsay has experience of Irish karst hydrogeology including hydrogeological conceptualising and technical review of a hydrogeological impact assessment for a flood defence scheme in the extensively karstified Gort lowlands.
Volume 2	9	Surface Water and Flood Risk	Dr Elaine Bennett, BSc. Biological Science PhD Plant Ecology Chartered Environmentalist (CEnv), Chartered Water and Environmental Manager (C.WEM)
			As per Chapter 7
			Laurence Cload, Chartered Engineer MEng Civil and Structural Engineering (Flood Risk)
			Chartered Civil Engineer experienced in the managing and engineering coastal and river structures throughout the UK and overseas. Experienced in a wide variety of modelling packages, including TUFLOW, ISIS, Flood

				Modeller, HECRAS, MIKE11, MIKE21 and SWAN software, working in and managing multi-disciplined teams as a hydraulic advisor and leading teams in the delivery of flood alleviation schemes. Worked closely with both private and public sector clients from small projects to those with a multimillion pound value. Responsible for the supervision of construction works and has a strong background in Visual Basic programming which is used in all aspects of work.
Volume 2	10	Biodiversity	Roger Macnaughton MSc Environmental Sciences BSc Zoology and Ecology	Lead ecologist, with over eighteen year's full-time professional experience, managing all biodiversity services for planning, post consent, construction and operational stages of projects. Specialises in the delivery of Ecological Impact Assessment (EcIA) and Appropriate Assessment (AA). Excellent understanding of Habitats Directive and relevant Irish Wildlife legislation. Considerable expertise in avian, freshwater species, protected mammals, terrestrial habitats, and flora features of interest in Natura 2000 sites. Presentation of evidence and cross examination experience at nine oral hearings (An Bord Pleanála) to date, most being controversial and subject to intense third-party scrutiny.
Volume 2	11	Air Quality	Chris Mills. MSc Air Pollution Management and Control BSc (Hons) Environmental Science	Chris is an MSc qualified environmental scientist with 13 years of consultancy experience. As Mott MacDonald's air practice leader he oversees air quality assessments across the whole group. Has been the technical lead for many air quality assessments and has experience of working in a range of sectors including power, oil and gas, petrochemicals, transportation and buildings. Oversees Environmental Permit applications and leads on the environment aspects of due diligence and Lenders' Technical Advisor work. Has managed a variety of projects from small-scale mixed-use developments in the UK to large international environmental and social impact assessments (ESIA's) to a range of international standards such as the Equator Principles and the IFC Performance Standards. Has recently been an Expert Witness for three transport projects in the UK on behalf of Highways England.
Volume 2	12	Climate	Kate Armstrong, MSc Environmental Management BSc (Hons) Biological Sciences (Environmental Biology)	Kate is a Chartered Environmentalist with experience in consultancy, the public and regulatory sectors, and the construction and waste industries. Kate leads on design integration of climate resilience and adaptation measures and has a background in project managing cross-discipline environmental, sustainability and social assessments of infrastructure projects. Kate is experienced in environmental compliance, opportunities

				and sustainability, with a technical background in water and land quality and environmental change.
Volume 2	13	Noise and Vibration	Richard Perkins. Chartered Engineer, 2002 BEng (Hons) ElectroAcoustics	Richard is a Chartered Acoustic Engineer with 27 years' experience in multidisciplinary acoustics, noise and vibration consultancy. Richard has been the lead Acoustician on many high-profile transportation, buildings, industrial noise and environmental projects in the UK and abroad. An experienced auditor and expert witness, and has experience in PAVA design and modelling, Speech Intelligibility (STI) testing, audibility, and the requirements for hearing impairments within public spaces.
Volume 2	14	Landscape and Visual	Richard Barker (Macroworks). Irish Landscape Institute Professional Practice Qualification – 2005 MLA – Lincoln University - 2003 PG Diploma Forestry – Canterbury University - 1996 BA Environmental Science – Massey University - 1995	Richard manages the LVIA department in Macro Works undertaking assessment work on a broad spectrum of projects from wind and solar energy. to roads and large scale industrial and infrastructural development. Richard has personally completed the landscape and visual assessment of over 90 wind farms 80 solar farms and numerous other commercial and infrastructural projects including more than a dozen SID projects. Consequently, he has considerable oral hearing training and expert witness experience.
Volume 2	15	Archaeology, Architectural and Cultural Heritage	Dr Enda O'Flaherty (Rubicon Heritage Services). PhD, School of Geography and Archaeology Post-Graduate Diploma in Archaeology Honours Bachelor's Degree in Heritage Studies	Enda has been with Rubicon Heritage Services since 2012. His previous experience includes seven years as a field and research archaeologist, both in Ireland and abroad where he has worked on exciting and diverse projects examining the dynamic nature of human settlement and the significance of landscape to communities in the past. His career to date has equipped him with all the skills associated with pre-planning archaeological assessment from desk based research projects through to full EIAR. In addition, he has professional experience in pre-planning surveying/field walk-overs, pre-excavation testing and all other archaeological skills through to post-excavation reporting and publication. Enda has developed a multi-disciplinary approach to landscape studies involving archaeology, physiographical studies, toponymy and documentary sources, which draws out the significance of physical environments for settlement in the past, and helps to understand their role in the cognitive landscape.
Volume 2	16	Material Assets	Dr Elaine Bennett, BSc. Biological Science PhD Plant Ecology Chartered Environmentalist (CEnv) Chartered Water and Environmental Manager (C.WEM)	As per chapter 7
Volume 2	17	Roads and Traffic	John Dooley. IEng, MICE (Incorporated Engineer (1993), Member of the Institution of Civil Engineers (2001)). BA in Management, CILM Diploma in Management	Project Principal and Chartered professional who leads the Mott MacDonald transport planning and traffic engineering business stream in Glasgow. He has extensive knowledge and experience of public transport,

				public realm, active travel (cycling and walking), bus priority, traffic and highway engineering schemes, leading and collaborating within multi-disciplinary teams, with 30 years + working within local government but predominantly the private sector. An expert in the field of road safety engineering and audit, with significant UK and overseas experience; due diligence, collision reduction engineering, auditing and lecturing.
Volume 2	18	Major Incidents and Disasters	Liam Burke, Chartered Engineer HDip Safety, Health and Welfare at Work (UCC, 2014)	Specialist experience in construction health and safety (Irish Regulations) including Project Supervisor Design Process (PSDP) and Construction Phase (PSCS) duties, as well as in-house Project Safety Advisor (PSA) duties. Supervision and construction monitoring for numerous project types, including local authority housing, siteworks, commercial, education and healthcare buildings.



## Appendix B Cable Route Drawings

# **Appendix B – Cable Route Drawings**

## **Appendix B1 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0000 EIAR Routes Overview

## **Appendix B2 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0001 Ballystruan to Newbury Route

## **Appendix B3 – EIAR Cable Route Overview**

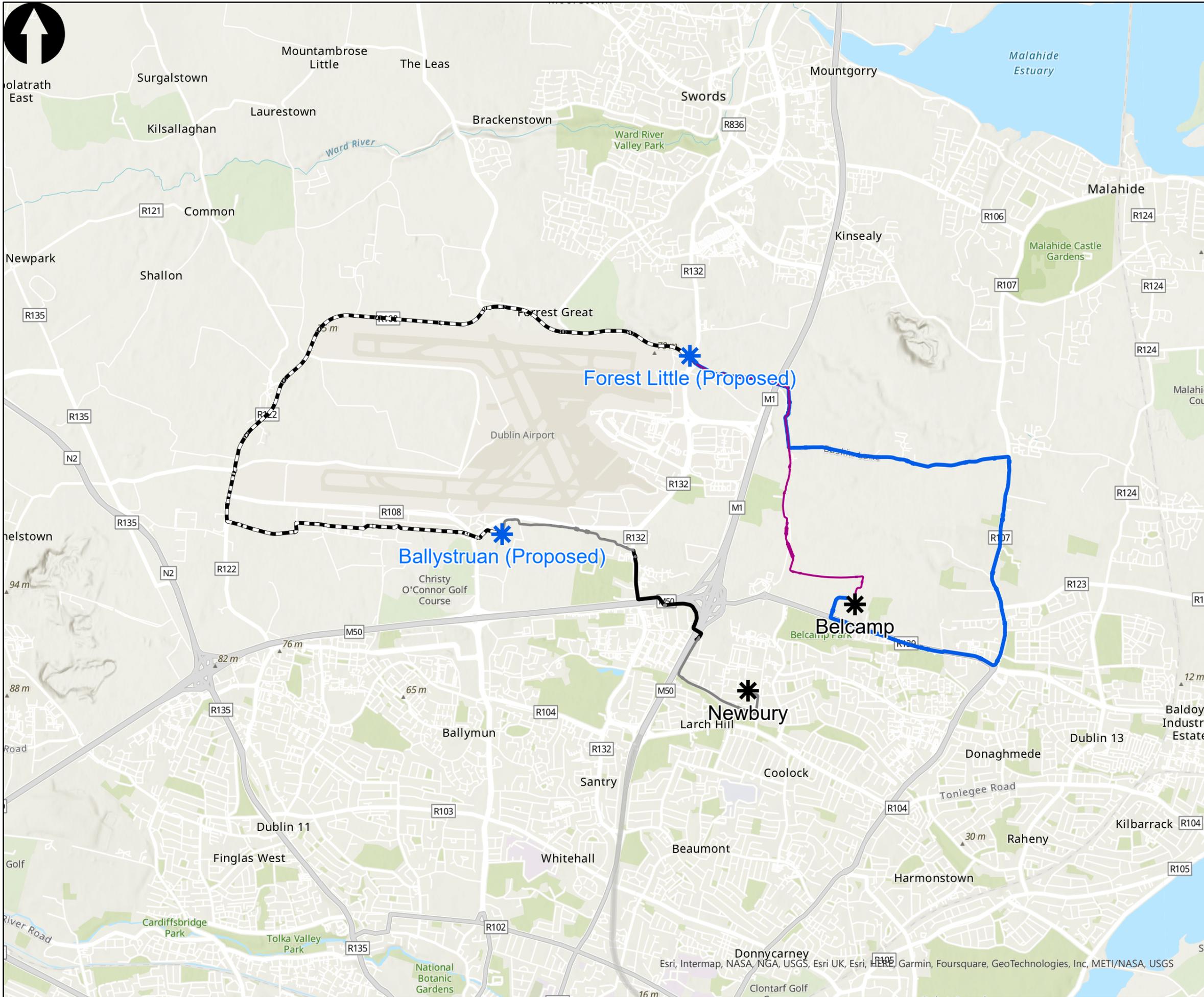
229100846-MMD-00-XX-DR-C-0002 Forest Little to Ballystruan

## **Appendix B4 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0003 Forest Little To Belcamp

## **Appendix B1 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0000 EIAR Routes Overview



**Key to Symbols**

- Proposed Substations
- Existing Substations
- Forest Little to Belcamp
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Forest Little to Belcamp Option 2
- Forest Little to Ballystruan

**Notes**

Proposed Substations Forest Little, Belcamp, Ballystruan and Newbury, previously applied for under ABP case reference 314724

Rev	Date	Drawn	Description	Ch'k'd	App'd
04	22/05/2023	XW	Information	XW	EAB

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**TIIV**  
Bonneagar Iompair Éireann  
Transport Infrastructure Ireland

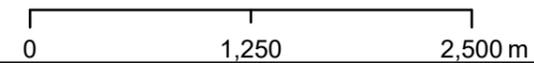
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**MetroLink 110kV Cable  
Planning Design**

Overview Map

Designed	X Wan	Eng Check	E A Bennett
Drawn	X Wan	Coordination	E A Bennett
GIS Check	E Tiri	Approved	E A Bennett
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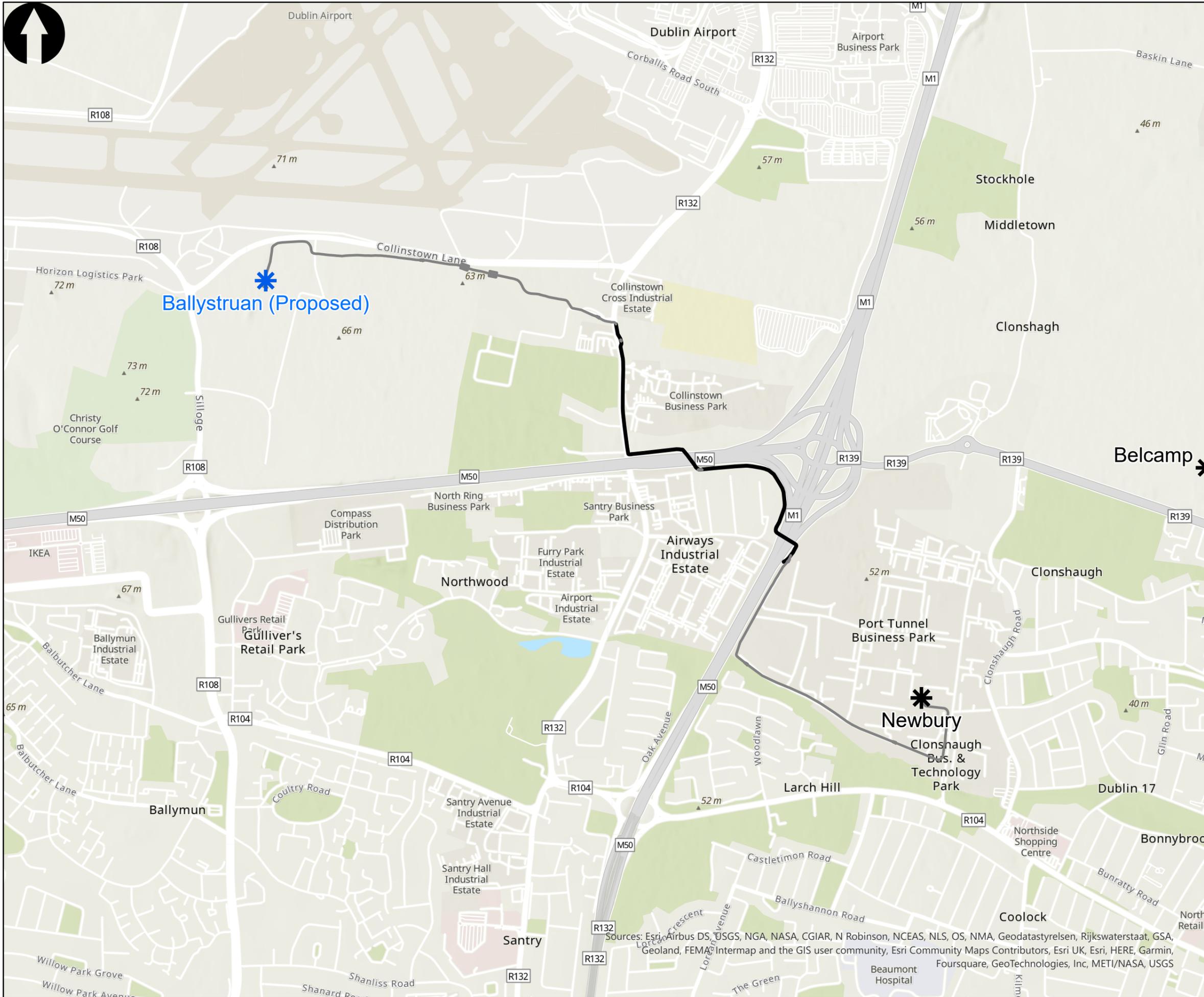
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**229100846-MMD-00-XX-DR-C-0000**

## **Appendix B2 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0001 Ballystruan to Newbury Route



**Key to Symbols**

- Proposed Substations
- Existing Substations
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts

**Notes**

Proposed Substations Forest Little, Belcamp, Ballystruan and Newbury, previously applied for under ABP case reference 314724

Rev	Date	Drawn	Description	Ch'kd	App'd
04	22/05/2023	XW	Information	XW	EAB

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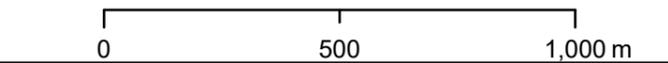
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**MetroLink 110kV Cable Planning Design**

Ballystruan to Newbury Route

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GIS Check	E Tiri	Approved	E A Bennett
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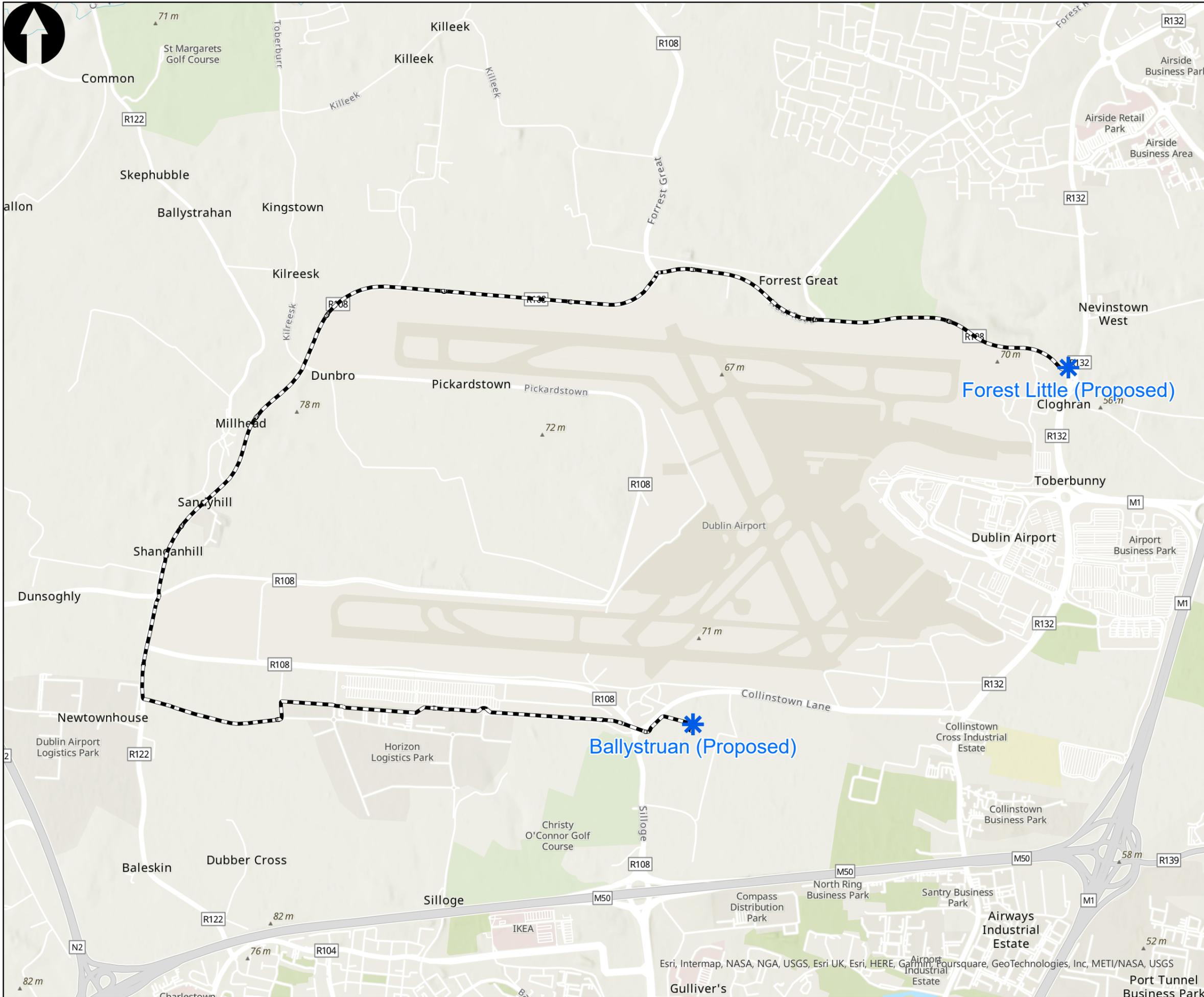
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## **Appendix B3 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0002 Forest Little to Ballystruan



**Key to Symbols**

- Proposed Substations
- Existing Substations
- Forest Little to Ballystruan

**Notes**

Proposed Substations Forest Little, Belcamp, Ballystruan and Newbury, previously applied for under ABP case reference 314724

Rev	Date	Drawn	Description	Ch'k'd	App'd
04	22/05/2023	XW	Information	XW	EAB

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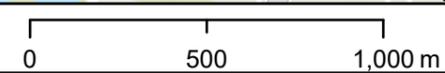
**Title**

**MetroLink 110kV Cable Planning Design**

Forest Little to Ballystruan Route

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Drawn	X Wan	Coordination	E A Bennett
GIS Check	E Tiri	Approved	E A Bennett
Scale at A3	Status	Rev	Security
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## **Appendix B4 – EIAR Cable Route Overview**

229100846-MMD-00-XX-DR-C-0003 Forest Little To Belcamp





## Appendix C - Consultation

# Appendices

Appendix C1 Stakeholder Consultation Letter  
Appendix C2 An Bord Pleanála Consultation

# **Appendix C1 Stakeholder Consultation Letter**

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**Our Reference**  
229100846

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mottmac.com

## Proposed Metrolink 110kV Underground Cable

26 May 2022

Dear Sir/Madam,

The Electricity Supply Board (ESB) are proposing to apply to An Bord Pleanála under Section 182A of the Planning and Development Act 2000 (as amended) for the construction and installation of high voltage underground cables. The proposed project is referred to as the MetroLink 110kV Underground Cabling (UGC) Route. All works proposed for Strategic Infrastructure Development under Section 182A of the Planning and Development Act 2000 (as amended) to be accompanied by “a statement of the likely effects on the environment (referred to subsequently in this Part as an ‘environmental impact statement’)”. This requirement is addressed by the preparation of an Environmental Impact Assessment Report (EIAR) to accompany the application.

ESB wish to consult with prescribed bodies and stakeholders prior to the finalisation of the EIAR and lodgement of the application to address potential concerns, comments on the content of the EIAR, or incorporate recommendations on the proposed project. TII welcome comments on the proposed project which is detailed herein. A copy of an overview drawing of the proposed cable route is enclosed with this letter.

The application lodgement, to An Bord Pleanála, is currently scheduled to occur no later than the end of Q4 2022.

### Background and Project Need

The population of Dublin is due to increase to 1.4 million by 2040, according to predictions from The National Planning Framework. Employment levels are their highest level ever. With the Central Statistics Office reporting continuous employment growth in the previous consecutive quarters rising to 2,255,000 people employed. The city centre of Dublin remains the primary location for employment with additional areas also seeing growth. It is predicted that the trend is likely to continue. For example, expansion continues within the technology sectors with companies like Google and Facebook are continuing to migrate to the Docklands area. This growing demand increases the challenge to get people to and from work in a reliable, affordable and sustainable manner.

The MetroLink project will link major transport hubs and connect key destinations including Ballymun, the Mater Hospital, the Rotunda Hospital, Dublin City University and Trinity College Dublin. Much of the 19km route will run underground and it is expected that the MetroLink will carry up to 50 million passengers annually, cutting journey times from Swords to the city centre to 25 minutes. This is an innovative project changing travel ideas in the city and the greater Dublin area.

The proposed MetroLink creates integration and connectivity between other transport hubs, such as Dublin Airport, Iarnród Éireann and DART. The cable installation will provide a

suitable and sufficient power source to facilitate MetroLink project.

### **Project Description**

The MetroLink is a proposed high-capacity, high-frequency rail line running from Swords to Charlemont, linking various transportation hubs, such as Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services, thus creating fully integrated public transport in the Greater Dublin Area.

This project, which is still in the design phase, will see the construction of three new 110 kV circuits to supply electricity to MetroLink:

- 110/220 kV Forest Little – Belcamp;
- 110 kV Newbury – Ballystruan; and
- 110 kV Ballystruan – Forest Little.

One of which, Forest Little – Belcamp will initially operate at 110 kV but is to be built to 220 kV standards for future operation. A fourth spare circuit will also be constructed from Forest Little to Belcamp to 110 kV standards. The cables will be installed along a mixture of public road and private land. Figure 1 below illustrates the location of the three cable routes.

In summary, the main elements of the proposed Metrolink 110kV underground cabling project, for consideration of the proposed EIAR are:

- The installation of new 110 kV cabling, some in existing trenching/ducting but some requiring new trenching and ducting. Specification of some of the cabling routes will be for 220kV to allow for future upscaling;
- Creation of joint bays for connection of cables;
- Installation of ducting within local road networks and under motorways;
- Crossings of rivers and drains; and
- Ancillary works

The accompanying EIAR will assess the environmental impacts of the proposed project and will include chapters on the following environmental topics:

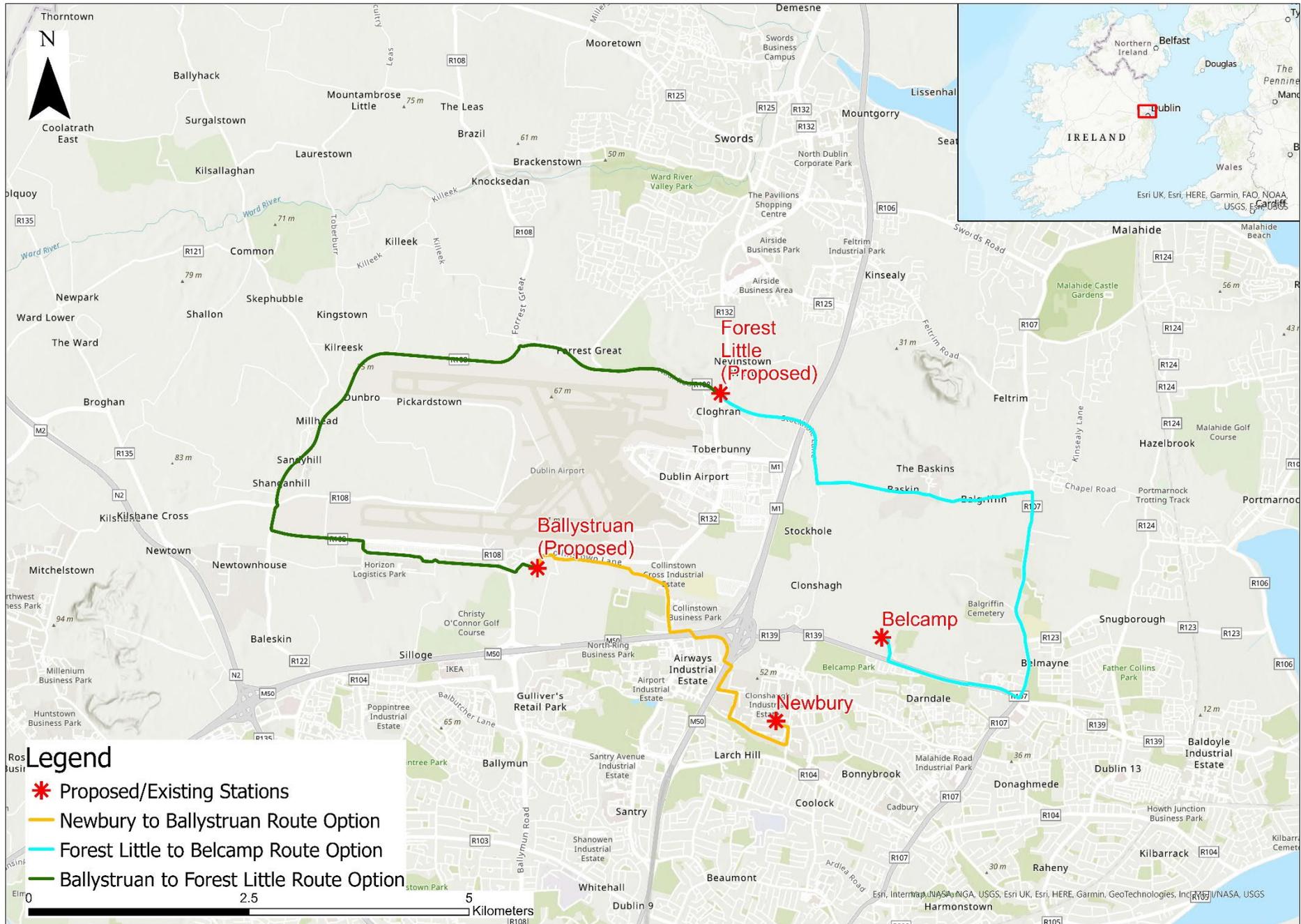
- Population and Human Health
- Air Quality
- Climate
- Land, Soils and Hydrogeology
- Water (including flood risk)
- Biodiversity
- Landscape
- Archaeology and Cultural Heritage
- Traffic and Transport
- Noise and Vibration
- Material Assets
- Disasters and Accidents

If you have any questions or comments please contact me via the contact details provided underneath by the 05 July 2022.

Yours faithfully,

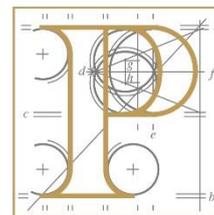
*Michael Sterling*

Michael Sterling  
Specialist (Environmental)  
01412224539  
07976360588  
michael.sterling@mottmac.com



## **Appendix C2 An Bord Pleanála Consultation**

**Our Case Number:** ABP-312348-22



An  
Bord  
Pleanála

Electricity Supply Board  
Engineering and Major Projects  
One Dublin Airport Central  
Dublin Airport  
Cloghran  
K67 XF72

**Date:** 24 January 2023

**Re:** Construction of three new 110kV Circuits. Newbury-Ballystruan 110kV, Ballystruan-Forest Little 110kV and Forest Little-Belcamp 110kV.  
At various locations between Forest Little, Belcamp, Clonshaugh and Harristown, Co. Dublin.

Dear Sir / Madam,

Please be advised that following consultations under section 182E of the Planning and Development Act, 2000, as amended, the Board hereby serves notice that it is of the opinion that the proposed development falls within the scope of section 182A of the Planning and Development Act, 2000 as amended. Accordingly, the Board has decided that the proposed development would be strategic infrastructure within the meaning of section 182A of the Planning and Development Act, 2000, as amended. Any application for approval for the proposed development must therefore be made directly to An Bord Pleanála under section 182A(1) of the Act.

Please also be informed that the Board considers that the pre-application consultation process in respect of this proposed development is now closed.

In accordance with section 146(5) of the Planning and Development Act, 2000, as amended, the Board will make available for inspection and purchase at its offices the documents relating to the decision within 3 working days following its decision. This information is normally made available on the list of decided cases on the website on the Wednesday following the week in which the decision is made.

The attachment contains information in relation to challenges to the validity of a decision of An Bord Pleanála under the provisions of the Planning and Development Act, 2000, as amended.

If you have any queries in relation to the matter please contact the undersigned officer of the Board.

Teil  
Glao Áitiúil  
Facs  
Láithreán Gréasáin  
Ríomhphost

Tel  
LoCall  
Fax  
Website  
Email

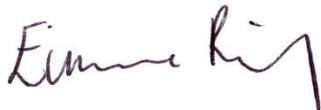
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1800 275 175  
(01) 872 2684  
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bord@pleanala.ie

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Baile Átha Cliath 1  
D01 V902

64 Marlborough Street  
Dublin 1  
D01 V902

Please quote the above mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board.

Yours faithfully,



---

Eimear Reilly  
Executive Officer  
Direct Line: 01-8737184

VC11

**Teil**  
**Glaó Áitiúil**  
**Facs**  
**Láithreán Gréasáin**  
**Ríomhphost**

**Tel** (01) 858 8100  
**LoCall** 1800 275 175  
**Fax** (01) 872 2684  
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**Email** [bord@pleanala.ie](mailto:bord@pleanala.ie)

64 Sráid Maoilbhríde 64 Marlborough Street  
Baile Átha Cliath 1 Dublin 1  
D01 V902 D01 V902

## List of Prescribed Bodies to be forwarded copies of the application documentation:

- Department of Transport
- Department of the Environment, Climate and Communications
- Department of Tourism, Culture, Arts, Gaeltacht, Sports and Media
- Department of Housing, Local Government and Heritage
- Dublin City Council
- Fingal County Council
- Transport Infrastructure Ireland
- Irish Water
- An Chomhairle Ealaíon
- Fáilte Ireland
- An Taisce
- Heritage Council
- The Commissioners of Public Works
- Dublin Airport Authority
- EirGrid
- Health Service Executive
- Health and Safety Authority
- Inland Fisheries Ireland
- Eastern and Midland Regional Assembly
- National Transport Authority
- Commission for Regulation of Utilities
- Commission for Railway Regulation

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**Email** [bord@pleanala.ie](mailto:bord@pleanala.ie)

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D01 V902 D01 V902

## **Judicial review of An Bord Pleanála decisions under the provisions of the Planning and Development Acts (as amended).**

A person wishing to challenge the validity of a Board decision may do so by way of judicial review only. Sections 50, 50A and 50B of the Planning and Development Act 2000 (as substituted by section 13 of the Planning and Development (Strategic Infrastructure) Act 2006, as amended/substituted by sections 32 and 33 of the Planning and Development (Amendment) Act 2010 and as amended by sections 20 and 21 of the Environment (Miscellaneous Provisions) Act 2011) contain provisions in relation to challenges to the validity of a decision of the Board.

The validity of a decision taken by the Board may only be questioned by making an application for judicial review under Order 84 of The Rules of the Superior Courts (S.I. No. 15 of 1986). Sub-section 50(7) of the Planning and Development Act 2000 requires that subject to any extension to the time period which may be allowed by the High Court in accordance with subsection 50(8), any application for judicial review must be made within 8 weeks of the decision of the Board. It should be noted that any challenge taken under section 50 may question only the validity of the decision and the Courts do not adjudicate on the merits of the development from the perspectives of the proper planning and sustainable development of the area and/or effects on the environment. Section 50A states that leave for judicial review shall not be granted unless the Court is satisfied that there are substantial grounds for contending that the decision is invalid or ought to be quashed and that the applicant has a sufficient interest in the matter which is the subject of the application or in cases involving environmental impact assessment is a body complying with specified criteria.

Section 50B contains provisions in relation to the cost of judicial review proceedings in the High Court relating to specified types of development (including proceedings relating to decisions or actions pursuant to a law of the state that gives effect to the public participation and access to justice provisions of Council Directive 85/337/EEC i.e. the EIA Directive and to the provisions of Directive 2001/12/EC i.e. Directive on the assessment of the effects on the environment of certain plans and programmes). The general provision contained in section 50B is that in such cases each party shall bear its own costs. The Court however may award costs against any party in specified circumstances. There is also provision for the Court to award the costs of proceedings or a portion of such costs to an applicant against a respondent or notice party where relief is obtained to the extent that the action or omission of the respondent or notice party contributed to the relief being obtained.

General information on judicial review procedures is contained on the following website, [www.citizensinformation.ie](http://www.citizensinformation.ie).

Disclaimer: The above is intended for information purposes. It does not purport to be a legally binding interpretation of the relevant provisions and it would be advisable for persons contemplating legal action to seek legal advice

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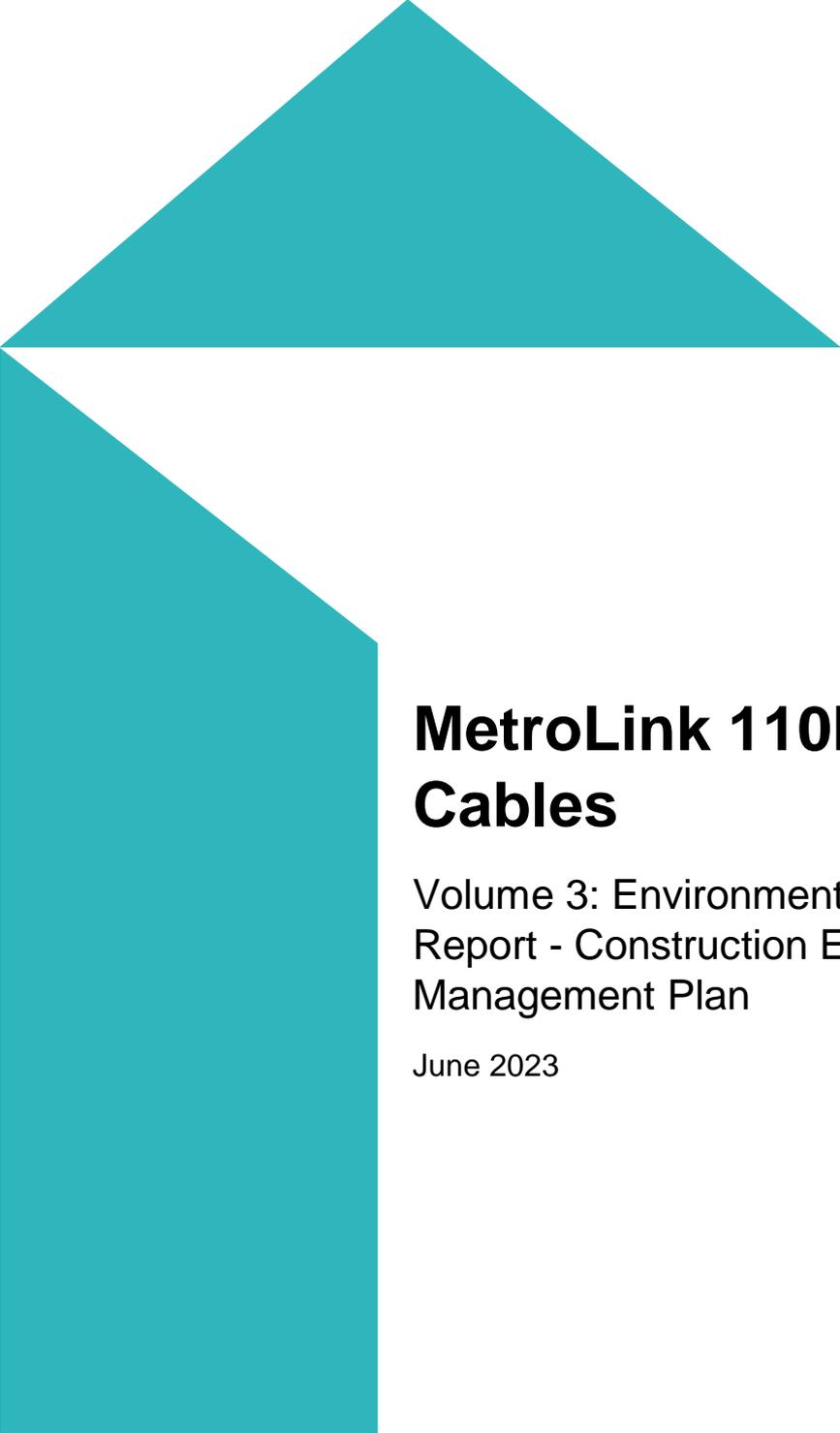
## Appendix D - CEMP

# Appendices

Appendix D1 – Construction Environmental Management Plan (CEMP)

Appendix D2 – ESB Construction Methodology

# **Appendix D1 – Construction Environmental Management Plan (CEMP)**

A large teal graphic on the left side of the page, consisting of a triangle at the top and a trapezoid below it, forming a shape that resembles a stylized 'M' or a mountain peak.

# **MetroLink 110kV Underground Cables**

Volume 3: Environmental Impact Assessment  
Report - Construction Environmental  
Management Plan

June 2023

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# 1 Introduction

## 1.1 Overview of the Proposed Development

The proposed development includes for the installation of 110kV underground ducting and cabling for three circuits between the following substations within the administrative areas of Fingal County Council and Dublin City Council:

- Newbury to Ballystruan;
- Ballystruan to Forest Little; and
- Forest Little to Belcamp.

Joint bays will be required along the routes in addition to temporary passing bays during construction. The proposed development is primarily within the local road network.

The specification for the Forest Little to Belcamp cable will be for 220kV to allow for future development.

## 1.2 Purpose of the CEMP

The purpose of this Construction Environmental Management Plan (CEMP) is to document and describe the main activities that will be undertaken to facilitate the proposed development and to provide a framework of environmental protection measures that will be implemented prior to commencement of, and throughout the duration of, the proposed works. The CEMP will be a key contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment are implemented. This document will be further developed by the appointed Contractor, within the parameters assessed in the application particulars, taking into account any conditions of the statutory Approval (which, it is anticipated, will include a requirement for agreement of the content of this CEMP with the relevant planning authorities – Fingal County Council and Dublin City Council), the results of confirmatory surveys and any additional measures identified during detailed design. This CEMP will remain a ‘live’ document which will be reviewed regularly and revised as necessary and appropriate.

The works will be undertaken by Contractors engaged by ESB. This CEMP will be provided to the appointed Contractor prior to the commencement of works and will be further developed by the appointed Contractor. The appointed Contractor will be required to obtain approval of any updated CEMP by ESB prior to commencement of any works, irrespective of any Condition of Statutory Approval that might be imposed by An Bord Pleanála for agreement of the content of the CEMP with Fingal County Council and Dublin City Council.

The Contractor’s CEMP will set out the approach and methodology which the Contractor will follow in scheduling and undertaking the work and will incorporate the control (mitigation) measures detailed in this CEMP in addition to specified conditions that may be prescribed in any grant of development consent for the proposed development, the measures provided in the Natura Impact Statement (NIS) and the Environmental Impact Assessment Report (EIAR) and any commitments given by ESB in relation to environmental protection associated with the activities described in this CEMP.

The primary objective of the CEMP is to safeguard the environment, site personnel and nearby sensitive receptors from site activity which may cause harm or nuisance. As such, the CEMP sets out a project framework to ensure that key mitigation measures and conditions set out as part of the planning consent process are translated into measurable actions and are appropriately implemented during the construction phase of the proposed development. As part of this framework, transparent and effective monitoring of the receiving environment during

construction will be used to inform and manage on-going activities on site and to demonstrate effectiveness of the measures outlined therein.

A contractual obligation will be included within the tendering processes and implemented on appointment of the Contractor to ensure that the proposed works are developed in compliance with the requirements of the CEMP, EIAR, NIS and planning conditions which will take precedence over this current version of the CEMP in the event of conflicting information.

ESB will monitor the contractor(s) performance on a regular basis and will undertake the following compliance checks throughout the duration of the construction period:

- Review contractor documents against the requirements of the CEMP;
- Undertake regular audits;
- Continuously check records;
- Set up a contractor reporting structure; and
- Conduct regular meetings (at least fortnightly) where Environmental Health and Safety is an agenda item.

As will be specified under Roles and Responsibilities, the Contractor's Environmental Clerk of Works (EnCoW) will also coordinate regularly with the corresponding staff delivering the elements of the project.

### 1.3 Structure of the CEMP

The structure of this CEMP is set out below.

- Chapter 1 describes the purpose of this CEMP
- Chapter 2 describes the roles and responsibilities of the construction phase team
- Chapter 3 describes the proposed construction activities
- Chapter 4 describes the control measures that will be implemented
- Chapter 5 includes an Environmental Incident Management Plan
- Chapter 6 describes the training and auditing protocols that will be implemented
- Chapter 7 describes the communications and procedure for complaints

A Construction Resource Waste Management Plan is provided in Appendix A and a Traffic Management Plan is provided in Appendix B.

## 2 Roles and Responsibilities

### 2.1 Introduction

This initial issue of the CEMP identifies the key roles for the construction works. The contractor will update the CEMP and will set out detailed roles and responsibilities (including named individuals) and an organogram of the team structure.

### 2.2 Employer

ESB is the Employer and has the following responsibilities:

- The planning application, including decision-making on the nature and extent of the proposed development, and setting out of environmental mitigation measures, included in this CEMP. The CEMP forms part of the documents supporting the S182A application;
- Post-consent manages the process towards construction including liaison with key environmental agencies and stakeholders;
- Undertakes a Client Engineering function, including inspections to ensure that detailed designs, plant, materials and works including scheduling meet the requirements of its functional specifications, its outline designs and its generic standards; and
- Continued liaison with landowners and local residents, as required.

### 2.3 Employers Representative

The Employer will employ an independent Environmental Clerk of Works (EnCoW) within the Employer's Representative Team to assess the construction of the Proposed Development and advise the Contractor and Contractor's EnCoW on the implementation of the agreed Contractors CEMP.

### 2.4 Contractor(s)

Contractors will be appointed following a tendering process and ESB will be responsible for the overall works. All parties will be responsible for the Health and Safety of site workers, for the implementation of all mitigation, as set out in Table 4.1 and the completion of the works to the satisfaction of the Employer.

### 2.5 Site Manager

The Site Manager will be responsible for the day to day running of the site and will direct and oversee the activities of a range of contractors and subcontractors throughout the works. The Site Manager will be responsible for programming of the works, will consult regularly with the Employer and will maintain site safety.

### 2.6 Contractors' Environmental Clerk of Works

The Contractors' EnCoW will have suitable environmental qualifications and the necessary experience and knowledge appropriate to the role. The Contractors' EnCoW will be delegated sufficient powers under the construction contract so that she / he will be able to instruct the Contractors to stop works and to direct the carrying out of emergency mitigation / clean-up operations. The Contractors' EnCoW will also manage consultation with environmental bodies including the NPWS and IFI. The Contractors' EnCoW will be responsible for carrying out regular monitoring of the Contractors' CEMP and will report monitoring findings as required by the planning consent. The Contractors' EnCoW will also report monitoring findings in writing to

the independent EnCoW within the Employer's Representative Team on a regular basis (at least weekly, but immediately in the case of incidents or accidents).

## **2.7 Contractor's Ecological Clerk of Works (ECOW)**

An Ecological Clerk of Works (ECoW) will be employed by the Contractors to oversee implementation of ecological mitigation and support the Contractors' Environmental Clerk of Works (Contractor's EnCoW) responsible for wider environmental mitigation. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented. The Contractor's EcOW will also ensure any disturbance licenses for protected species are arranged for in the event that confirmatory pre-construction surveys identify breeding or resting sites within the ZoI.

The Contractors' ECoW will advise on ecological mitigation measures which require to be implemented and scheduled as part of the works and will be included in regular liaison meetings between project teams.

The independent EnCoW, employed on behalf of the Employers Representative team, will review and comment on the reports generated by the Contractor's EnCoW/ECoW; namely pre-construction survey reports, and the specific monitoring and compliance reports referenced under the mitigation measures in this CEMP.

## 3 Proposed Activities

### 3.1.1 Introduction

The following sections describe the proposed construction phase activities associated with the installation of the new UGC, discussed in detail within Chapter 6 of the EIAR Description of the Proposed Development.

It is the case that the UGC infrastructure, including the cable route, joint bays, communications chambers, and other structures and works, have been sited within a red line application area and subject to environmental assessment.

Following the consenting of the proposed development, should this be the case by ABP, there will be a process of pre-construction detailed design and siting of the grid infrastructure to ensure its most appropriate permanent location. This will occur within the parameters and assessments of the Approved development; any siting which extends outside such parameters, for example outside the red line application area, will require to be the subject of post-consent modification in accordance with the provisions of statutory legislation.

### 3.2 Overview of the Receiving Environment

The proposed development is located primarily within the existing road network within the functional areas of Dublin City Council and Fingal County Council. A summary of the route is provided in the sections below.

#### 3.2.1 Proposed Newbury to Ballystruan 110kV UGC Route

The cable route initially runs through private property south of the Old Airport Road, through the north perimeter of the two GAA pitches, before entering Comer Group's property (i.e. presently used as agricultural land) and then into the DAA Quickpark carpark, parallel to the Old Airport Road/Collinstown Lane.

The cable route subsequently joins the R132/Swords Road before heading south using existing ducting where viable. At the M50 motorway the cable route turns east, running along the north side of the motorway before crossing to the southside adjacent to the Turnapin Green/Turnapin Cottages area. The cable route then follows the slip road alignment to the south along the M1 motorway before crossing the motorway into the Clonshaugh Business and Technology Park.

The route then runs south, adjacent to the M1 motorway before turning east along the road ca. 20m-50m north of the Santry River at Clonshaugh Business and Technology Park. At the main entrance road to Clonshaugh Business and Technology Park the circuit turns north, before entering Newbury 110 kV substation to the west.

#### 3.2.2 Proposed Ballystruan to Forest Little 110kV UGC Route

The Proposed Ballystruan to Forest Little 110kV UGC route heads west from Ballystruan substation through Ballymun Kickhams GAA grounds onto the Harristown Road, between the DAA Blue Carpark and the Harristown Bus Station.

Running to the north of Horizons Logistics Park before joining and continuing along Harristown Lane before turning north onto the R122. The UGC route follows the R122 north and then turns in an easterly direction around the perimeter of the airport, at Pickardstown on Barberstown Road. It continues east to join up with the Naul Road and into the proposed Forest Little substation adjacent to Cloghran roundabout.

### 3.2.3 Proposed Forest Little to Belcamp 110kV/220kV UGC Route

#### 3.2.3.1 Option 1

Starting at the proposed Forest Little substation, Option 1 crosses the R132 at the Cloghran roundabout onto Cloghran, travelling off road and crossing the M1 by trenchless method. The UGC route continues adjacent to Stockhole Lane, prior to re-joining Stockhole Lane. Option 1 then turns east onto Baskin Lane. At Kinsealy the route turns south onto the R107/Malahide Rd towards the Clarehall junction before turning west on the R139 and entering the existing 220kV Belcamp Station.

#### 3.2.3.2 Option 2

Starting at the proposed Forest Little substation, Option 1 crosses the R132 at the Cloghran roundabout onto Cloghran, travelling off road and crossing the M1 by trenchless method. The UGC route continues adjacent to Stockhole Lane, prior to re-joining Stockhole Lane. Option 2 continues due south along Stockhole Lane and Clonshaugh Road, before going off road just after Baskin Park. A HDD crossing under the Cuckoo Stream and under Clonshaugh Road is proposed, prior to turning in an easterly direction along agricultural lands prior to turning south on the approach to the existing 220kV Belcamp Station.

### 3.3 Description of the Construction Phase (Underground Cable)

The following sections describe the proposed construction phase activities associated with the installation of the new UGC.

Following the consenting of the proposed development, should this be the case by ABP, there will be a process of pre-construction detailed design and micro-siting of the grid infrastructure. This will occur within the parameters and assessments of the Approved development; any micro-siting which extends outside such parameters, for example outside the red line application area, will be subject to post-consent modification in accordance with the provisions of statutory legislation, as required. Throughout the design and assessment process, all reasonable and practically achievable measures have been taken to minimise and avoid impacts.

#### 3.3.1 Trenching and Ducting

The standard trench dimensions for a 110kV cable (Figure 6.5) are approximately 0.6m wide x 1.35m deep. These dimensions are based on a standard arrangement within the public roadway (assessments are based on a width of 0.6m to 1.5m to allow for standard trefoil formation. This will be the predominant type of trenching required as the majority of the routes are within public roadways.

The trench dimension are 1.5m wide and 1.4m depth for standard double circuit trefoil formation (Figure 3.2). For standard 110kV/220kV circuit and where utility congestion exists, a flat formation 110kV/220kV up to 2.9m wide is required (Figure 3.3). Existing ducts will be used where available. For off-road routes, additional space may be required for route alignment to avoid underground objects such as tree roots or other obstructions that cannot be removed.

Following excavation of the trench, bedding material, Cement Bound Granular Material (CBGM) will then be laid, the ducts put in place, protection strips laid on top and the trench will be backfilled. Following duct installation, the road above the trench will be reinstated to the standard required by the relevant authority at that location, in this case Fingal County Council, Dublin City Council and Dublin Airport Authority.

The duct installation will progress sequentially starting at one joint bay and moving towards the next joint bay along the route. The construction area will move in tandem with the progress of

the duct installation, with only the relevant portion of the section cordoned off while under construction.

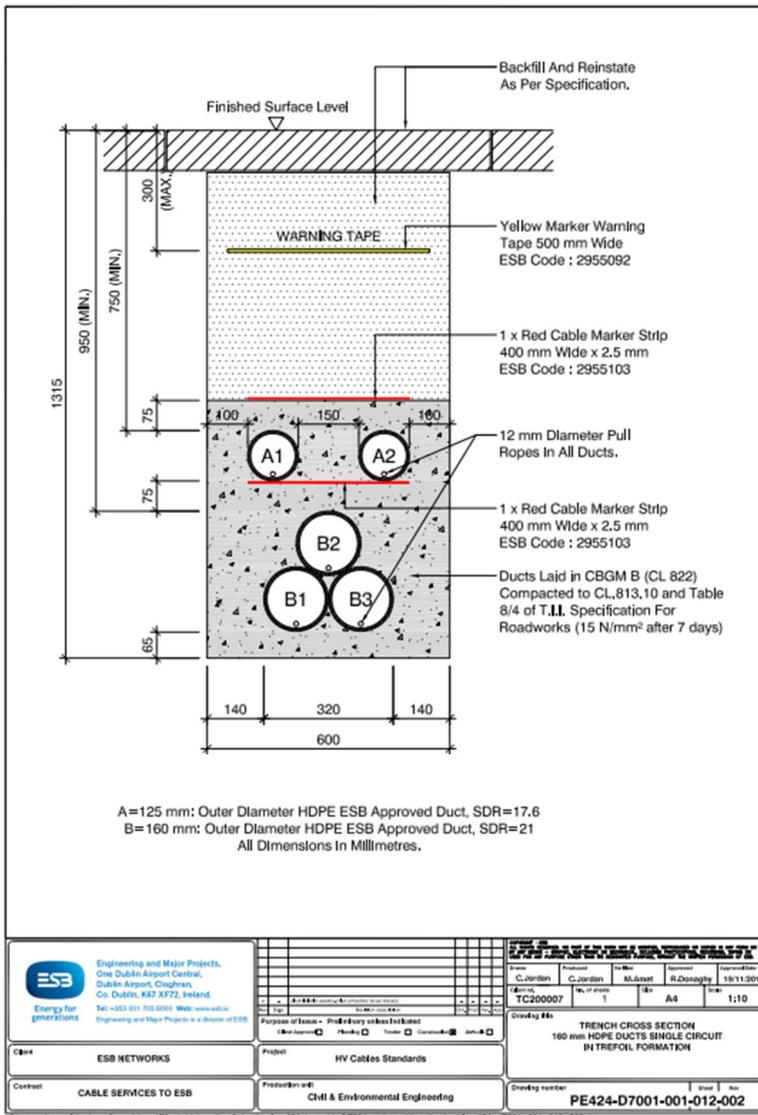
Excavation where utilities are congested will require numerous crossings and parallel runs of trenching and ducting with existing utilities. This will also require agreement on the method of crossing the utilities prior to excavation and may require supervision by a member of the utility provider. Hand digging and use of smaller excavators may also be required. Traffic management will be required for on-road construction.

For off-road or cross-country sections, a temporary working strip of approximately 30m in width is proposed. While the cable trench is approximately 0.6 to 1.5m (110kV to 110/220kV) in width, the approximately 30m working strip is required for the following reasons;

- To facilitate the storage of topsoil which must be removed from;
  - The footprint of the temporary construction access track (typically up to 5m in width).
  - The footprint of the cable trench.
  - A buffer strip between the temporary access track and the trench (for safety).
  - Subsoil storage area.
  - Materials storage areas.
- To facilitate the laying of the temporary construction access track alongside the cable trench to allow for the movement of construction equipment and materials along the section of the route on the farmland.
- To facilitate the excavation of the cable trench and the installation of the cable ducting.
- To facilitate the storage of distinct layers of subsoils excavated from the cable trench in segregated piles for later reinstatement to the original soil profile.

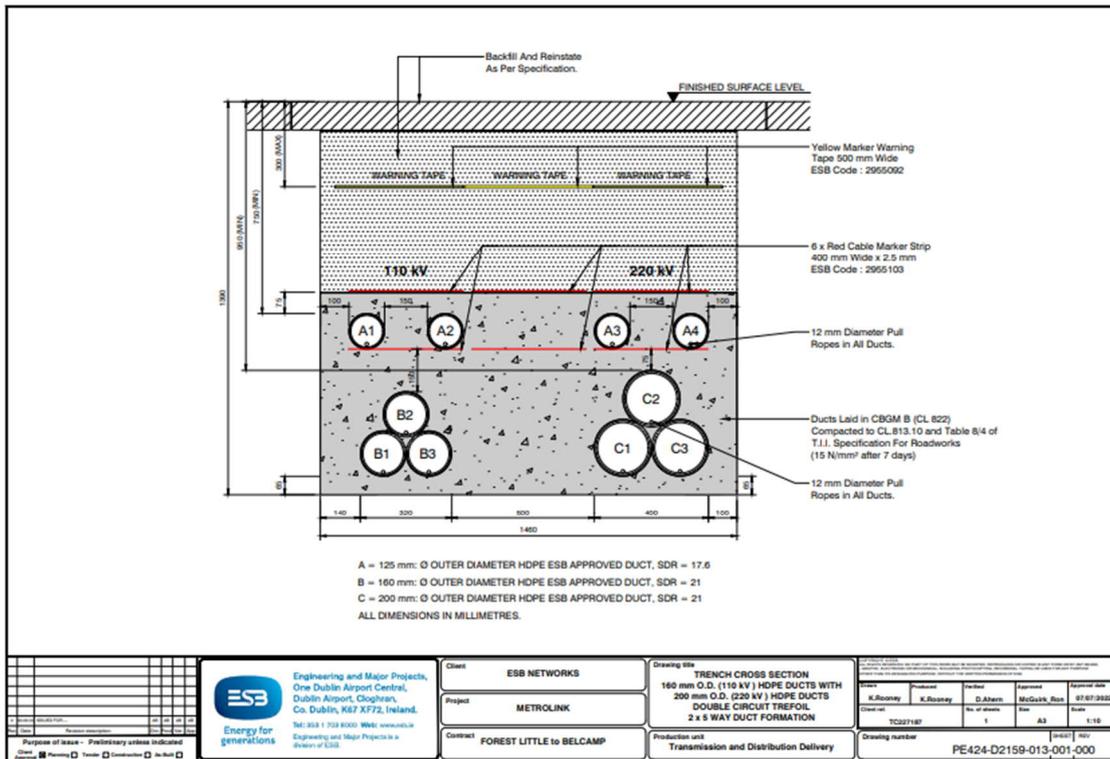
Approximately 30-50 m of trenching and ducting is completed in a day, dependent on conditions. Figure 3.4 illustrates a trench for a high voltage cable and Figure 3.5 illustrates reinstatement of the road.

Figure 3.1: 110kV Detail Circuit Trefoil Formation



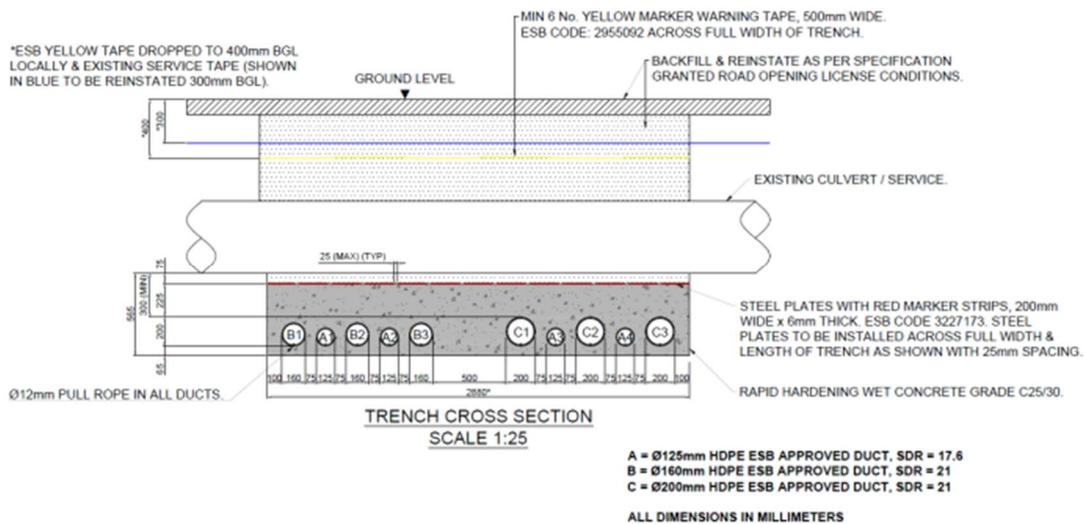
Source: ESB

Figure 3.2: 110kV/220kV Double Circuit Trefoil Formation Detail



Source: ESB

Figure 3.3: 110kV/220kV Double Circuit Flat Formation Typical Detail



Source: ESB

**Figure 3.4: Typical HV Trench Cross Section**



Source: ESB

**Figure 3.5: Reinstatement of Road Surface Over Trench**



Source: ESB

### 3.3.2 Cable Installation and Jointing

The cables will be brought to site on cable drums which will then be placed into position. Once the drum is set up, a winch system at the remote joint bay location(s), including pulling cable, will be attached to the nose of the cable and rollers will be used to guide the cable end towards the duct. The cables will then be pulled into the duct with lubrication being applied to the cable and duct throughout the process in order to control pulling tensions.

A bend radius of typically 20m or greater is used to navigate changes in direction for the cable route. The bend radius can be reduced to 6m to navigate very tight corners however as this introduces increased pulling tensions when installing the cable, it is used sparingly and only where required.

As detailed previously, joint bays will be required to be installed along the cable route to join consecutive lengths of cable and to facilitate cable pulling.

The width of the joint bays and the nature of the road network in the area means that road closures and diversions will be required in some areas along the route during construction and operation. However, all reasonable and practically achievable measures, such as moving of equipment and placing temporary covers over the trenches to allow essential access for vehicles, will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes. Specific traffic management requirements and localised arrangements will be developed by the appointed contractor(s) and will be agreed in advance of implementation with the appropriate local authority.

Joint bays generally consist of precast concrete walls and base located below ground with typical approximate dimensions of 8m length x 2.5m width x 2.3m depth for 220kV joint bays and 6m length x 2.5m width x 2.3m depth for 110kV joint bays. Sand or lean mix concrete may be used as a blinding layer to the underside of the chamber. The ducts will be installed to each end of the chamber, then proven, cleaned and sealed. Figure 3.6 illustrates a joint bay and Figure 6.7 illustrates the cable pulling.

**Figure 3.6: Completed Joint Bay prior to Cable Installation (pre-cast)**



Source: ESB

**Figure 3.7: Typical Set-Up of HV Cable Pulling Procedure**



Source: ESB

### 3.3.3 Cable Crossings (Water, Utility, Airport Lights etc)

A number of crossings will be required along the cable routes. These crossings will be facilitated by either open cut trenching or HDD and will be confirmed following the site investigation. For the purposes of the EIAR, the worst case has been assessed. HDD works have been confirmed at Stockhole Lane (Forest Little – Belcamp Option 2) and for the crossing of the M1 (Forest Little – Belcamp Option 1 and Option 2).

A description of open cut trenching and HDD methods is provided in section 6.4.3.1 and section 6.4.3.2. All works will be preceded by detailed confirmatory utilities / services location assessments, and where existing utilities / services are identified, the works will be diverted around the service / utility depending on the level of complexity arising.

The identification of crossings along the proposed cable routes has been based on consultations with utility providers, site walkovers, field studies and reviews of publicly available datasets such as Environmental Protection Agency (EPA) datasets and mapping. All crossings will be confirmed at construction stage and the mitigation detailed and proposed as part of this EIAR will be implemented when dealing with any such features.

#### 3.3.3.1 Open Cut Trenches at Water Crossings

Open cut water crossings have the potential to generate silt and suspended solids. In order to reduce the risk of discharging sediment it is proposed to carry out all of these works in a dry works area.

The dry works area will be isolated by installing an impermeable barrier between the watercourse and the works area. The impermeable barrier will be tailored to the watercourse in question. Techniques include the use of inflatable dams, frame dams or, in smaller watercourses, sandbags (double-bagged and underfilled; containing only clean washed sand).

Water pumped from the dry works area will be treated using settlement tanks to remove sediment prior to discharge back to the watercourse. In consultation with Inland Fisheries Ireland (IFI), greater filtration of silt may be achieved prior to discharge, through proposed use of silt de-watering bags which trap silt and expel only clean water and can be left to biodegrade on riverbanks as a habitat enhancement measure.

Water will be conveyed over the isolated section of channel by pumping or the use of a temporary diversion. Where sufficient capacity is available, and there is no risk of excessive scour, the diversion will be within the footprint of the existing channel.

The existence of a temporary impermeable barrier within the channel, will have a direct impact on the cross section of the channel and is expected to give rise to localised changes in water depth, velocities and sediment erosion / deposition.

Where open trenching is proposed, site restoration works will be carried out following completion of the crossing, in agreement with IFI. These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation.

Open cut trenching works will not be carried out during extreme rainfall or high flow events. Met Éireann provides a 5-day weather forecast via its website ([www.met.ie](http://www.met.ie)) and works will not take place at least during yellow, orange and red weather warnings. The Contractor's Environmental Clerk of Works (EnCOW) will monitor this daily and will provide reports for audit.

Unless otherwise agreed with IFI, any element of the works requiring instream works will be restricted to the fisheries open season (i.e. restricted to July to September inclusive). Where trenching (instream) works are proposed, electrofishing may be required to remove fish under licence from IFI. Method statements will be developed in agreement with IFI for the works.

#### 3.3.3.2 Horizontal Directional Drilling

HDD technology has been widely used in the oil and gas industries for several decades. It has become more commonplace in recent times in municipal engineering projects, such as for the installation of electrical cables, optical cables and potable water pipes. Competent specialist contractors will be appointed to undertake the work.

The HDD Contractor will conduct the drilling works in a safe and controlled manner with due regard for site constraints including environmental issues. The Contractor will be required to ensure that their proposed works do not adversely affect, existing services / utilities, groundwater / aquifers.

The HDD compounds consist of launch and reception pits as the drilling rig requires the temporary installation of a level hardstanding area on a geotextile base. A pilot hole will be drilled from one side of the crossing to the other side while supporting the bored hole with bentonite. The drill bit will be oriented by the surveyor, and the driller will push the drill string into the ground to maintain the bore path. A steering system, guided by tri-axial magnetometers and accelerometers that provide real time directional information to the surveyor at the driller's console, will be used to navigate the bores.

The drilled cuttings will then be flushed back by the drill fluid flowing via nozzles in the drill bit, up the annulus to the surface, where they will be separated from the fluid fraction for disposal. A comprehensive closed-loop drilling fluid mixing and circulation system with recycling capability will be utilised to minimise the volume of fluids required on site.

Constant monitoring by the specialist drilling team of fluid volume pressure, pH, weight and viscosity will be carried out. The volume of cuttings produced will also be monitored to ensure that no over cutting takes place and that hole cleaning is maintained. The mud returns will be pumped to the circulation system trailer by means of a banded centrifugal pump. The nature of the cuttings will also be monitored to understand the ground conditions as the drilling progresses.

After the initial pilot hole is completed, it will be reamed in a number of passes to reach the required bore size to enable the cable ducts to be pulled through. To ensure that the prevailing geological conditions have suitable cohesion that can maintain the bore during the drilling and reaming process, close attention will be paid by the specialist drilling team to modelled drag forces during pullback with constant monitoring of load stress undertaken to ensure that modelled tensile stress, collapse pressures, hoop stress and buckling stress are not exceeded. In addition to the above measures, the rate of drilling progress will be monitored to assist with the identification of any voids or changes in strata.

On completion of the works, the stone and geotextile will be carefully removed using a back-hoe or 360° excavator and removed off-site to an appropriately permitted waste facility. The site will then be reinstated to its original condition.

There are limitations in entry angle and radius of curvature for drilling and often accommodating these to match favoured ground conditions can be challenging. The advantage with this method is that a number of standalone cable ducts can be provided as required with suitable separation to meet the preferred requirement. Unlike other installation techniques, a key advantage of HDD is that shafts are not required, but only entry / exit transition pits.

The Contractor will monitor river / stream flows upstream and downstream of any directional drilling of watercourse crossings. The flow monitoring will be undertaken on a daily basis for five working days prior to the directional drilling, during the directional drilling and for five working days following completion of the directional drilling. The Contractor will record the results of such monitoring, and provide these to ESB and the local authority and as required by any conditions. If a measurable increase in losses from the watercourse to ground is observed in the reach where the directional drilling took place, bed lining will be undertaken if required by IFI.

### 3.3.4 Temporary Construction Compounds

The installation of underground ducting and cables will require temporary construction compounds to accommodate temporary storage, contractor offices, etc. These compounds are

typically, but not always, located in close proximity to the works area. Generally, these compounds are selected by the appointed contractors for the project based on a variety of factors, including operational requirements. Contractors are not appointed until planning permission has been secured and contracts have been signed for a particular project.

In the case of this project, given the passage of time between when preparation of this application for planning approval and when construction would commence, which will be a number of years, specific temporary construction compound locations cannot be identified in the planning application drawings, nor can specific locations be considered in the EIAR.

However, it is recognised that where a project is the subject of EIA, temporary compounds must be assessed and planning approval sought where required. It can sometimes be the case that construction compounds may already exist and are approved so it is not always necessary to seek further approval.

While this EIAR does not assess the impact of temporary construction compounds at specific identified locations, the contractor will ensure that the following environmental parameters will be complied with. The temporary compounds will form part of separate planning application(s). Area of existing hardstanding will be used where possible. The parameters which the temporary compound will comply with are:

- Compounds will not be located within 100m of proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs)
- Compounds will not be located in areas of semi natural habitats of significant local biodiversity value or in locations that will disturb protected fauna breeding sites, determined following ecological surveys
- Compounds will not be located in or within the zone of notification of archaeological sites or sites of architectural heritage including National Monuments, Sites with Preservation Orders, listed in the Record of Monuments and Places (RMPs), Areas of Archaeological Potential, RPSs, Architectural Conservation Areas, NIAH structures
- There will be a requirement for a programme of monitoring of any greenfield or off-road groundworks including those associated with temporary construction compounds, which will be agreed with the planning authority
- Compounds will not be located within a flood zone and will be located a minimum of 50m from watercourses
- Where there is linkage between a compound location and drains leading to rivers, bunding and silt fencing must be installed to prevent run off from entering downstream watercourses
- Where bedrock is likely to be encountered and excavated, compounds should not be located in vicinity of karst features. Sanitary facilities will not be in proximity to karst voids, and vehicle activity near karst voids is to be avoided in case of collapse
- Compound exits and entrances will not compromise road safety and there must be sufficient capacity on the road network
- The location of compounds will be removed from residential areas where possible to ensure noise and lighting do not significantly affect residents or other sensitive receptors
- The location of compounds will be away from air sensitive receptors as far as practicable to avoid adverse construction air quality impacts to sensitive receptors.
- The storage of dusty material in the compounds will be covered by impervious sheeting or water suppression will be applied to avoid wind erosion to air sensitive receptors.

All temporary construction compounds will be secured with hoarding / fencing around their perimeter as appropriate. Temporary construction compounds will include facilities such as construction phase car parking and welfare facilities and temporary material storage areas as

necessary. Any discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility, located in the wider area.

Where an access road is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed and the land will be reinstated to its original condition.

All construction workers will be required to use the designated access / egress routes only.

Storage of fuel and refuelling will be undertaken within bunded areas. Water will be brought to site via tankers as required.

Security lighting will be directional and cowled. The Contractor will regularly review security lighting in this regard, to inform adaptive management if necessary and report the monitoring findings regularly to ESB and the local authority.

### 3.3.5 Passing Bays

During the construction phase of the proposed development, where a joint bay is required within the road, the provision of a passing bay at the location of the joint bay will facilitate the through movement of traffic along the road, as required. This will be by means of single traffic signalled lane or stop/go system at the joint bay, during the construction /installation phase.

The installation of the passing bay entails the removal of the top layer of ground to the side of the carriageway and temporarily storing it locally to the side for reinstatement following the works (to include hedgerow re-instatement). The passing bays will then be constructed to a standard agreeable to Fingal County Council/Dublin City Council.

Where the road width is still not sufficient, a road closure may be required to undertake the work. Further detail on proposed road closures and diversions is provided in the construction phase Traffic Management Plan provided in Appendix D, as an appendix to the Construction Environmental Management Plan.

### 3.3.6 Construction Traffic

The total number of construction staff on-site will vary during the construction phase of the works but is expected to peak at approximately fifteen (15) persons. Four per trenching and ducting crew, two traffic management personnel per crew, one surveyor, one junior engineer and one senior engineer / project manager.

The estimated traffic movements associated with installation of the cable are presented in Table 3.1. The ultimate approach will be determined by the appointed Contractor, within the parameters assessed in this EIAR. No abnormal loads are anticipated to be required for the installation of the UGC.

The estimated average daily HGV traffic generation by number of vehicles and movements (one movement = one inbound journey + one return journey) per HV cable section are detailed in Table 3.1.

**Table 3.1: Average Daily HGVs**

HV Cable Route	Civil		Electrical	
	HGVs	HGV Movements	HGVs	HGV Movements
110 kV Newbury – Ballystruan; and	26	52	3	6

HV Cable Route	Civil		Electrical	
	HGVs	HGV Movements	HGVs	HGV Movements
110 kV Ballystruan – Forest Little.	26	52	3	6
110 kV / 220 kV Forest Little – Belcamp Option 1	42	84	7	14
110 kV / 220 kV Forest Little – Belcamp Option 2	29	58	0*	0*

Source: Mott MacDonald

\*The joint bays are off road, resulting in a 0 daily average

In general, it is anticipated that construction will occur during normal working hours i.e. Monday to Friday 07:00 to 19:00 hours and 08.00 to 17.00 on Saturday. However, the working hours may be dictated by either the planning conditions or conditions contained within the road opening licenses, if granted. Night working may also be a requirement in highly congested areas and these works will be completed in full compliance with the local authorities' requirements. There may be instances where extended hours / days are required however should working outside these hours / days be required they will only be undertaken with prior agreement with all relevant statutory authorities.

### 3.3.7 Construction Programme

The power supply for the MetroLink project is anticipated to be required in the 2030s, consequently, it is proposed that the associated cabling works associated will be undertaken in two stages/phases, namely a civil phase, and an electrical phase.

The civil phase will be undertaken at the earliest opportunity, while the electrical phase will be undertaken at later date when the MetroLink infrastructure requires it.

The following are indicative timelines for construction of the underground cables:

- Newbury to Ballystruan - Subject to the grant of statutory approval, it is anticipated that the construction phase will commence in Q2 of 2030 and the construction works (civil) will be complete in Q1 of 2031.
- Ballystruan to Forest Little - Subject to the grant of statutory approval, it is anticipated that the construction phase (civil works only) will commence in Q3 of 2026 and the construction works (civil) will be complete in Q4 of 2027.
- Forest Little to Belcamp - Subject to the grant of statutory approval, it is anticipated that the construction phase (civil works only) will commence in Q3 of 2027 and the construction works (civil) will be complete in Q1 of 2029.

**Table 3.2: Indicative Programme**

	Newbury – Ballystruan	Ballystruan – Forest Little	Forest Little – Belcamp (option 1)	Forest Little – Belcamp (option 2)
<b>Civil Works</b>				
Pre-construction	6 weeks	6 weeks	6 weeks	6 weeks
Trenching and ducting works and temporary reinstatement	16 weeks	40 weeks	48 weeks	24 weeks

	<b>Newbury – Ballystruan</b>	<b>Ballystruan – Forest Little</b>	<b>Forest Little – Belcamp (option 1)</b>	<b>Forest Little – Belcamp (option 2)</b>
(based on two crews)				
Joint Bay Installation & temporary reinstatement	7 weeks	9 weeks	18 weeks	9 weeks
Permanent Reinstatement of trench	3 weeks	8 weeks	7 weeks	4 weeks
<b>Total</b>	<b>32 weeks</b>	<b>63 weeks</b>	<b>79 weeks</b>	<b>43 weeks</b>
<b>Electrical Works</b>				
Pre-construction works	3 weeks	3 weeks	3 weeks	3 weeks
HV cable joint bay re-excavation (min 3 max 5 at time)	7 weeks (jointing works in parallel after initial 5 JB's open)	7 weeks (jointing works in parallel after initial 5 JB's open)	10 weeks (jointing works in parallel after initial 5 JB's open)	5 weeks (jointing works in parallel after initial 5 JB's open)
Proving of ducting / HV cable installation	7 weeks	8 weeks	14 weeks	7 weeks
HV cable jointing	6 weeks	9 weeks	17 weeks	8 weeks
HV cable commissioning (sheath test, cross bonding and HV/AC testing)	3 weeks	3 weeks	3 weeks	3 weeks
Permanent Reinstatement of Joint Bays (Civil Contractor)	6 weeks	6 weeks	11 weeks	5 weeks
<b>Total</b>	<b>32 weeks</b>	<b>36 weeks</b>	<b>58 weeks</b>	<b>31 weeks</b>

### 3.3.7.1 Traffic Management Plan

The appointed Contractor will further develop the Traffic Management Plan (TMP) based on the information provided within the Appendix D of this CEMP, in ongoing consultation with Fingal County Council and Dublin City Council. The TMP is considered a 'live' document and as such, may be subject to iterative updates in consultation and agreement with the two Local Authorities, as part of ongoing review (throughout the construction phase of the proposed development). This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified in the application documentation. The implementation of the TMP will mitigate potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through the CEMP.

### 3.3.7.2 Construction Resource Waste Management Plan

Prior to commencement of the development, the appointed Contractor will implement the Construction Resource Waste Management Plan (appended to this CEMP), which will ensure that optimum levels of waste prevention, reduction, re-use, recycling, and recovery are achieved throughout the duration of the proposed development. As with the CEMP and TMP, the CRWMP may be subject to iterative updates in consultation and agreement with the two Local Authorities, as part of ongoing review (throughout the construction phase of the proposed

development). This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified in the application documentation.

The plan has been prepared in accordance with waste management guidance and principles as outlined in Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021) and Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015).

All operations at the site will be managed and programmed in such a manner as to prevent / minimise waste production and maximise upper tier waste management (i.e. re-use, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible.

The requirement to develop, maintain and operate the CRWMP will form part of the contract documents for the proposed development and will be updated by the appointed Contractor in advance of the commencement of construction activities on site. Waste sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery/disposal in a manner which will not adversely affect the environment. All employees will be required to comply with the obligations under this CRWMP.

### **3.3.8 Environmental Clerk of Works**

The Contractor's Environmental Clerk of Works (EnCoW) will have suitable environmental qualifications. The EnCoW will have the necessary experience and knowledge appropriate to the role (including experience of HDD and will be a member of a relevant professional body, such as the Institute of Environmental Management and Assessment (IEMA)). The suitability of qualifications/ experience of proposed EnCoW will be confirmed by a senior/ principal environmental / ecologist person from the Employers Representative. The EnCoW will be delegated sufficient powers under the construction contract so that they will be able to instruct the Contractor to stop works and to direct the carrying out of emergency mitigation / clean-up operations. The EnCoW will also manage consultation with environmental bodies including the NPWS and IFI. The EnCoW will be responsible for carrying out regular monitoring of the Contractor's CEMP and will report monitoring findings in writing to ESB on a regular basis (at least weekly, but immediately in the case of incidents or accidents).

### **3.3.9 Description of the Construction Phase (Substation Interface)**

The proposed underground cables will connect into two existing substations (Newbury 110kV substation and Belcamp 220kV substation) and two proposed substations (Forest Little 110kV substation and Ballystruan 110kV substation) which form part of the MetroLink RO application. The ducting will be brought to the wall of the Gas Insulated Switchgear (GIS) substation buildings and pass through ducts into the cable pit and then connect into the GIS switchgear on the first floor of the GIS building. The ducts will then be sealed.

## 4 Control Measures

### 4.1 Introduction

The following sections detail the minimum control (mitigation) measures that will be implemented prior to commencement and throughout the duration of the proposed works.

As detailed in Section 1.2 *Purpose of this CEMP*, the Contractor's CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in this CEMP in addition to specified conditions that may be prescribed in any grant of consent, measures outlined in the NIS and the EIAR and any commitments given by ESB in relation to environmental protection associated with the activities outlined in this CEMP.

All mitigation measures will be implemented under the supervision of an Environmental Clerk of Works (EnCoW) whom will be appointed by the Contractor (the Contractor's EnCoW).

### 4.2 General Site Environmental Rules

- The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works.
- All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648) and under the supervision of an Environmental Clerk of Works (EnCoW).
- All mitigation will be implemented under the supervision of the Contractor's EnCoW.
- The EnCoW will carry out daily inspection of works areas for evidence of pollution, and areas where corrective action is required

### 4.3 Construction Environmental Management – Measures to be Implemented

Table 4.1 details the mitigation measures in the EIAR.

**Table 4.1: Mitigation Measures**

Phase	Mitigation and Monitoring
<b>Chapter 7 Population and Human Health</b>	
7.1	Construction activities have the potential to create a nuisance and cause disruption. All work will be carried out having regard to international and national legislation, and best practice guidance, as detailed in the topic-specific chapters of this EIAR.
7.2	A CEMP is included in Appendix D of this EIAR. The CEMP will be implemented by the contractor in consultation with ESB to safeguard the environment, site personnel, and nearby sensitive receptors, i.e. occupiers of residential and commercial properties, from site activities that may cause harm or nuisance. ESB have engaged with landowners directly affected by the proposed development and will continue to liaise with landowners throughout the construction period.
7.3	<b>Construction</b> The appointed contractor(s) (in collaboration with ESBN) will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This is likely to include the circulation of information about ongoing activities; particularly those that could potentially cause a disturbance, including due to traffic. A telephone number will be provided and persons with appropriate authority to respond to calls and resolve or escalate any problems arising will be available.
7.4	The appointed Contractor will also implement the Traffic Management Plan included as Appendix D1 of this EIAR, which will be finally agreed upon with Fingal County Council, Dublin City Council and ESB to mitigate any potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through the site CEMP.
7.5	There are no specific mitigation measures required to ameliorate potential impacts on population and human health in addition to the measures specified in other chapters of this EIAR. Specific measures to mitigate likely significant impacts on human health during the construction phase (i.e. Noise and Vibration, Air and Climate, Water, The Landscape, Traffic and Major Accidents and/or Disasters) are dealt with separately in the relevant chapters in this EIAR.
7.6	<b>Operational</b> The location and nature of the proposed development is not expected to have a permanent impact on the population of the area and wider environs. The 110 kV cable will not require specific or routine maintenance activities along the cable trench or joint bay locations. Access may be required on a rare occasion to facilitate cable replacement if a failure occurs. Annual access will be required to link boxes and communications chambers for inspection and maintenance. These works will be temporary and result in imperceptible effects due to nuisance in the event that traffic management is required.
7.7	It is clear from freely available scientific information that the maximum magnetic field generated from the HV UGC will be well below the ICNIRP guidance limit.
<b>Chapter 8 – Land, Soils &amp; Hydrogeology</b>	
8.1	<b>Construction</b> Design and construction best practice mitigation measures are specified in the Land, Soils & Hydrogeology chapter and include the following: During the construction phase, the Construction Environmental Management Plan (CEMP) specifies the range of measures to avoid and minimise impacts that may occur in construction. This requires the appointed contractor to have in place appropriate consents for works that could affect groundwater and to implement specific measures to protect groundwater dependant springs and boreholes, including control of silt-laden runoff. CEMP measures of relevance to soils geology and hydrogeology include:

Phase	Mitigation and Monitoring
8.2	Soil management: Excavated soil material for reuse will be stored at least 15m from drains and watercourses with silt fencing to prevent contaminant runoff. The Construction Waste Management plan specifies that excavated soil material, if not being reused will be disposed of offsite to licenced waste facilities.
8.3	Dewatering: Ground water and surface water accumulating in the base of trenches will not be pumped directly to roadside drains or watercourses unless it is clean and free from solids. Trench and joint bay dewatering will be pumped through silt socks to percolation areas if the soil is not saturated. Otherwise a settlement tank will be used. Contaminated water will either be tankered off site for disposal in a licensed facility or pumped to a portable on-site settlement tank for treatment.
8.4	Bentonite injection: Bentonite grout injection will occur within a bunded pit inside the cable trench. Unused bentonite grout and any spillages within the pit will be removed off site for disposal under licence in an approved facility. The construction team undertaking this work will be made aware of the contaminant risks associated with the use of the material.
<b>Monitoring Measures:</b>	
8.5	The following pre-construction survey of wells, springs and groundwater abstractions will be undertaken.
8.6	Water level monitoring will be undertaken pre-construction, during construction and post-construction for wells and springs which may be impacted by dewatering, such as St Doolagh's Well and St Catherine's Pond.
8.7	Water quality and water level testing will be undertaken pre-construction, during construction and post-construction for identified drinking water abstraction sources which may be impacted by construction activities.
8.8	Bentonite grout injection will be carefully monitored during and post-construction.

### Chapter 9 - Surface Water & Flooding

<b>General</b>	
The following mitigation measures will be implemented prior to commencement and throughout the duration of the proposed works.	
9.1	<ul style="list-style-type: none"> <li>An on-site Environmental Clerk of Works (EnCoW) will be appointed prior to commencement of works.</li> </ul>
9.2	<ul style="list-style-type: none"> <li>Confirmatory pre-construction surveys will be carried out and seasonal constraints will be confirmed in agreement with IFI and National Parks and Wildlife Service (NPWS) and Fingal/Dublin City Council, as appropriate.</li> </ul>
9.3	<ul style="list-style-type: none"> <li>Works will be carried out in accordance with the guidelines set out by IFI in 'Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016).</li> </ul>
9.4	<ul style="list-style-type: none"> <li>The IFI Biosecurity Protocol for Field Survey Works will be complied with.</li> </ul>
9.5	<ul style="list-style-type: none"> <li>Works will not be carried out during extreme rainfall or high flow events and watercourse crossings managed to minimise impact on flood risk. . Plant and materials within the flood plain will be removed in the event of extreme rainfall or high flow events.</li> </ul>
9.6	<ul style="list-style-type: none"> <li>The Contractor's EnCoW will monitor watercourse levels during construction, and if extreme watercourse levels are forecast then works will be programmed to avoid such times.</li> </ul>

Phase	Mitigation and Monitoring
9.7	<ul style="list-style-type: none"> <li>In the case of a warning of a flood event, plant and materials vulnerable to flooding in 'at risk' construction compounds will be relocated to parts of the compound that are considered to be not at risk of flooding.</li> </ul>
	<b>Surface Water Quality Protection Measures</b>
	The following water quality mitigation measures will be implemented prior to commencement and throughout the duration of the works:
9.8	<ul style="list-style-type: none"> <li>Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location i.e. the more times a piece of ground is tracked, the more likely it is that vegetative cover will be removed and ruts will be created that will act as miniature rivers where dirty water will flow.</li> </ul>
9.9	<ul style="list-style-type: none"> <li>Tracking beside streams and tracks will be avoided to avoid damage to the bankside.</li> </ul>
9.10	<ul style="list-style-type: none"> <li>A buffer zone of 15m will be maintained between storage and working areas and watercourses, taking account of the minimum working area required to facilitate the works. Laydown areas within flood risk zones will be minimised, but where necessary will be managed so that potential obstructions are removed in the event of an adverse weather warning</li> </ul>
9.11	<ul style="list-style-type: none"> <li>The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable.</li> </ul>
9.12	<ul style="list-style-type: none"> <li>Re-instatement method statements will be subject to approval by the EnCoW.</li> </ul>
9.13	<ul style="list-style-type: none"> <li>Concrete will be brought to site by covered truck. Wet concrete operations adjacent to watercourses will be avoided where possible.</li> </ul>
9.14	<ul style="list-style-type: none"> <li>The Contractor will ensure that all concrete truck wash watering / cleaning is undertaken offsite where possible and remote from watercourses.</li> </ul>
9.15	<ul style="list-style-type: none"> <li>In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed:</li> </ul>
9.16	<ul style="list-style-type: none"> <li>o All collected waste will be managed in accordance with the Waste Management Act 1996, and associated Regulations:</li> </ul>
9.17	<ul style="list-style-type: none"> <li>o Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces;</li> </ul>
9.18	<ul style="list-style-type: none"> <li>o Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces;</li> </ul>
9.19	<ul style="list-style-type: none"> <li>o All tanks and drums will be bunded in accordance with established best practice guidelines; and</li> </ul>
9.20	<ul style="list-style-type: none"> <li>o Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works.</li> </ul>
9.21	Temporary construction compounds shall not be located within a flood zone and will not be located within 25m of a watercourse. This is to minimise the impact on flood risk and reduce the flood risk to construction plant and materials.
9.22	Silt fences (to Hy-TEX Premium specification or similar) and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of same will be determined by the EnCoW.
9.23	Site restoration post works will be carried out, in agreement with IFI. These works may include riverbank stabilisation, gravel replacements etc. In all cases, the site will be restored post installation.
	<b>Silt Control Measures</b>
9.24	Silt control measures will be used to control silt generated from activities on site and prevent it gaining access to surface drainage which could convey silt to larger streams and watercourses.

Phase	Mitigation and Monitoring
9.25	Silt control measures include silt traps which can be located in small drains where flow is small and silt fences where runoff from large areas needs to be controlled.
9.26	Silt fences must be installed in the working areas and not at the watercourse.
9.27	Access routes will be delineated such that an appropriate set back distance from watercourses is maintained. Where works are to be undertaken adjacent to watercourses the setback distance will be delineated by the EnCoW on site.
9.28	Where distances between the works and watercourse allow, a minimum setback distance of 30m from the watercourse will be maintained.
9.29	Where the site is constrained, the best available set back distance will be employed taking account of the minimum working area required to facilitate the works.
	<b>Silt Fences</b>
9.30	Silt fences will be installed downslope of the area where silt is being generated on disturbed ground.
9.31	To be effective the silt curtain must contain the area where silt is generated and must terminate on high ground (i.e. an elevated area not in the watercourse).
9.32	Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh.
9.33	The base of the silt fence will be bedded at least 15-30 cm into the ground at two metre intervals.
9.34	Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains.
9.35	The integrity of the silt fencing will be checked daily by the EnCoW and after poor weather conditions (rain or wind) and any failures rectified immediately.
9.36	Two lines of silt curtain / fence will be installed, where considered necessary, by the EnCoW.
9.37	Any build-up of sediment along the fence boundary will be removed daily.
9.38	Silt fences will be maintained until vegetation on the disturbed ground has re-established. Re-instatement method statements will be subject to approval by the EnCoW.
9.39	The silt fencing must be left in place until the works are completed (which includes removal of any temporary ground treatment).
9.40	Silt fences will not be removed during heavy rainfall.
9.41	The silt fence will not be pulled from the ground but cutaway at ground level and posts removed.
9.42	A record of when it was installed, inspected and removed will be maintained by the EnCoW.
	<b>Silt Traps:</b>
9.43	The purpose of the trap is to reduce the level of solids in the slowly flowing water. The silt trap works by allowing a build-up of water behind it slowing flow and allowing solids to settle out. The following requirements will apply:
9.44	<ul style="list-style-type: none"> <li>• Silt traps will only be placed in drains downstream of working areas where the volume of water flow is expected to be low.</li> </ul>
9.45	<ul style="list-style-type: none"> <li>• Silt traps will be made of terram or similar material, not mesh.</li> </ul>

Phase	Mitigation and Monitoring
9.46	<ul style="list-style-type: none"> <li>The trap will be staked into the banks of the drain / watercourse such that no water can flow around the sides.</li> </ul>
9.47	<ul style="list-style-type: none"> <li>The material will be bedded into the drain bed/watercourse to prevent water flowing beneath it.</li> </ul>
9.48	<ul style="list-style-type: none"> <li>The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it.</li> </ul>
9.49	<ul style="list-style-type: none"> <li>Inspections will be carried out daily; during the proposed works, weekly on completion of the works for at least one month, and after heavy rains, and monthly thereafter until bare areas have developed new growth.</li> </ul>
9.50	<ul style="list-style-type: none"> <li>Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom.</li> </ul>
9.51	<ul style="list-style-type: none"> <li>In sensitive areas a series of silt traps will be placed in the drain.</li> </ul>
9.52	<ul style="list-style-type: none"> <li>The silt trap will not be pulled from the ground but cutaway at ground level and posts removed.</li> </ul>
9.53	<ul style="list-style-type: none"> <li>A record of when it was installed, inspected and removed will be maintained by the EnCoW.</li> </ul>
9.54	<p>In terms of the operational and maintenance phase, this is likely to be limited and this will involve periodic inspection of key elements to confirm that these are operating as intended and whether any cleaning or remedial maintenance works are required.</p>
9.55	<p><b>Operational</b> Access to joint bays may be required on a rare occasion to facilitate cable replacement if a failure occurs, therefore effects on surface watercourses are not likely to occur.</p>
9.56	<p>For maintenance works in the vicinity of watercourses, the mitigation measures detailed for the construction phase will be implemented. There are no additional mitigation measures required for the operational and maintenance phase.</p>
<b>Chapter 10 Biodiversity</b>	
<b>Mitigation and Monitoring Measures</b>	
10.1	<p>Mitigation measures were designed having regard to the Mitigation Hierarchy. This is a sequential order of mitigation actions, whereby the preference for mitigation measures are as outlined below:</p>
10.2	<ul style="list-style-type: none"> <li>Avoidance: Steps to avoid harm to biodiversity</li> </ul>
10.3	<ul style="list-style-type: none"> <li>Minimisation: Where adverse effects cannot be avoided, action is taken to minimise these effects.</li> </ul>
10.4	<ul style="list-style-type: none"> <li>Compensation: Only considered after all possibilities for avoidance and minimisation of effects have been implemented.</li> </ul>
10.5	<p><b>Construction</b> Careful consideration has been taken throughout the design process to use existing infrastructure (e.g. ducting) and to follow existing roadways which will ultimately minimise potential impacts to the surrounding habitats. As such, substantial mitigation through avoidance and minimisation has already been achieved. Additional mitigation measures to further avoid and/or minimise the potential impacts are outlined hereunder.</p>
<b>Construction Phase</b>	
<b>Monitoring of Mitigation Measures</b>	
10.6	<p>During construction, monitoring will be carried out, and reported by the Contractors' Ecological Clerk of Works (ECoW), in agreement with the Employer's Representative Team, with regard for relevant conditions and licenses where required.</p>

Phase	Mitigation and Monitoring
10.7	Monitoring will take place at river crossings where instream works, and river bankside disturbance works are to take place. Monitoring will also be required where works are necessary in close proximity to stands of Invasive Species, potential roost features, and at badger setts.
10.8	The specific intervals at which the monitoring will take place will be determined by the relevant ecologist, having regard for licenses, and planning conditions.
<b>Ecological Clerk of Works (ECoW)</b>	
10.9	An Ecologist/ Ecological Clerk of Works (ECoW) will be employed by the Contractor to oversee implementation of mitigation and deliver toolbox talks and preconstruction ecology surveys, as appropriate. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented and impacts to KER habitats and other non-made ground habitats are minimise and avoided where practical.
10.10	The ECoW will be a full member of a relevant environmental institute, such as the Chartered Institute of Ecology and Environmental Management (CIEEM) and have demonstrable experience in ecological supervision and habitat restoration works.
<b>Construction</b>	The Contractor's ECoW will also ensure any disturbance licenses are arranged if any significant findings are determined from confirmatory pre-construction surveys outlined above. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and effects are minimised.
10.11	The Contractor's ECoW will also ensure any disturbance licenses are arranged if any significant findings are determined from confirmatory pre-construction surveys outlined above. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and effects are minimised.
10.12	Separate to the ECoW, or if the ECoW does not have appropriate experience, an Environmental clerk of works (EnCOW)/ Environmental Engineer, with appropriate experience of managing surface water runoff/ pollution control will be employed on the site. The EnCOW will have responsibility for ensuring water quality and other general environmental protection measures are suitable and appropriate, and that they are effectively monitored.
<b>Independent Environmental Clerk of Works (EnCoW)</b>	
10.13	An independent Environmental Clerk of Works (EnCoW) will be employed on behalf of the Employers Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor's ECoW.
<b>Pre-Construction Confirmation Surveys</b>	
10.14	Given the dynamic distribution of species and habitats over time, significant changes can arise between baseline surveys and construction. For example, invasive species distribution may change following treatment (such as sites observed under treatment along the Forrest Little – Belcamp route), or dispersal by humans, animals, or water.
10.15	<p>In advance of enabling works, the Contractor will commission pre-construction confirmatory surveys of identified significant ecological receptors, to update the findings of the surveys completed in 2022 and 2023. Surveys will specifically confirm updated distribution of, and inform any revisions to proposed mitigation for:</p> <ul style="list-style-type: none"> <li>● Demarcate Local Importance (Higher value) habitats and works areas for so to minimise impacts and monitor works</li> <li>● Badger setts at off road sections that bisect hedgerows</li> <li>● Potential bat roosts</li> <li>● Potential for Smooth Brome (rare flora) where works offroad in grassland type habitats;</li> <li>● Surface water flow and condition of watercourse crossings</li> <li>● Invasive species within the Zol of the proposed development;</li> <li>● Amphibians</li> <li>● Breeding birds</li> </ul>
<b>Pre-Construction</b>	

Phase	Mitigation and Monitoring
10.16	Invasive species surveys will be carried out having regard to Guidance of Transport Infrastructure Ireland .
10.17	The Contractor's ECoW will conduct confirmatory badger surveys having regard to Surveying Badgers <sup>10</sup> and record signs of badgers including tracks, hair, latrines and setts at locations where potentially active badger setts have been identified including;
10.18	Belcamp cable connection site and
10.19	South-West point on the boundary of the Dublin airport
10.20	The extent of survey area for badger surveys will be defined with regard to Guidelines for the Treatment of Badgers during the Construction of National Road Schemes <sup>11</sup> as 150m beyond all works areas within suitable habitat.
10.21	Should works progress within habitat identified as suitable for amphibians during the breeding season (February and March), a pre-construction confirmatory survey for frogs will be undertaken.
10.22	All surveys will be undertaken by a suitably qualified ecologist (s) who may be the Contractors ECoW, but who will have demonstrable experience in the survey and assessment of the feature. The results of pre-construction confirmatory surveys will inform the refinement of mitigation measures (if required) in Contractor method statements, and all results will be incorporated into Contractor's constraint mapping.
<b>Mitigation for the Compensation and Retention of Habitats</b>	
10.23	There is potential for retention of key habitat features, such as drainage ditch, scrub, treeline and hedgerow, and replanting of woody vegetation species to mitigate for the loss of scrub and hedgerow
<b>Landscaping Mitigation for Habitat Key Ecological Receptor Loss:</b>	
10.24	No specific habitat loss mitigation is required for watercourses. Mitigation pertaining to water quality is outlined in Chapter 10 – Biodiversity, section 10.8.1.8.
10.25	Clearance within scrub habitat will be kept to the minimum required to facilitate the works. This will be monitored by the EcOW and topsoil reinstated post works and allowed to regrow with brambles, grass and forbs available in retained topsoil.
10.26	Scrub/Marsh will be avoided, demarcated (if required) and monitored during works by the site EcOW
10.27	<b>Construction</b> Clearance within broadleaved woodland habitat will be avoided where possible and level of impacts outlined will not arise. This area will be avoided, demarcated (if required) and monitored during works by the site EcOW. Topsoil will reinstated post works and allowed to regrow with brambles, grass and forbs available in retained topsoil
10.28	Clearance of wet grassland will be avoided where possible and level of impacts outlined will not arise. This area impacted will be minimised and monitored during works by the site EcOW. Topsoil and turves will reinstated post works and regrow.
10.29	Clearance of treelines will be kept to the minimum required to facilitate works. Treelines on either side of areas removed for the cable route will be bolstered as outlined below to replace area lost.
10.30	Clearance of hedgerows will be kept to the minimum required to facilitate works. Hedgerows on either side of areas removed for the cable route will be bolstered as outlined below replace area lost. Hedgerows within passing bays (total of 165m) will be fully reinstated/ replanted with local hedgerow species e.g. hawthorn, blackthorn, hazel, holly and willow. These will be of native provenance.
<b>Reinstatement</b>	

Phase	Mitigation and Monitoring
10.31	Where reinstatement is not possible (i.e. within the line of the cable itself) treelines and hedgerows will be bolstered either side of the cable route to compensate for the loss.
10.32	Unless otherwise agreed with the Employer's Representative, the Contractor will re-instate hedgerows, and treelines, to a species-rich condition (i.e. five woody species per 30 m), comprising only native species suited to the locality. Reinstated hedgerows and treelines are to be protected from browsing damage by wildlife and livestock using tree guards and/or exclusion fencing, as appropriate.
<b>Construction</b>	The Contractor will seed all grassland verges with a native wildflower mix of Irish provenance (to specification of EC12 Wild Flora for Earth Banks, Bunds and Ditches).
10.33	All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, or similar verge seed mixes, under the supervision and direction of the ECoW. Plant species of native provenance will be used in all replanting of semi natural habitats. It is preferable from an ecology and pollinator perspective that no reseeding takes place and natural seedbank in reinstated topsoil regrow.
10.34	The Contractor will commit to a five year after-care plan for hedging, grassland, and agricultural reinstatement, or as otherwise agreed with the local authority.
10.35	The Contractor's agronomist will inspect, photograph and report in writing to the Employer's Representative on the establishment-phase of all vegetation.
<b>Operation</b>	The Contractor's agronomist will review, and advise on any corrective measures required to ensure good condition, immediately after reinstatement, and at least twice yearly thereafter for a five year period.
10.36	<b>Mitigation for the protection of Rare Plant Species</b>
10.37	Prior to works commencing a confirmatory survey for Smooth brome within grassland type habitats, where direct impacts will arise, will be carried out by an experienced botanist during its flowering season (optimal survey season for grass is between May and July). The botanist, to be appointed by the Contractor, will coordinate with the Contractors ECoW and, report findings to the ENCoW within the Client's Representative Team. The botanist will be contracted for a period lasting at least one year following the cessation of potentially damaging construction works at the plant location(s) (see monitoring below).
10.38	In the event where one or more plants are identified at risk of impact, an assessment of risk of impact will be carried out by the appointed botanist, in consultation with a NPWS grassland. The assessment will be specific to the species which identify any additional measures required to protect the species by either avoiding and protecting the plant species in situ, or (only as a last resort) through the translocation of the plant species to new receptor locations nearby, under licence from the NPWS. Any additional measures as outlined under the terms of the license will also be included.
10.39	For a period lasting at least one year following the cessation of potentially damaging construction works at the plant location(s), the appointed botanist will undertake quarterly site visits to photograph and document the success of the mitigation measures, and discharge any conditions associated with any license(s). Where issues regarding the establishment are encountered, the botanist will consult with the NPWS, in agreement with the Contractor and the Ecologist within the Employer's Representative Team, to identify reasonable steps to improve the chances of re-establishment.
10.40	<b>Mitigation for the Protection of Mammals</b>
10.41	<b>Mitigation for the Protection of Badger</b>
<b>Construction</b>	As outlined previously, prior to works commencing a preconstruction survey for badgers will be undertaken. Where active badgers setts have been identified within the Zol of the proposed development, the use of camera monitoring, setting of footprint traps, soft blocking of the sett entrance or similar will be required to confirm their presence.

Phase	Mitigation and Monitoring
10.42	A description of the setts i.e. main sett, annex sett, or outlier sett will be provided by the ECoW along with the level of activity at the sett. This will allow for an understanding of the importance of the setts in the wider context of the local population. As per the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes <sup>Error! Bookmark not defined.</sup> , where setts have been confirmed, no heavy machinery will be used within 30m of badger setts (unless carried out under licence from the NPWS).
10.43	Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
10.44	None of the above works will be undertaken within 50m of active setts during the breeding season (December to June inclusive). An assumption that the sett is active will apply unless proven otherwise during the course of investigation. Where works may interfere with the badger sett directly, exclusion will take place as per NRA guidelines.
<b>Mitigation for the Protection of Bats</b>	
10.45	The design and construction of bat mitigation measures herein has had regard for relevant documents including the NRA's "Guidelines for the Treatment of Bats During the Construction of National Road Schemes" <sup>1</sup> , the NPWS Bat Mitigation Guidelines for Ireland <sup>2</sup> , and (with specific regard to roosts in trees), the Bat Tree Habitat Key <sup>3</sup> .
10.46	Trees with suitability for roosting bats will not be felled in advance of surveying for bats, unless in agreement with the ECoW, and NPWS as relevant. Prior to felling of any trees, an initial bat survey of trees to be felled will be undertaken, by a licensed qualified specialist, to assess the suitability of the tree to contain bat roosts as per the documents cited.
10.47	<b>Construction</b>
10.48	Prior to construction, trees identified with potential roost features of a Moderate to High value will be thoroughly re-examined during confirmatory surveys, to ascertain the presence or absence of roosting bats. A licence will be sought from the NPWS, as required. Surveys will be conducted by an experienced bat ecologist. The trees will be examined for the presence or absence of bats / bat roosts immediately prior to felling. Features in trees identified from ground level as of medium or high suitability for, will be climbed and/or accessed by a Mobile Elevated Working Platform; and inspected using a digital endoscope to confirm the ground-level rating, and where possible identify presence of roosting bats. Where timing facilitates it (i.e. when felling is being undertaken during the active season for bats from May to September inclusive), emergence surveys may additionally be carried out to confirm presence or absence of roosting bats, subject to the advice of the bat ecologist, and any licence conditions. Where felling does not occur within one day of the examination, the trees will be re-assessed, unless otherwise agreed with the NPWS.
10.48	Where evidence of a roost, or roosting bats has been determined, a license for destruction of a roost and/or exclusion of bats will be required from the NPWS. The procedures for the exclusion of bats and destruction of roost as detailed in the license document will be obeyed, at all times, by the Contractor.
10.49	Where bat exclusions are required, they will be undertaken in accordance with the requirements of the bat specialist. They will not be carried out during the breeding season, between the months of June to August inclusive, or during hibernation in the months of November to March inclusive, unless under license from the NPWS. Where the felling of trees found to be suitable as bat roosts cannot be avoided, any mitigation conditioned by the NPWS (e.g. replacement bat roost features on public lands following consultation with the NPWS, and the local authority) will be and put in place at least one month in advance of any felling or disturbance.

<sup>1</sup> <https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Bats-during-the-Construction-of-National-Road-Schemes.pdf>

<sup>2</sup> <http://battreehabitatkey.co.uk/>

<sup>3</sup> Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Phase	Mitigation and Monitoring
<b>Mitigation for the Protection of Breeding Birds</b>	
10.50	The clearance of all vegetation (except vegetation with no nesting potential as determined by the ECoW), will take place outside of the breeding season for birds where possible or as determined by risk of disturbance to a nest site.
<b>Construction</b>	The ECoW or other suitably qualified ecologist will conduct further confirmatory pre-construction surveys to assess risk of disturbance to nesting birds to inform vegetation clearance activity. In the event where confirmatory pre-construction surveys confirm or presume nesting birds are present, an exclusion zone will be established around the nesting bird (to include the risk of abandonment due to indirect disturbance), and no vegetation clearance may proceed until young are presumed to have fledged, or nesting has failed. Confirmatory pre-construction surveys have a shelf life of 72 hours, after which repeat surveys will be required if vegetation has not been cleared.
10.51	
<b>Mitigation for the Protection of Amphibians</b>	
10.52	As outlined previously, pre-construction confirmatory survey for frog will be undertaken prior to works commencing during the common frog breeding season (February and March), at potential suitable breeding habitat (drains impacted).
10.53	When surveying for the species biosecurity measures will be followed to ensure that there is no incidental spread of vector borne diseases between waterbodies. This includes the cleaning, disinfection and drying of all equipment and will have regard to guidelines from Inland Fisheries Ireland <sup>4</sup> .
<b>Construction</b>	Should frogs be recorded, translocation of the species to suitable receptor sites will be undertaken, in consultation with the NPWS, and local authority where relevant. Any translocation of these species will be under licence by the NPWS.
10.54	
10.55	Where common frog is recorded within the footprint of the works, spawn will be captured and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat. Adult and young frogs are likely to flee disturbance and will not require translocation.
<b>Mitigation for the Protection of Watercourses</b>	
10.56	Mitigation for the protection of water quality with regard to sediment control is outlined in Chapter 9.
10.57	Construction works should nevertheless be carried out in accordance with the guidelines set out by IFI in 'Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016) in areas where watercourses are encountered.
10.58	Additionally, the open season (July-September) restriction for any instream works will apply at watercourse crossings along the Ballystruan – Forrest Little cable route, which coincide with the upper reaches of the River Ward.
10.59	Works method statements will be agreed with IFI for all watercourse crossings, following Geotechnical Investigation data review.
<b>Construction</b>	The works method statement may include details on silt fencing, pH monitoring requirements, and handheld turbidity monitoring. Stop works authority escalation, including during Met Eireann (Red, Orange, Yellow) warnings will be informed by turbidity and pH monitoring, and require agreement of the Contractors ECoW and the Employers Rep ENCoW (i.e ESNB) if inspections indicate mitigation at risk of not performing effectively.
10.60	
10.61	At a minimum, all pollution control measures will be designed, installed, and maintained in accordance with measures outlined below and under the supervision of the Contractor's Environmental Clerk of Works (EnCoW).
10.62	The pouring of concrete will be required during the construction phase. To prevent the runoff of concrete into nearby watercourses and drains, the following will be implemented.
10.63	No on-site batching will be permitted at the proposed works areas. Concrete will instead be transported to the site within a concrete truck.

<sup>4</sup> Inland Fisheries Ireland (2016) Guidelines on protection of Fisheries During Construction Works in and Adjacent to Waters.

Phase	Mitigation and Monitoring
10.64	Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses.
10.65	Concrete trucks will be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area.
10.66	Where concrete pours are to take place instream they will only take place within an isolated, dry, works area.
10.67	Where the isolated working area requires constant pumping to maintain a dry works area, pumps shall be turned off during the pour, and remain off until concrete has hardening negating a run-off risk; and such that the discharge will not result in a change in pH of +/-0.5 units.
10.68	Where concrete pours are required within a watercourse, the Contractors EnCoW will regularly monitor the pH of the watercourse during concrete works using a handheld pH meter. Should any change in pH +/-0.5 be detected concrete works shall immediately be ceased (handheld monitors will have maximum variance of +/- 0.1). The entry point to the watercourse will then be identified and implement appropriate measures to prevent further escape to the environment
10.69	The Contractor's EnCoW will ensure that covers are available for freshly poured concrete to avoid wash off in the event of rain.
10.70	Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal.
10.71	The Contractor will schedule concrete works during relatively dry weather conditions (i.e. when there are no active Met Eireann yellow, orange or red warnings) to reduce the elevated risk of runoff.
10.72	The Contractor's EnCoW will notify the Independent EnCoW employed within the Employer's Representative Team, the NPWS and IFI immediately of any concrete spills into watercourses.
<b>Mitigation to Prevent the Spread of Invasive Species</b>	
10.73	Japanese knotweed has been recorded within the ZoI of the proposed development. There is potential for additional stands of invasive species to be present within or adjacent to the works areas following establishment of new populations between baseline surveys, and construction.
10.74	Prior to works commencing a full invasive species survey will be carried out. The pre-construction invasive species survey will be carried out within the works areas, including compound locations and laydown areas, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas.
10.75	<b>Construction</b>
10.76	The invasive species survey will be carried out during the appropriate growing season (May – October). The findings of this invasive species survey will be incorporated into the measures below, by the Contractor's EnCoW and any specialists. Any stands of invasive species recorded within the ZoI will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer such that below ground growth is accounted for (4m for Japanese knotweed <sup>5</sup> buffer not required for other species). No works will be carried out within the exclusion zones unless approved by the Contractor's EnCoW.
10.77	The Contractor's EnCoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. The toolbox talk will take place prior to works commencing in any areas where Invasive Species have been recorded.
10.78	All machinery will be steam-cleaned prior to entering and before leaving site
<b>Additional Mitigation Measures included within the NIS/AA</b>	

<sup>5</sup> Fennell, M., Wade, M., Bacon, K., (2018); Japanese knotweed (*Fallopia japonica*): An analysis of capacity to cause structural damage (compared to other plants) and typical rhizome extension

Phase	Mitigation and Monitoring
10.79	<b>Ecological Supervision and Monitoring</b>
10.80	An ECoW will be employed by the Contractor to oversee implementation of mitigation and deliver toolbox talks, as appropriate. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.
10.81	The ECoW will be a full member of a relevant environmental institute, such as the Chartered Institute of Ecology and Environmental Management (CIEEM) and have demonstrable experience in ecological supervision and habitat restoration works.
10.82	The Contractor's ECoW will also ensure any disturbance licenses are arranged if any significant findings are determined from confirmatory pre-construction surveys outlined above. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and effects are minimised.
10.83	An independent Environmental Clerk of Works (EnCoW) will be employed on behalf of the Employers Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor's ECoW. These monitoring and survey reports will also be provided to the local authority or other parties where required by condition.
<b>Chapter 11 - Air</b>	
	<b>Air quality mitigation</b>
11.1	Construction activities associated with the proposed development with no mitigation are predicted to have:
11.2	A 'low' to 'high' risk for construction for 110 kV / 220 kV Forest Little – Belcamp – Option 1
11.3	A 'negligible' to 'medium' risk for construction for 110 kV / 220 kV Forest Little – Belcamp – Option 2
11.4	<b>Construction</b> A 'negligible' to 'medium' risk for construction for 110 kV Newbury to Ballystruan and
11.5	A 'negligible' to 'medium' risk for construction for 110 kV Ballystruan – Forest Little
11.6	Best practice mitigation measures adapted from the IAQM guidance are presented below. The potential dust risk of 110 kV / 220 kV Forest Little – Belcamp Option 1 are comparatively higher, therefore specific mitigation measures have been recommended for these two routes. These mitigation measures, or equivalent, will be incorporated into the proposed development's Construction Environment Management Plan (CEMP). The dust and emission control methods presented below will be agreed with the local authority and implemented effectively throughout the construction period.
	<b>For the 110 kV / 220 kV Forest Little – Belcamp Option 2, and 110 kV Ballystruan – Forest Little and 110 kV Newbury to Ballystruan</b>
	<b>Communication and Site Management</b>
11.7	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
11.8	<b>Construction</b> <ul style="list-style-type: none"> <li>• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager / engineer or the site manager.</li> </ul>
11.9	<ul style="list-style-type: none"> <li>• Display the head or regional office contact information.</li> </ul>
11.10	<ul style="list-style-type: none"> <li>• Develop and implement a dust management plan (DMP), which may include measures to control other emissions, approved by the Local Authority.</li> </ul>

Phase	Mitigation and Monitoring
11.11	<ul style="list-style-type: none"> <li>Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken.</li> </ul>
11.12	<ul style="list-style-type: none"> <li>Make a complaint log available to the planning authority, when requested.</li> </ul>
11.13	<ul style="list-style-type: none"> <li>Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book.</li> </ul>
<b>Monitoring</b>	
11.14	<ul style="list-style-type: none"> <li>Carry out regular site inspections, record inspection results and make an inspection log available to the planning authority, when requested.</li> </ul>
<b>Preparing and maintaining the site:</b>	
11.15	<ul style="list-style-type: none"> <li>Avoid site runoff of water or mud.</li> </ul>
11.16	<ul style="list-style-type: none"> <li>Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.</li> </ul>
11.17	<ul style="list-style-type: none"> <li>Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover with Hessian, mulches or trackifiers.</li> </ul>
11.18	<ul style="list-style-type: none"> <li>Cover, seed or fence stockpiles to prevent wind whipping.</li> </ul>
<b>Operations vehicles / machinery and sustainable travel:</b>	
11.19	<ul style="list-style-type: none"> <li>Ensure all vehicles switch off engines when stationary – no idling vehicles.</li> </ul>
11.20	<ul style="list-style-type: none"> <li>Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment, where practicable</li> </ul>
11.21	<ul style="list-style-type: none"> <li>Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.</li> </ul>
<b>Operations</b>	
11.22	<ul style="list-style-type: none"> <li>Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.</li> </ul>
11.23	<ul style="list-style-type: none"> <li>Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water, where possible and appropriate.</li> </ul>
<b>Mitigation specific to trackout:</b>	
11.24	<ul style="list-style-type: none"> <li>Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. Avoid dry sweeping of large areas.</li> </ul>
11.25	<ul style="list-style-type: none"> <li>Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.</li> </ul>
11.26	<ul style="list-style-type: none"> <li>Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.</li> </ul>
11.27	<ul style="list-style-type: none"> <li>Record all inspections of haul routes and any subsequent action in a site log book.</li> </ul>

Phase	Mitigation and Monitoring
11.28	<ul style="list-style-type: none"> <li>Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.</li> </ul>
11.29	<ul style="list-style-type: none"> <li>Access gates to be located at least 10 m from receptors where possible.</li> </ul>
<b>For the 110 kV / 220 kV Forest Little – Belcamp Option 1:</b>	
<b>Communication and Site Management</b>	
11.30	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
11.31	<b>Construction</b>
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	
<b>Monitoring:</b>	
11.32	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked.
11.33	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
11.34	<b>Operation and Maintenance</b>
During the operation phase of the proposed development, access may be required on rare occasion to facilitate cable replacement if failure occurs. Annual access to link boxes and communication chambers will be required for inspection and maintenance. Given the frequency of inspection and maintenance, the effects of operation road traffic contributions from the proposed development are considered negligible significance compared to the existing surrounding road traffic contributions on the local road network. There are no mitigation measures is required during operation phase of the proposed development.	
<b>Chapter 12 - Climate</b>	
<b>Physical climate risks</b>	
12.1	Climate resilience during the construction phase of the proposed development has been scoped out of the assessment. Any risks arising due to extreme weather events during construction will be addressed by appropriate measures in the Construction Environmental Management Plan (CEMP). This may include:
<b>Construction</b>	Procedures and precautions will be implemented for areas that may experience flooding, including use of temporary flood defence barriers and preparation of temporary demobilisation plans. These procedures will consider prolonged and intense rainfall events that may lead to staff safety risks or pollution risks where construction materials (e.g. dust, contaminants, metals, or oils) have potential to runoff into watercourses. This will consider likely surface water runoff routes and plans for the protection of plant such as fuel storage and materials stockpiles, and the demobilisation of vehicles and items of mobile plant;
12.2	

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12.3	Workforce health and safety plans and welfare management systems will be put in place by the contractor, including details to be outlined within works plans and task briefs as appropriate. This will consider periods of high temperatures that may lead to risks of heatstroke for construction staff and severe precipitation events that may lead to slips and falls;
12.4	Contingency plans will be in place for situations where flooding leads to restricted site access or key staff being unable to get to work, leading to construction delays;
12.5	Contingency plans will be in place for situations where storms, high winds or flooding lead to loss of mains power supply or communications, and the identification of safety critical risks and construction programme consequences; and
12.6	Include regular monitoring of flood alerts and weather warnings from Met Éireann
<b>GHG Assessment</b>	
The following mitigation measures apply in relation to construction impacts on climate change:	
12.7	Integrate GHG emissions reduction since the early design stage, promoting GHG saving opportunities when determining the definitive specifications of products, materials and layouts, and explore alternatives to achieve the desired development.
12.8	Take a planned approach focused on GHG emissions reduction, through the use of good construction practices and energy efficient processes and technologies, including the re-use or refurbishing of existing assets.
12.9	Promote fuel switching or substitution in transport of materials to site, as well as efficient route scheduling with suppliers.
12.10	Engagement with other stakeholders, to reduce resource and energy consumption and associated GHG emissions over the life cycle of this development.
12.11	Compensate unavoidable residual emissions.
<b>Physical Climate Risks</b>	
The assessment identified no significant risks were identified due to the embedded mitigation of the proposed development. Therefore, additional design measures to enhance resilience is not required.	
<b>GHG Assessment</b>	
The following mitigation measures apply in relation to operational impacts on climate change:	
12.12	As considered in Chapter 6, throughout the design and assessment process, all reasonable and practically achievable measures have been taken to minimise and avoid impacts, including design specifications and standards to minimise and avoid GHG emissions, as recommended IEMA and aligned with PAS 2080.
12.13	Implement the mitigation hierarchy recommended by IEMA, operating efficiently through the use of good practices and techniques that reduce resource and energy consumption.
12.14	Regular maintenance checks to ensure that the UGC are operating according to calculated efficiency rates and that best practice control measures will be implemented to mitigate against GHG emissions.

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12.15	Application of the circular economy hierarchy, in order to reduce, re-use, repair and recover when maintenance is undertaken, as well as use of good practices by value-chain members.
12.16	The annual GHG emissions will be driven by the operating profile of the proposed development. The total GHG emissions will therefore be minimised by increasing efficiency and reducing conductivity losses.
12.17	Engagement with other stakeholders, to avoid physical damages and losses, requiring additional repairs and materials.
12.18	Compensate unavoidable residual emissions
<b>Chapter 13 - Noise and Vibration</b>	
13.1	<p>A Construction Environmental Management Plan (CEMP) that includes noise and vibration mitigation is included in Appendix D.</p> <p>The impact of noise and vibration on nearby sensitive receptors within the vicinity of the proposed development will be controlled by implementation of the principal of Best Practicable Means (BPM). This will be achieved by undertaking construction activities in accordance with good practice set out in BS 5228-1/2:2009+A1:2014. The preferred approach for controlling construction noise is to reduce source levels where possible but with due regard to practicality.</p>
13.2	<p>Measures that will be implemented include the following:</p> <ul style="list-style-type: none"> <li>• Selecting quiet equipment;</li> </ul>
13.3	<ul style="list-style-type: none"> <li>• Ensure equipment is maintained, in good working order, and is used in accordance with the manufacturer's instructions;</li> </ul>
13.4	<ul style="list-style-type: none"> <li>• Members of the construction team should be trained and advised during toolbox briefings on quiet working methods;</li> </ul>
13.5	<ul style="list-style-type: none"> <li>• Equipment shall not be left running unnecessarily;</li> </ul>
13.6	<ul style="list-style-type: none"> <li>• Equipment shall be fitted with silencers or mufflers where possible;</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>• Use plant enclosures whenever feasible;</li> </ul>
13.8	<ul style="list-style-type: none"> <li>• Materials shall be lowered instead of dropped from height;</li> </ul>
13.9	<ul style="list-style-type: none"> <li>• Inform nearby sensitive receptors in advance of construction activities and keep them up to date with progress and changes;</li> </ul>
13.10	<ul style="list-style-type: none"> <li>• Give nearby sensitive receptors a point of contact from the contractor; the contact should liaise with residents and maintain good communication between nearby residents and the contractor; and</li> </ul>
13.11	<ul style="list-style-type: none"> <li>• Utilising low vibration working methods.</li> </ul>
<b>At construction compounds, the following mitigation measures will be implemented:</b>	
13.12	<ul style="list-style-type: none"> <li>• Manage deliveries to prevent queuing of traffic at access points;</li> </ul>
13.13	<ul style="list-style-type: none"> <li>• Use of adjustable or directional audible vehicle-reversing alarms and/or alternative warning systems (i.e. white noise alarms);</li> </ul>
13.14	<ul style="list-style-type: none"> <li>• Imposition of suitable speed limit at construction compound to minimize noise from vehicle movements; and</li> </ul>

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13.15	<ul style="list-style-type: none"> <li>Implementation of site hoarding.</li> </ul>	
13.16	<p>Night works are not recommended at areas with high residential density. Where night working is unavoidable, in addition to mitigation proposed above, the following mitigation measures will be implemented:</p>	
13.17	<ul style="list-style-type: none"> <li>details of night working, including likely duration, start and completion dates, be clearly communicated to nearby noise sensitive receptors;</li> </ul>	
13.18	<ul style="list-style-type: none"> <li>avoid or limit the use of particularly noisy plants during these periods;</li> </ul>	
13.19	<ul style="list-style-type: none"> <li>temporary noise screens will be used at construction areas close to noise sensitive receptors to reduce noise disturbance.</li> </ul>	
13.20	<p>Good public relations are invaluable in securing public acceptance of construction noise. People are more tolerant of noise if they understand the reason behind it, the likely duration, start and completion dates, and mitigation measures used to minimise noise levels. Letter box drops explaining the proposed works will be implemented. A dedicated site contact will be nominated to liaise with residents and establish good rapport. A complaint handling procedure will also be put in place.</p>	
13.21	<p><b>Operational</b></p>	
<p>There are no anticipated noise and vibration impacts associated with the operational phase of the proposed development and therefore no mitigation is required.</p>		
<p><b>Chapter 14 – The Landscape</b></p>		
14.1	<p><b>Construction &amp; Operation</b></p>	
<p>Landscape and visual mitigation measures are not considered necessary in relation to the UGC routes as there will be no material effects from the operational stage underground elements. Likewise, for temporary / short term elements of the project, including the visual elements required during the construction stage, specific landscape and visual mitigation measures are not considered necessary</p>		
<p><b>Chapter 15 - Archaeology Architectural Cultural Heritage</b></p>		
15.1	<p>The mitigation strategies outlined in this section detail the techniques to be adopted to ameliorate the impacts that the proposed development may have on features of archaeological, architectural and / or cultural heritage within the study area during both the construction and operation phases of the proposed development.</p>	
15.2	<p>The following proposed mitigation measures are subject to approval by the relevant planning authorities and the National Monuments Service of DHLGH.</p>	
15.3	<p><b>Construction</b></p>	
<ul style="list-style-type: none"> <li>As part of an advance works programme prior to the commencement of construction, a suitably qualified project archaeologist will be appointed for the purpose of managing the progress of archaeological works, and ensuring that all archaeological works are carried out in accordance with the terms of any directions.</li> </ul>		
15.4	<ul style="list-style-type: none"> <li>As part of an advance works programme prior to construction, an underwater archaeological survey will be undertaken for all watercourses, where damming and trenching will be undertaken, along the cable route. This survey and evaluation will:</li> </ul>	
15.5	<ul style="list-style-type: none"> <li>o Be carried out by a suitably qualified and suitably experienced underwater archaeologist under licence</li> </ul>	

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15.6	<ul style="list-style-type: none"> <li>○ Incorporate appropriate dive and wade survey as well as metal detection survey</li> </ul>
15.7	<ul style="list-style-type: none"> <li>○ Result in a detailed report setting out any findings and outlining any further mitigation measures that will be employed in relation to the proposed development. This report will be submitted to the National Monuments Service (DHLGH).</li> </ul>
15.8	<p>Note, where an HDD methodology is proposed to facilitate a crossing, this will avoid any direct impact on the subject river or water course at that location.</p>
15.9	<ul style="list-style-type: none"> <li>• As part of an advance works programme prior to construction, a combination of advance confirmatory geophysical survey and advance confirmatory archaeological test trenching will be carried out, where feasible, for all off-road sections of the cable routes as well as the proposed Laydown Areas, compounds and passing bays, should any groundworks be required in these locations. This advance prospection will:</li> </ul>
15.10	<ul style="list-style-type: none"> <li>○ Be carried out by a suitably qualified archaeologist under licence</li> </ul>
15.11	<ul style="list-style-type: none"> <li>○ Result in a detailed report setting out any findings and outlining any further mitigation measures that will be employed in relation to the proposed development. This report will be submitted to the National Monuments Service (DHLGH).</li> </ul>
15.12	<ul style="list-style-type: none"> <li>• It is recommended that buffer zones be established for all RMPs/Protected Structures which are adjacent to the redline boundary so as be excluded from areas where any construction works will take place)::</li> </ul>
15.13	<ul style="list-style-type: none"> <li>○ CH066 (enclosure DU00427/PS04);</li> </ul>
15.14	<ul style="list-style-type: none"> <li>○ CH111 (Holy Well PS09);</li> </ul>
15.15	<ul style="list-style-type: none"> <li>○ St. Doolaghs Ecclesiastical Site; (CH170-CH182; DU00721/11350017; DU04758; DU00723; DU00718; DU04182; DU00722; DU04757; DU00719)</li> </ul>
15.16	<ul style="list-style-type: none"> <li>○ CH231 (an <i>in situ</i> pump located within the redline boundary)</li> </ul>
15.17	<ul style="list-style-type: none"> <li>• It is recommended that a buffer zone be established for CH231 – an in situ pump located within the redline boundary so as be excluded from areas where any construction works will take place (buffer zone to be determined by the Planning Authority):</li> </ul>
15.18	<ul style="list-style-type: none"> <li>• As part of an advance works programme prior to construction, a condition survey shall be undertaken of CH111 (Holy Well PS09); CH145 (Bridge); CH191 (St. Doolaghs Bridge); and CH231 (an <i>in situ</i> pump located within the redline boundary). These condition surveys shall inform the requirement for any additional mitigation measures as determined by the project archaeologist in consultation with the National Monuments Service (DHLGH).</li> </ul>
15.19	<ul style="list-style-type: none"> <li>• Where a section of an upstanding townland boundary must be removed (CH261) then:</li> </ul>
15.20	<ul style="list-style-type: none"> <li>• A representative cross-section of the townland boundary will be investigated and recorded by a suitably qualified archaeologist prior to removal.</li> </ul>
15.21	<ul style="list-style-type: none"> <li>• All sub-surface groundworks associated with the proposed development works will be subject to a programme of archaeological monitoring.</li> </ul>
15.22	<ul style="list-style-type: none"> <li>• This will be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.</li> </ul>

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15.23	<ul style="list-style-type: none"> <li>If significant archaeological material is encountered during the course of archaeological monitoring, then resolution of any such significant material will be determined in consultation with the National Monuments Service (DHLGH).</li> </ul>
15.24	<ul style="list-style-type: none"> <li>Where possible, every reasonable effort will be made to preserve <i>in situ</i> or reduce the impact on any identified archaeological material. Where preservation in situ cannot be achieved, either in whole or in part, then a programme of full archaeological excavation will be implemented to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work will be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.</li> </ul>
15.25	<ul style="list-style-type: none"> <li>A written report will be prepared detailing the results of all archaeological work undertaken.</li> </ul>

## Chapter 16 - Material Assets

<b>Utilities</b>	
16.1	All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works. This will include thorough investigations to identify and reconfirm the location of all utility infrastructure within the works areas.
16.2	Service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum, only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions. At this stage disruption is anticipated to be minimal as the works will be carried out within the existing road network.
<b>Waste Management</b>	
16.3	<b>Construction</b> A Construction Resource Waste Management Plan (as part of the CEMP) is included within Appendix D of this EIAR. This plan provides information on the segregation of all construction wastes to facilitate optimum levels of re-use, recovery, and recycling operations.
16.4	As per section 16.4 the operational/decommissioning phase are not anticipated to be significant and will be managed and programmed in such a manner as to prevent / minimise waste production and maximise upper tier waste management (i.e. re-use, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible.
16.5	Waste arisings will be handled, stored, managed and re-used or recycled as close as practicable to the point of origin.
16.6	Wastes will be sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery / disposal in accordance with the Waste Management Act 1996 and associated amendments and regulations and in a manner which will not adversely affect the environment. All employees will be made aware of their obligations under the CEMP.
16.7	The CEMP will be available for inspection at all reasonable times for examination by the Local Authority.
<b>Utilities</b>	
16.8	<b>Operational</b> As no adverse operational phase impacts on utilities are anticipated, no specific mitigation measures are proposed.
<b>Waste Management</b>	

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16.9	All waste generated during the operational phase will be managed in accordance with the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations, particularly with regard to the use of appropriately permitted waste contractors and appropriately authorised destinations for waste materials.
<b>Chapter 17 – Roads and Traffic</b>	
17.1	The appointed contractor will agree temporary traffic management measures then adopt and monitor an appropriate way of working in consultation with FCC, DCC, DAA the appointed contractor, TII and/or their Agents and An Garda Síochána as appropriate.
17.2	The CTMP has been developed for the purposes of this assessment and will be further developed as necessary in consultation with FCC, DCC, DAA and the Gardai prior to construction commencing. The CTMP will document measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular the emergency services. The CTMP will be considered a 'live' document and will be developed accordingly, within the parameters assessed in this EIAR.
17.3	Signed diversion routes will be provided to mitigate journey disruption. Where practically achievable, diversion routes will not apply outside of the worksite hours of operation.
17.4	During the construction phase, signage will be installed to warn road and recreational route users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.
17.5	Furthermore, only vehicles essentially required to facilitate construction will be allowed to attend worksites. Car sharing will be promoted to construction workers by the contractor during the induction process.
17.6	To reduce the potential for debris being deposited onto the local road network in the construction site accesses and road sections of HV cable construction, the appointed contractor will ensure that public roads and footways are cleaned and swept during and after the works. This cleansing regime (to be agreed) will minimise the amount of deleterious material deposited on the road surface and the appointed contractor will ensure that the nearest public road will be kept clear of debris by monitoring and then utilising a road sweeper where necessary.
17.7	The appointed contractor could employ a number of sub-contractors, and all will fall under the umbrella of the CTMP and will have an obligation to adhere to the Plan; this obligation will form part of the procurement process and will be written into any contract of employment.
17.8	Compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures set out in the CTMP and recording of any complaints. The appointed contractor will be required to stipulate that all contractors disseminate these rules to their sub-contractors.
17.9	In liaison with ESB, the appointed contractors will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This will include circulation of information about ongoing activities; particularly those that could potentially cause disturbance, including due to traffic.
17.10	The appointed contractor will nominate a person to be responsible for the co-ordination of all elements of Roads and Traffic during the construction process (Liaison Officer). This person will liaise with the local community so that the community has a direct point of contact within the developer organisation who they could contact for information purposes or to discuss matters pertaining to traffic management or site operation.
17.11	If the construction phase of any notably sized development(s) appears likely to overlap with the proposed development, the appointed contractor will seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.
17.12	Prior to commencement of construction, and during the construction phase, engagement with the proponents of other developments will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of

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	works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts on population and human health are minimised. The specific detail will be developed by the appointed contractor within the parameters assessed in this EIAR.
	<b>Construction Access Arrangements</b>
17.12	Transportation, including deliveries to and from the construction areas will be taken from the existing public road network. The local area road network is shown in Figure 17.2 of the Roads and Traffic Chapter.
17.13	Given the nature of construction of the HV cabling (including joint bays and passing bays), there will be multiple work sites along the HV cable routes throughout the construction programme.
17.14	The construction methodology is provided within Chapter 6. The proposed programme of worksite locations and temporary compounds (following future consent) will be confirmed by the appointed contractor as an integral part of their adopted CTMP provided as an Appendix to the CEMP. All construction vehicle drivers will be instructed to access their destination worksite via an approved route; this is to be determined by the approved contractor in conjunction with the administering local authority.
	<b>Measures identified to Minimise and Mitigate Traffic Impacts included within the CTMP</b>
	<b>General</b>
17.15	Road sections in the Study Area have been reviewed with the principal aim being to minimise potential disruption to local communities, and general traffic. There are a range of traffic management measures proposed to minimise potentially disruptive impacts associated with construction works and construction traffic. These measures are hereafter described.
	<b>Time Control</b>
17.16	Construction working hours will be conditionally defined through planning agreement or road opening license. Normal working hours are expected to be Monday to Friday 07:00 to 19:00 and 08.00 to 17.00 on Saturday, but overnight working may also be a requirement in highly congested areas. In instances where extended hours / days are required works will only be undertaken with prior agreement with the relevant statutory authority.
17.17	The appointed contractor will plan and manage construction works activities to minimise potential disruption on the surrounding road network and any other detrimental impact to the local community.
17.18	The appointed contractor will liaise with Fingal County Council (FCC), Dublin City Council (DCC) and Dublin Airport Authority (DAA) upon finalisation of the construction programme to ensure (as far as is reasonably practicable) that no conflict with planned road works in the vicinity of any construction works occurs so as not to impact motorists further.
17.19	Deliveries will be scheduled, as far as is reasonably practicable, to avoid network peak hours and passing by schools around typical drop-off and pick-up times. Where practically achievable, diversion routes will not apply outside of the compound's hours of operation.
17.20	Accordingly, the appointed contractor will discuss and agree with FCC, DCC and DAA on times to be avoided at schools and other community receptors at peak periods of the construction programme to minimise disruption.
17.21	The appointed contractor will liaise with FCC, DCC and DAA regarding local events dates and seek to avoid traversing affected route sections at agreed times.
	<b>Diversion Routes</b>
17.22	Where practical, localised traffic management (e.g., single lane alternate working) or temporary passing bays will be implemented. However, at locations where local traffic management or passing bays are not practical then local road diversions will be implemented. In all cases all reasonable

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	and practically achievable measures, such as moving of equipment and placing steel plates over the trenches to allow essential access for vehicles, will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes.
17.23	An indication of the location of and potential implications of diversions are set out in Section 2.3.2 of the CTMP, Appendix D of the EIAR. Confirmed diversion routes will be agreed before construction between the appointed contractor and relevant authorities.
17.24	Once the construction programme, construction methodologies and associated compound layout requirements are firmly established, there will be a process of approvals for signage and information provision regarding essential traffic diversions. These will be discussed and agreed upon with FCC, DCC, DAA and other authorities as required.
17.25	When a road closure is required, the procedure set out in Section 75 of the Roads Act 1993 will be followed and the proposed diversion route will be approved by the relevant Road Authority.
17.26	When a closure is required, there will be a provision for a diversion route suitable to accommodate the types and volumes of traffic. Diversion route signage will be clear and consistent, guiding the traffic through each decision point until it re-joins the route from which it was diverted.
17.27	Diversion routes will be maintained in a satisfactory condition throughout the period of the diversion.
<b>Transportation Protocol</b>	
17.28	All contractors will adhere to the agreed CTMP and any agreed conditions imposed by FCC, DCC and DAA.
17.29	All construction vehicles associated with the proposed development will:
17.30	<ul style="list-style-type: none"> <li>• Display a unique identification number shown on a plate clearly visible.</li> </ul>
17.31	<ul style="list-style-type: none"> <li>• Be securely sealed.</li> </ul>
17.32	<ul style="list-style-type: none"> <li>• Record origin, destination, and route of the vehicle.</li> </ul>
17.33	<ul style="list-style-type: none"> <li>• Not leave in convoy.</li> </ul>
17.34	<ul style="list-style-type: none"> <li>• Ensure all vehicle identifications including registration plates on the vehicle are clearly visible.</li> </ul>
17.35	<b>Construction</b> En route to and from their destinations drivers of all construction vehicles will:
17.36	<ul style="list-style-type: none"> <li>• Access their destination compound via an approved route; this is to be determined by the approved contractor in conjunction with the administering local authority.</li> </ul>
17.37	<ul style="list-style-type: none"> <li>• Strictly observe speed limits.</li> </ul>
17.38	<ul style="list-style-type: none"> <li>• Drive in a safe and courteous manner with due care and consideration for other road users both vehicular and pedestrian.</li> </ul>
17.39	<ul style="list-style-type: none"> <li>• Be aware and alert whilst driving through towns and villages particularly at school times.</li> </ul>
17.40	<ul style="list-style-type: none"> <li>• Strictly adhere to the hours of operation detailed by the TMP.</li> </ul>
17.41	<ul style="list-style-type: none"> <li>• Not deliberately wait or stack on any public road.</li> </ul>
17.42	The appointed contractor will maintain a management system whereby the following records are kept and are available to FCC, DCC and DAA:

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17.43	<ul style="list-style-type: none"> <li>The number of vehicles arriving and leaving their destination.</li> </ul>
17.44	<ul style="list-style-type: none"> <li>All complaints received regarding transport and resultant action taken.</li> </ul>
17.45	<ul style="list-style-type: none"> <li>All instances where a protocol has been breached and resultant action taken.</li> </ul>
17.46	The appointed contractor will supply the following information to FCC, DCC and DAA, which will be treated in confidence:
17.47	<ul style="list-style-type: none"> <li>Action to be taken when a protocol is breached; and</li> </ul>
17.48	<ul style="list-style-type: none"> <li>A log of vehicle movements.</li> </ul>
<b>Road Cleaning/Sweeping</b>	
17.49	<p>To reduce the potential for debris being deposited onto the local road network in the road sections/compound areas of HV cable construction, the appointed contractor will ensure that public roads and footways are cleaned and swept during and after the works. This cleansing regime will minimise the amount of deleterious material deposited on the road surface and the appointed contractor will ensure that the nearest public road will be kept clear of debris by monitoring and then utilising a road sweeper where necessary.</p>
<b>Construction</b>	<b>Speed Restrictions</b>
17.50	<p>All construction workers, including contractor managed HGV drivers, will be briefed on the absolute requirement to adhere to posted speed limits on public roads through induction sessions and through regular briefings (toolbox talks). Other parties responsible for site deliveries will also be instructed per the requirement for compliance with posted speed limits on all roads.</p>
17.51	<p>Speed limits posted within compounds will be considered mandatory and, therefore will be complied with.</p>
<b>Temporary Signage</b>	
17.52	<p>During the construction phase, signage will be installed to warn road users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.</p>
17.53	<p>General information signage will be installed to inform road users and local communities of the nature and location of the works, including contact details should they require additional information.</p>
17.54	<p>Indicative signage for use on these routes is illustrated in Figure 3.2.</p>
<b>Construction</b>	<p>Temporary signage will be formally agreed with FCC, DCC and DAA prior to installation and commencement of construction. All signing will also be provided in accordance with the Traffic Signs Manual.</p>
17.55	<b>Temporary Traffic Management</b>
17.56	<p>The construction worksite requirements in conjunction with existing road corridor geometry in some locations necessitates that localised road closures and diversions will be required.</p>
17.57	<p>Other forms of traffic management include:</p>
<b>Construction</b>	<ul style="list-style-type: none"> <li>Localised lane closure and traffic management signing on dual carriageway sections.</li> </ul>
17.58	<ul style="list-style-type: none"> <li>Localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic on dual carriageway sections</li> </ul>
17.59	

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17.60	<ul style="list-style-type: none"> <li>Single alternate lane operation controlled by temporary traffic signals on two lane single carriageway sections.</li> </ul>
17.61	<ul style="list-style-type: none"> <li>Single alternate lane operation controlled by temporary traffic signals and convoy operation (to control vehicle speed) on two lane single carriageway sections.</li> </ul>
17.62	<ul style="list-style-type: none"> <li>Single alternate lane operation manually controlled using stop/go signs.</li> </ul>
17.63	<ul style="list-style-type: none"> <li>Temporary passing bays to enable traffic to bypass works.</li> </ul>
<b>Public Transport</b>	
17.64	The appointed contractor will discuss with FCC, DCC, DAA and local bus operators regarding matters that could affect the flow of buses and, will implement reasonable and practically achievable measures to mitigate any disruption to bus services and inconvenience to service users.
17.65	Public Transport services that may be affected by local traffic management are listed within Table 3.1 in the CTMP.
17.66	<b>Pedestrian, Cyclist or Equestrian Routes</b>
17.67	Appropriate signage advising of dates and hours of working will be installed on the pedestrian, cyclist, and recreational routes, among others, in advance of road crossing points to warn users of construction traffic.
17.68	Indicative signage for use at these locations is illustrated in Figure 3.3. The exact details and location of the signage would be agreed with FCC, DCC and DAA.
<b>Parking for Vehicles of Construction Workers, Operatives and Visitors</b>	
17.69	To avoid detriment associated with obstructive parking, adequate car parking space for permanent construction workers, visitors and deliveries will be provided within the site compounds. Car parking will not be permitted on any public road network adjacent to the site to minimise the potential for obstruction and delay for other road users. The requirement for construction workers not to park their private vehicles on public roads will be a mandated and advised to all construction workers prior to commencement of works and reinforced via 'toolbox talks'.
17.70	Vehicle sharing will be promoted to construction workers by the contractor during the induction process.
<b>CTMP Implementation and Monitoring</b>	
<b>General</b>	
17.71	The implementation of the CTMP will be the responsibility of the appointed contractor who will also be responsible for monitoring. Further evolution of the CTMP will be required during the detailed proposed development planning stages and during the construction phase.
17.72	The appointed contractor may employ several sub-contractors, and all in such cases sub-contractors' activities will fall under the requirements of the CTMP and therefore sub-contractor construction workers and sub-contractor managed construction vehicle drivers will have an obligation to adhere to the CTMP. This obligation will form part of the procurement process and will be written into any relevant employment or commissioning contract.
<b>Construction</b>	CTMP compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures in the CTMP and record any complaints. The appointed contractor will stipulate that all contractors circulate these rules to their sub-contractors.
17.73	CTMP compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures in the CTMP and record any complaints. The appointed contractor will stipulate that all contractors circulate these rules to their sub-contractors.
17.74	Non-compliance with the CTMP will constitute a breach of contract, and action will be taken against the contractor or supplier should repeated non-compliance continue. Details of the proposed monitoring and enforcement regime will be supplied to FCC, DCC, or DAA upon request.

Phase	Mitigation and Monitoring
	<b>Responsibilities</b>
17.75	The appointed contractor will nominate a person responsible for the coordination of all elements of traffic and transport during the construction process, a nominated Liaison Officer. The Liaison Officer will be the direct point of contact for the developer organisation with the local community. Accordingly, local residents and business holders can contact the Liaison Officer for information purposes or discuss specific matters about traffic management or site operation.
17.76	Contact details for the Liaison Officer will be made available to relevant parties and more generally, as agreed with local authorities, to the local community prior to commencement of works on-site.
17.77	The appointed contractor (or their appointed agent) will review the number of construction workers, traffic numbers, and the construction programme as the proposed development progresses. Any proposed or unplanned substantive changes will be discussed and agreed with FCC, DCC, or DAA as far as is reasonably practicable.
17.78	As necessary, meetings would be held with FCC, DCC, or DAA and the appointed contractor to discuss the CTMP and to discuss any relevant issues raised by the local community.
	<b>Transport Co-ordination</b>
17.79	The appointed contractor will be responsible for the co-ordination of all elements of HGV transport to and from the compounds and worksites. The appointed contractor (or their appointed agents) will be responsible for co-ordination and liaison with sub-contractors, FCC, and DCC, DAA, TII, emergency services and the local community.
17.80	The Liaison Officer will inform FCC, DCC, DAA (or agents thereof) of any important matters that could affect traffic movement through reports issued at regular intervals or by day-to-day reports of any substantial, essential changes to transport plans necessitated by circumstances.
	<b>Communication and Consultation</b>
17.81	As indicated above, the appointed contractor will nominate a Liaison Officer to act as a point of contact with the local community. The Liaison Officer would be responsible for keeping the local community informed of progress on the site and communicating upcoming activities which could give rise to increased construction vehicle movements.
17.82	The Liaison Officer will be able to attend Community Council meetings to provide a report and to be on hand to answer any questions that the local community may have. Contact details will be provided for the Liaison Officer (telephone number and email address) and will be made available locally so that members of the public have an opportunity to ask questions and provide feedback.
17.83	The appointed contractor will utilise local media channels to circulate information regarding traffic management.
17.84	Signs will be erected at access points to construction compounds to provide contact details of the appointed contractor's Project Manager. These contact details will also be provided directly to the emergency services.
	<b>Liaison with Other Developers/Contractors</b>
17.85	It is recognised that the construction period associated with the proposed development could coincide with the construction of other proposed developments whereby construction related traffic will travel through the same area and use the same public roads.
17.86	If the construction phase of any notably sized development(s) appears likely to overlap with the proposed development, the appointed contractor will seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.
	<b>CTMP Review</b>

Phase	Mitigation and Monitoring
17.87	The CTMP, as a 'live document' will be reviewed on a regular basis by the appointed (as needed, in tandem with the appointed contractor(s) prior to and during the project construction phase. The CTMP, during the project's evolution, will be subject to change to enable the most effective and suitable measures for implementation and where needed, approved by FCC, DCC, and DAA.

**Table 4.2: Natura Impact Statement Mitigation**

Mitigation Reference	Mitigation Measure
NIS 1	<p>Invasive species confirmatory surveys will be carried out to establish whether any new instances have become established within the Zol of the Proposed Development. All surveys will be undertaken by a suitably qualified ecologist(s) who may be the Contractors Ecological Clerk of Works (ECoW), but who will have demonstrable experience in the survey and assessment of the feature. The pre-construction invasive species survey will be carried out within the works areas, including compound locations and laydown areas, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas.</p> <p>The invasive species survey will be carried out during the appropriate growing season (May – October). The findings of this invasive species survey will be incorporated into the measures below, by the Contractor’s ECoW and any specialists.</p> <p>Any stands of invasive species recorded within the Zol will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer such that below ground growth is accounted for (4m for Japanese knotweed following Fennell et al., 2018<sup>6</sup>; buffer not required for other species). No works will be carried out within the exclusion zones unless approved by the Contractor’s ECoW.</p> <p>The results of pre-construction confirmatory surveys will inform the refinement of mitigation measures (if required) in Contractor method statements, and all results will be incorporated into Contractor’s constraint mapping.</p>
NIS 2	<p>An Ecologist/ Ecological Clerk of Works (ECoW) will be employed by the Contractor to oversee implementation of mitigation and deliver toolbox talks and preconstruction ecology surveys, as appropriate. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.</p> <p>The ECoW will be a full member of a relevant environmental institute, such as the Chartered Institute of Ecology and Environmental Management (CIEEM) and have demonstrable experience in ecological supervision and habitat restoration works.</p> <p>The Contractor’s ECoW will also ensure any disturbance licenses are arranged if any significant findings are determined from confirmatory pre-construction surveys outlined above. The Contractor’s ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and effects are minimised.</p> <p>Separate to the ECoW, or if the EcOW does not have appropriate experience, an Environmental clerk of works (EnCOW)/ Environmental Engineer, with appropriate experience of managing surface water runoff/ pollution control will be employed on the site. The EnCOW will have responsibility for ensuring water quality and other general environmental protection measures are suitable and appropriate, and that they are effectively monitored.</p> <p>An independent Environmental Clerk of Works (EnCoW) will also be employed on behalf of the Employers Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor’s ECoW. These monitoring and survey reports will also be provided to the local authority or other parties where required by condition.</p>
NIS 3	<p>At a minimum, all pollution control measures will be designed, installed, and maintained in accordance with measures outlined below and under the supervision of the Contractor’s Environmental Clerk of Works (EnCoW).</p> <p>The pouring of concrete will be required during the construction phase. To prevent the runoff of concrete into nearby watercourses and drains, the following will be implemented.</p> <p>No on-site batching will be permitted at the proposed works areas. Concrete will instead be transported to the site within a concrete truck.</p>

<sup>6</sup> Fennell, M., Wade, M. and Bacon, K.L., 2018. Japanese knotweed (*Fallopia japonica*): an analysis of capacity to cause structural damage (compared to other plants) and typical rhizome extension. *PeerJ*, 6, p.e5246.

Mitigation Reference	Mitigation Measure
	<p>Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses.</p> <p>Concrete trucks will be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area.</p> <p>Where concrete pours are to take place instream they will only take place within an isolated, dry, works area.</p> <p>Where the isolated working area requires constant pumping to maintain a dry works area, pumps shall be turned off during the pour, and remain off until concrete has hardening negating a run-off risk; and such that the discharge will not result in a change in pH of +/-0.5 units.</p> <p>Where concrete pours are required within a watercourse, the Contractor's EnCoW will regularly monitor the pH of the watercourse during concrete works using a handheld pH meter. Should any change in pH +/-0.5 be detected concrete works shall immediately be ceased (handheld monitors will have maximum variance of +/- 0.1). The entry point to the watercourse will then be identified and implement appropriate measures to prevent further escape to the environment</p> <p>The Contractor's EnCoW will ensure that covers are available for freshly poured concrete to avoid wash off in the event of rain.</p> <p>Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal.</p> <p>The Contractor will schedule concrete works during relatively dry weather conditions (i.e. when there are no active Met Eireann yellow, orange or red warnings) to reduce the elevated risk of runoff.</p> <p>The Contractor's EnCoW will notify the Independent EnCoW employed within the Employer's Representative Team, the NPWS and IFI immediately of any concrete spills into watercourses.</p>
NIS 4	<p><b>Silt Control Measures</b></p> <p>Silt control measures will be used to control silt generated from activities on site and prevent it gaining access to surface drainage which could convey silt to larger streams and watercourses.</p> <p>Silt control measures include silt traps which can be located in small drains where flow is small and silt fences where runoff from large areas needs to be controlled. Silt fences must be installed in the working areas and not at the watercourse.</p> <p>Access routes will be delineated such that an appropriate set back distance from watercourses is maintained. Where works are to be undertaken adjacent to watercourses the setback distance will be delineated by the EnCoW on site, with inputs from the ECoW if required.</p> <p>Where distances between the works and watercourse allow, a minimum setback distance of 25m from the watercourse will be maintained.</p> <p>Where the site is constrained, the best available set back distance will be employed taking account of the minimum working area required to facilitate the works.</p>
NIS 5	<p><b>Silt Fences</b></p> <p>Silt fences will be installed downslope of the area where silt is being generated on disturbed ground.</p> <p>To be effective the silt curtain must contain the area where silt is generated and must terminate on high ground (i.e. an elevated area not in the watercourse).</p> <p>Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh.</p> <p>The base of the silt fence will be bedded at least 15-30 cm into the ground at two metre intervals.</p> <p>Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains.</p> <p>The integrity of the silt fencing will be checked daily by the EnCoW and after poor weather conditions (rain or wind) and any failures rectified immediately.</p>

Mitigation Reference	Mitigation Measure
	<p>Two lines of silt curtain / fence will be installed, where considered necessary, by the EnCoW.</p> <p>Any build-up of sediment along the fence boundary will be removed daily.</p> <p>Silt fences will be maintained until vegetation on the disturbed ground has re-established. Re-instatement method statements will be subject to approval by the EnCoW.</p> <p>The silt fencing must be left in place until the works are completed (which includes removal of any temporary ground treatment).</p> <p>Silt fences will not be removed during heavy rainfall.</p> <p>The silt fence will not be pulled from the ground but cutaway at ground level and posts removed.</p> <p>A record of when it was installed, inspected and removed will be maintained by the EnCoW.</p>
NIS 6	<p><b>Silt Traps</b></p> <p>The purpose of the trap is to reduce the level of solids in the slowly flowing water. The silt trap works by allowing a build-up of water behind it slowing flow and allowing solids to settle out. The following requirements will apply:</p> <p>Silt traps will only be placed in drains downstream of working areas where the volume of water flow is expected to be low.</p> <p>Silt traps will be made of terram or similar material, not mesh.</p> <p>The trap will be staked into the banks of the drain / watercourse such that no water can flow around the sides.</p> <p>The material will be bedded into the drain bed/watercourse to prevent water flowing beneath it.</p> <p>The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it.</p> <p>Inspections will be carried out daily; during the proposed works, weekly on completion of the works for at least one month, and after heavy rains, and monthly thereafter until bare areas have developed new growth.</p> <p>Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom.</p> <p>In sensitive areas a series of silt traps will be placed in the drain.</p> <p>The silt trap will not be pulled from the ground but cutaway at ground level and posts removed.</p> <p>A record of when it was installed, inspected and removed will be maintained by the EnCoW.</p>
NIS 7	<p><b>Invasive Species</b></p> <p>Japanese knotweed has been recorded within the ZoI to the development. There is potential for additional stands of invasive species to be present within or adjacent to the works areas following establishment of new populations between baseline surveys, and construction.</p> <p>Prior to works commencing a full invasive species survey will be carried out. The pre-construction invasive species survey will be carried out within the works areas, including compound locations and laydown areas, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas.</p> <p>The invasive species survey will be carried out during the appropriate growing season (May – October). The findings of this invasive species survey will be incorporated into the measures below, by the Contractor’s ECoW and any specialists.</p>

Mitigation Reference	Mitigation Measure
	<p>Any stands of invasive species recorded within the Zol will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer such that below ground growth is accounted for (4m for Japanese knotweed<sup>7</sup> buffer is not required for other species). No works will be carried out within the exclusion zones unless approved by the Contractor's ECoW.</p> <p>The Contractor's ECoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. The toolbox talk will take place prior to works commencing in any areas where Invasive Species have been recorded.</p> <p>All machinery will be steam-cleaned prior to entering and before leaving site.</p> <p>In the event of the requirement for the excavation and disposal of Invasive Alien Species infected soil, the Contractor (EnCoW) will be responsible for the securing of appropriate derogation licences for the transportation and disposal of such material.</p>

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<sup>7</sup> Fennell, M., Wade, M., Bacon, K., (2018); Japanese knotweed (*Fallopia japonica*): An analysis of capacity to cause structural damage (compared to other plants) and typical rhizome extension

# 5 Environmental Incident Response Plan

## 5.1 Introduction

In the unlikely event of an incident, the Environmental Incident Response Plan will ensure that any incident is dealt with effectively, and that the response is timely and appropriate. This plan will be further developed by the appointed Contractor, in line with the mitigation measures detailed in the EIAR and NIS for the proposed development, to describe the procedures, lines of authority and processes that will be followed to ensure that all incident response efforts are prompt, efficient and appropriate to the particular incident.

## 5.2 Plan Objectives

The objectives of the plan are:

- To ensure the health and safety of all workers on site
- To minimise environmental effects
- To devise response procedures
- To establish procedures for an effective response to the incident which minimises effects on the environment and the health and wellbeing of personnel.

## 5.3 Implementation of the Plan

Risks and appropriate responses for incidents will be reviewed and updated regularly to ensure that all risks and response mechanisms are included within the plan. It will identify the risks associated with health and safety and the environment and will evolve throughout the project lifecycle, with inputs from the contractor/PSCS and sub-contractors.

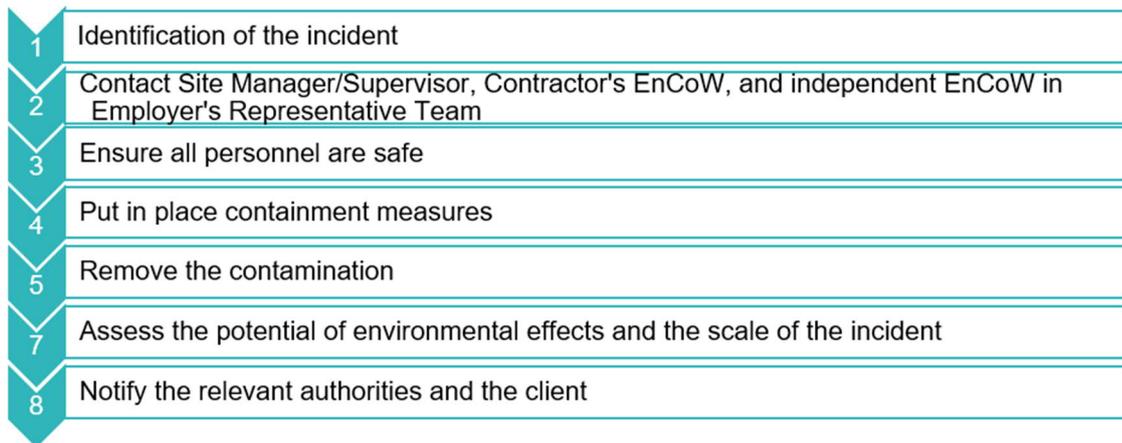
## 5.4 Environmental Emergency Response Procedures

The mitigation measures specified in the EIAR and NIS will minimise / avoid environmental pollution. However, procedures must be in place in the unlikely event of an incident. The following are required to ensure that the project / site / activity risks are known to all personnel on site:

- Identify all activities related to the project which have the potential to cause an incident;
- Conduct a risk assessment for each activity;
- Ensure effective planning of the works and the required equipment to deliver EIAR mitigation requirements;
- Contact details for those contacts detailed in section 5.5 to be distributed to personnel and displayed on site; and
- Training of staff/personnel in relation to response procedures, including drills.

In the unlikely event of an incident, the response will follow the following steps:

**Figure 5.1: Incident Response Procedure**



An example of emergency response actions required, in the event of a spillage is as follows:

1. If safe, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
2. If safe, contain the spill using the absorbent spills material provided. Do not spread or flush away the spill.
3. Cover or bund off any vulnerable areas where appropriate.
4. If possible, clean up as much as possible using the absorbent spills materials.
5. Do not hose the spillage down or use any detergents.
6. Contain any used absorbent material in weather tight containers bins/bags so that further contamination is limited.
7. Notify the Site Manager so that used absorbent material can be disposed of using a licensed Waste Contractor, and
8. An accident investigation should be performed in accordance with procedures and the report sent to the Site Manager.

All works in the vicinity of the incident must be ceased until such a time as the Site Manager notifies personnel that it is safe to proceed with the works. The Contractor's EnCoW will be responsible for formulating any corrective actions that are required (e.g. repairs silt fencing in the event of damage from extreme weather) in consultation with the Contractor and relevant stakeholders.

For each incident, the following will be reported:

- Location of the incident;
- Time and Date;
- Scale of the incident;
- Nature of the incident and source-pathway and receptor;
- Remediation measures undertaken;
- Name of the personnel who reported the incident; and
- Any other relevant details.

The Site Manager will keep a log of all environmental incidents on file, and these will be made available to the Local Authority, the independent EnCoW within the Employer's Representative

Team and other agencies, as required, such as the Inland Fisheries Ireland or the Environmental Protection Agency.

## 5.5 Emergency Contact List

An emergency contact list will be displayed at prominent and suitable locations at construction sites during the proposed works. An example is provided in Table 5.1, and this will be further developed to include contact details for key personnel with environmental responsibilities, as detailed in Chapter 2 of this CEMP.

Table 5.1: Emergency Services and Authorities Contact Details

<b>Emergency Services</b>	<b>Contact Telephone Number</b>
Ambulance	999 or 112
Fire Services	999 or 112
Fingal County Council Fire and Building Control Department	01 8905542
Dublin City Council Fire and Building Control Department	01 222 2222
Fingal County Council Environment Department	01 890 5919
Dublin City Council Environment Department	01 222 2222
Fingal County Council, Road Operations	01 8905000
Dublin City Council, Road Operations	01 222 2222
Inland Fisheries Ireland (Dublin)	01 884 2693
National Parks and Wildlife Services	1890 383 000/ (01) 888 3200
Environmental Protection Agency	1890 33 55 99 / 053 9160600
National Monuments Services	01 888 2178
ESB Emergency	1850 372 999
Bord Gais Emergency	1850 20 50 50
Irish Water Emergency	1850 278 278
Irish Rail	01 8555454
Health and Safety Authority	1890 289 389

## 6 Training and Auditing

### 6.1 Environmental Induction and Awareness Training

All site personnel will receive environmental induction and awareness training in conjunction with site safety training. The environmental training and awareness training will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and potential impacts associated with their activities, the controls in place to mitigate said impacts. Prior to working in areas of particular sensitivity, the Contractors' EnCoW will give a toolbox talk to site personnel. All site personnel will be trained in relation to incident response procedures and drills will be undertaken to ensure timely and effective responses to incidences.

All signed training records will be held on site for future inspection.

### 6.2 CEMP Reviews and Auditing

Internal and external auditing will facilitate the assessment of the effectiveness of the CEMP and compliance against regulatory and legislative requirements. Audit reports will be produced identifying examples of good practice, opportunities for improvement, non-conformances, and corrective actions taken, as appropriate. Recommendations for follow-up audits will also be provided. The findings of the audits will be reported to the Site Manager, the Contractors and the independent EnCoW within the Employer's Representative Team.

Internally, the Contractors' EnCoW will bring any changes required to the CEMP to the attention of the Contractor. A report on each change to the CEMP will be appended to the CEMP. The Contractors' EnCoW will monitor and track any changes in environmental legislation and any changes required will be brought to the attention of the Site Manager and Contractor. Changes to the CEMP may also arise due to changes in activities and measures contained in the CEMP may need to be updated / altered to take account of this.

Externally, the independent EnCoW within the Employer's Representative Team will carry out regular reviews of the CEMP to ensure that the Contractors are conducting the works in compliance with the EIAR, NIS and any conditions imposed by the Consenting Authorities.

The CEMP, environmental inspection reports and audit records will be maintained in hard copy and electronic formats for inspection.

# 7 Communication and Complaints

## 7.1 Communication and Engagement

Communication with the public and other stakeholders will be a two-way mechanism, to ensure awareness of the project and to share information. The Contractor will share important information with the public and other stakeholders.

The communication strategy will include:

- List of environmental stakeholders
- Road users – the Contractor will ensure that traffic disruption is minimised during construction.
- Local population – the Contractor will provide the local population and other stakeholders with advance notice of works in the area,
- Method and frequency of communication – this can include personal contact, letter drops, emails, telephone, meetings/presentations
- Details of key contacts – Employer, Site Manager, Contractors' EnCoW
- Details of the consultation register – a record will be maintained of all third-party communication and consultation. This includes consultation with statutory and non-statutory organisations, and members of the public.

The Contractors' Community Liaison Team will be expected to interface with the Employer's Community Liaison Team to ensure the successful delivery of the project in so far as communities are concerned.

## 7.2 Environmental Complaints

A formal complaints procedure will be developed and implemented by the Contractor.

Signage will be provided at site entrances or on perimeter hoarding locations showing details of whom to contact in the event of a complaint.

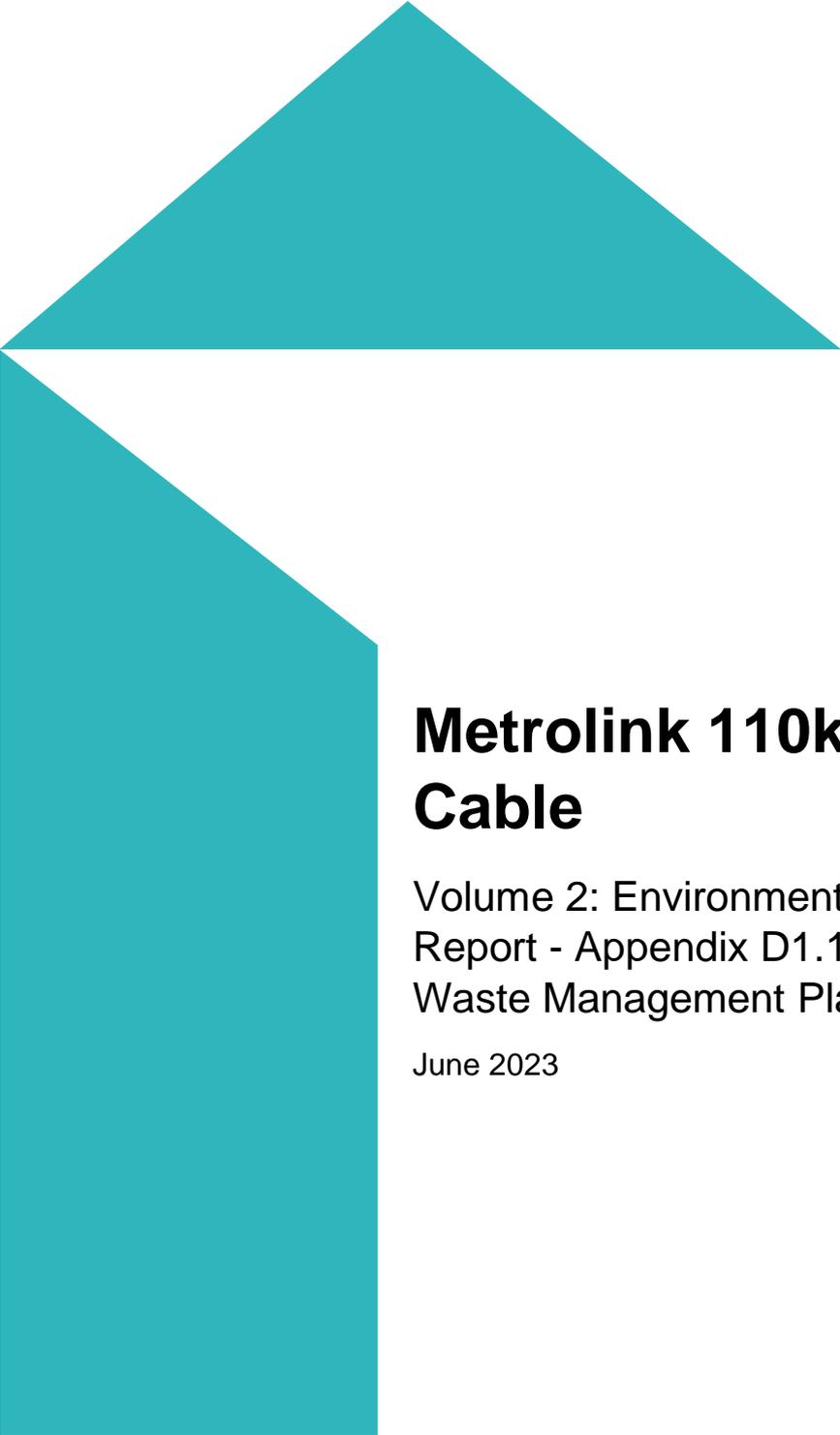
The Contractor will:

- Assess what corrective and preventive action is required.
- Carry out further investigation if necessary.
- Provide a response within a reasonable timescale.
- Notify the relevant stakeholder of the proposed corrective and preventive actions to be adopted.
- On completion of the corrective action and following agreement that the complaint has been adequately addressed; the Site Manager will close the case and record the date of closure. The complaints register will include details of the preventative measures undertaken to avoid a reoccurrence and will be agreed with the Contractor's EnCoW.

The Contractor will additionally communicate the specifics of any environmental complaint to ESB.

# Appendices

- D1.1 Construction Resource Waste Management Plan
- D1.2. Construction Traffic Management Plan

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# **Metrolink 110kV Underground Cable**

Volume 2: Environmental Impact Assessment  
Report - Appendix D1.1 Construction Resource  
Waste Management Plan

June 2023

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# 1 Introduction

## 1.1 Purpose of the CRWMP

This Construction Resource Waste Management Plan (CRWMP) has been prepared for the construction of underground ducting and cables for MetroLink, as detailed in Chapter 6 Description of the Development, in accordance with waste management guidance and principles as outlined in *Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects* (EPA, 2021)<sup>1</sup>.

The 2021 EPA guidelines replace the *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG), June 2006*.

This CRWMP will evolve in agreement with the planning authorities, in the context of matters such as Conditions of the Statutory Approval, and as detailed design of the development emerges, to ensure that optimum levels of waste prevention, reduction, re-use, recycling, and recovery are achieved throughout the duration of the Proposed Development. Litter management will also be included. Because at this point – the commencement of the statutory consenting process, exact quantities and volumes of waste material cannot be determined, particularly in the absence of any Conditions of the Consent Approval.

The requirement to develop, maintain and operate this CRWMP will form part of the contract documents for the project and will be updated by the appointed Contractor(s) in advance of the commencement of construction activities on site. Waste sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the Proposed Development site to an authorised site of recovery/disposal in a manner which will not adversely affect the environment. All employees will be required to comply with the obligations under this CRWMP.

On commencement of the project, the Contractor appointed to undertake the works will be responsible for the further development of this CRWMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to the local authorities to enable fulfilment of reporting obligations. The CRWMP will be developed and agreed in line with the process presented in Figure 1.2 *Process Lifecycle of Resource Waste Management Plan*.

The Contractor will be required to regularly revisit this CRWMP throughout the lifecycle of the project so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and to ensure that that data is collected on an ongoing basis so that it is as accurate as possible.

The Contractor will be required to:

- Reduce the use of virgin resources;
- Keeping materials in the economy as long as possible;
- Maintain their intrinsic value/quality as high as possible;
- Reduce fumes or emissions which may result in additional GHG emissions. Plant equipment and vehicles to be used on the proposed project should be selected based on their relative environmental performance; and
- Reduce hazardous substances in products and waste.

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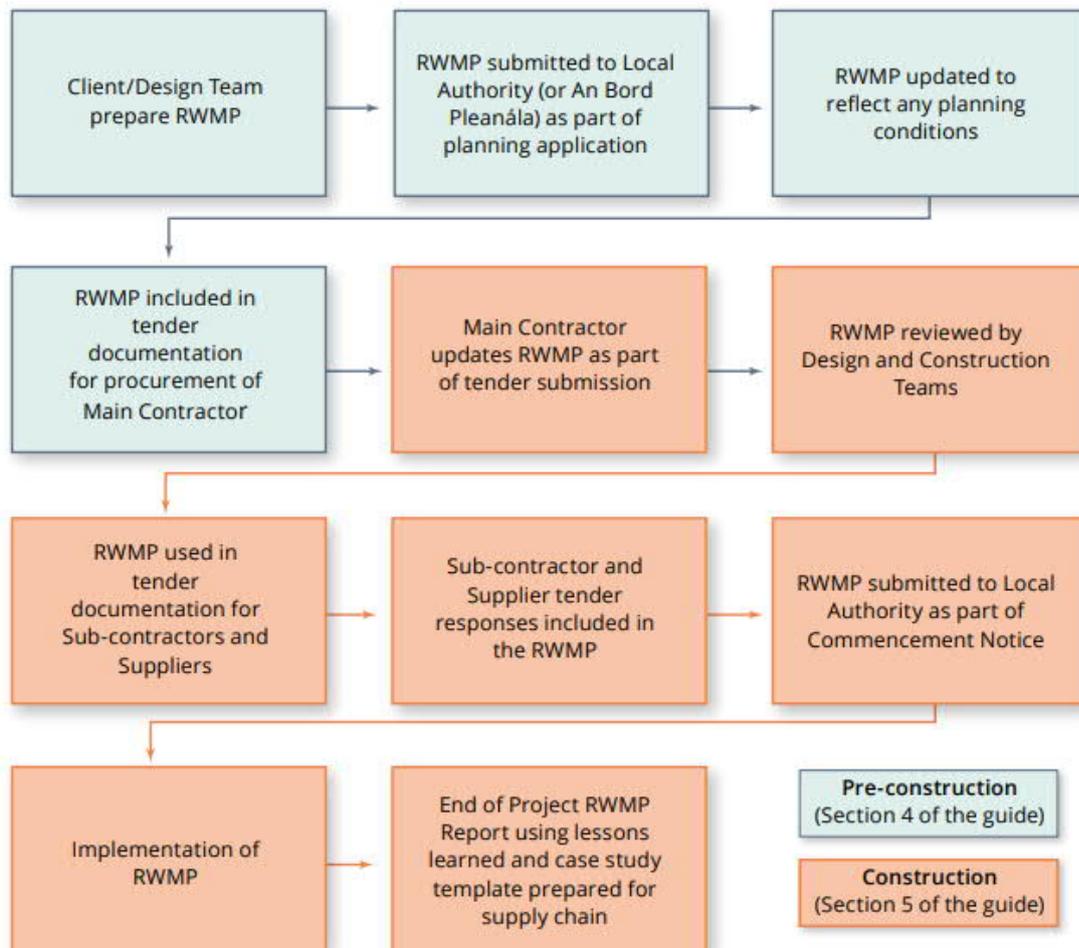
<sup>1</sup> [CDWasteGuidelines.pdf \(epa.ie\)](#)

This CRWMP has been prepared for the Proposed Development as there is potential for the project to exceed the specified Tier 2 construction waste threshold limits set out in the above referenced guidelines.

This CRWMP has been prepared with reference to, and taking account of, the following legislation, plans and waste management guidance documents:

- The Waste Management Act 1996 – 2008, Amendments & Associated Regulations;
- Construction Industry Research and Information Association (CIRIA) document 133 Waste Minimisation in Construction;
- Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015) The Litter Pollution Act 1997;
- The Waste Management Plan for the Connacht-Ulster Waste Management Plan 2015-2021; and
- Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021).

**Figure 1.1: Process Lifecycle of Resource Waste Management Plan**



Source: Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021)

## 1.2 Structure of this CRWMP

*Design Out Waste* (EPA, 2015) notes that the preparation of a Waste Management Plan within the early design and feasibility phases provides a framework to carry out design reviews, and should be used as an implementation, benchmarking, monitoring and reporting tool throughout the overall construction process.

This CRWMP has been prepared in line with the recommendations of the *Best Practice Guidelines* (EPA, 2021) for Tier 2 projects and consequently addresses the following:

- Introduction
- Project description.
- Roles and Responsibilities
- Design Approach
- Key Materials, Quantities and Costs
  - Waste forecasting: Analysis of the waste arising / materials surpluses.
  - Specific waste management objectives for the project.
  - Proposed strategies and associated costs: Methods proposed for prevention, reuse and recycling of wastes.
  - Materials logistics.
- Site Management
  - Monitoring procedures: Auditing and record keeping; and
  - Proposals for education of workforce and plan dissemination programme.
- Site Infrastructure

## 1.3 Irish Waste Management Targets

The EU Waste Framework Directive (Directive 2008/98/EC) set the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It also included definitions for when waste ceases to be waste and becomes a secondary raw material (end-of-waste criteria) and how to distinguish between waste and by-product. The Directive was enacted in Ireland under the Waste Directive Regulations 2011 (S.I. No. 126 of 2011).

The EU Waste Framework Directive (2008/98/EC) requires Member States to take the necessary measures to achieve the minimum recycling/recovery target of 70% by weight for non-hazardous construction and demolition (C&D) waste, excluding naturally occurring materials. The Directive specifies that such a target should be achieved by preparing for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other material.

Ireland is required to meet the waste re-use and recycling targets presented in Table 1.1.

**Table 1.1: Targets**

Target Specifics	Reference Year	Rate	Indicator
Preparing for re-use, recycling and other material recovery (incl. beneficial backfilling operations using waste as a substitute) of 70% by weight of C&D non-hazardous waste (excluding natural soils & stone)	2020	78%	On Track

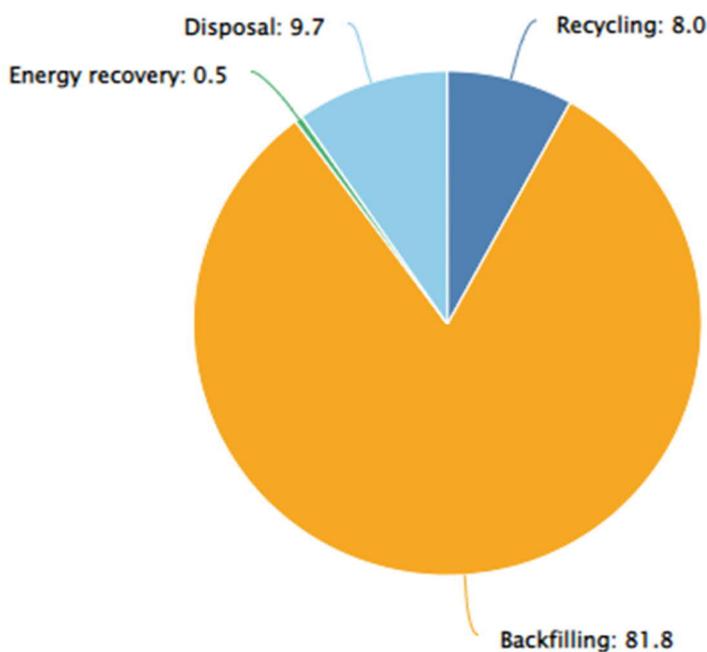
Source: <http://www.epa.ie/nationalwastestatistics/constructiondemolition/>, EPA Waste Data Release, 26 October 2022

Ireland is currently on-track to meet the EU waste targets for C&D waste. It should be noted, however, that soil and stones waste are excluded from the calculation of the Waste Framework Directive targets.

The EPA<sup>2</sup> notes that just over 8.2 million tonnes C&D waste was generated in Ireland in 2020. This decrease mirrors the trend in construction activity indicated by the CSO's construction index; and it was driven by a decrease in the generation of waste soil and stone, waste concrete, brick, tile and gypsum and waste bituminous mixtures.

The composition of C&D waste in Ireland in 2020 is illustrated in Figure 1.2.

**Figure 1.2: Composition of C&D waste material collected in Ireland, 2020**



Source: [www.epa.ie](http://www.epa.ie)

The overall composition of C&D waste changed little between 2019 and 2020. At 84% soil and stone waste remained dominant, followed by waste concrete, brick, tile and gypsum (6 per cent) and mixed C&D waste (5 per cent). The proportion of segregated (wood, paper, glass, plastic and metal) C&D waste collected remained small at 3.1 per cent in 2020 increasing from 2.5 per cent in 2019.

The vast majority (95%) of C&D waste underwent final treatment in Ireland in 2020; only 5% was exported abroad for final treatment. Most of the C&D waste was backfilled (82%), 8% was recycled with 10% sent for disposal. The dominance of backfilling as a treatment operation reflects the large proportion of soil and stones in C&D waste.

Recycling was the main treatment operation for metals (100%), for segregated wood, paper, glass and plastic (79%) and for waste bituminous mixtures (57%).

<sup>2</sup> [Construction & Demolition | Environmental Protection Agency \(epa.ie\)](https://www.epa.ie)

The Contractor(s) will be obliged to aim for an overall recycling rate of 70% of C&D material, in accordance with EU targets under Waste Framework Directive (2008/98/EC) as well as regional waste management targets.

#### 1.4 Waste Management Regulatory and Policy Requirements

The Eastern Midlands Region Waste Management Plan 2015 -2021<sup>3</sup>, which includes the areas of Fingal and Dublin City, states the following:

*The generation and management of waste is an everyday challenge which the people, businesses, industry and institutions of the Eastern-Midlands Region must recognise and address. In our daily lives we produce non-hazardous, hazardous and sometimes toxic wastes. These wastes have the potential to impact negatively on our communities, our health, our environment and future generations if not managed appropriately. Effective management systems are needed to ensure that we continue to live in healthy communities and protection is afforded to our environment. In the region we have a collective responsibility to improve our behaviours in response to this ongoing problem. This is necessary if we are to rethink the waste challenge and ignite the opportunities which waste as a resource offers.*

The Waste Framework Directive 2008/98/EC defines waste as “any substance or object that the holder discards or intends to or is required to discard”.

The Waste Hierarchy described in the framework prioritises prevention over re-use, recycling recovery and disposal, as illustrated in Figure 1.3.

Figure 1.3: Waste Hierarchy



Source: Waste Framework Directive ([https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive\\_en](https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en))

The primary legislative instruments that govern waste management in Ireland relevant to the Proposed Development are as follows:

- Waste Management Act 1996 (S.I. No. 10 of 1996), as amended. Sub-ordinate legislation to this Act includes:

<sup>3</sup> Eastern Midlands Western Region | ([emwr.ie](http://emwr.ie))

- European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
- Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008)
- Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008)
- Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
- Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) (Amendment) Regulations 2012 (S.I. No. 221 of 2012), as amended 2015 (S.I. No. 189 of 2015)
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
- Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003) .
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)
- Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021)

## 2 Roles and Responsibilities

### 2.1 Description and Role of the Client and Key Personnel

ESB is the Employer and has the following responsibilities:

- The planning application, including decision-making on the nature and extent of the Proposed Development, and setting out of environmental mitigation measures, included in this CEMP.
- Post-consent manages the process towards construction including liaison with key environmental agencies and stakeholders;
- Undertakes a Client Engineering function, including inspections to ensure that detailed designs, plant, materials and works including scheduling meet the requirements of its functional specifications, its outline designs and its generic standards; and
- Ensures that the Contractor employs an independent Environmental Clerk of Works (EnCoW) to assess the construction of the Proposed Development and advise the Contractor on the implementation of the agreed Contractor's CRWMP.

### 2.2 Description and Role of the Resource Manager

The Resource Manager will be appointed by the Contractor(s) who will ensure that the objectives and measures contained within this CRWMP are incorporated into the project specific CRWMP to achieve the associated target re-use / recycling rates.

The Resource Manager will be responsible for all aspects of waste management at the different stages of the Proposed Development, and overall implementation of this CRWMP and associated procedures.

The Resource Manager, as appointed by the Contractor, will be technically competent and appropriately trained.

The Resource Manager will facilitate effective communication of the waste management objectives with all operatives associated with the project (including site staff, external contractors and suppliers).

Another key objective of the Resource Manager will be the maintenance of accurate records on the quantities of waste / surplus materials generated and the real cost (including purchasing) associated with waste generation and management. The recording of summary information will further assist the implementation of the plan.

The Resource Manager will keep records of the quantities of waste / surplus materials generated and the costs associated with waste generation and management.

The Resource Manager will ensure that reporting and recording requirements are met, and all necessary resources are in place to support the implementation of the plan.

### 2.3 Description of the Role of the Contractor

The appointed Contractor(s) will be responsible for the Health and Safety of site workers and the completion of the works to the satisfaction of the Employer.

## 2.4 Description and Role of other parties and key personnel

### 2.4.1 Project Supervisor Design Process (PSDP) / PSCS

- ESB will be PSDP for the detailed design phase of this project.
- The PSCS on the project will be the appointed Contractor(s).

### 2.4.2 Site Manager

The Site Manager will be responsible for the day to day running of the site and will direct and oversee the activities of the Contractor and subcontractors throughout the works. The Site Manager will be responsible for programming the works, will regularly consult with the Employer and will maintain site safety.

## 2.5 Contact Details

As detailed previously, the requirement to develop, maintain and operate this CRWMP will form part of the contract documents for the project and will be updated by the appointed Contractor in advance of the commencement of construction activities on site. At that time the specific roles and responsibilities will be confirmed with the Planning Authority as part of the next iteration of this CRWMP prior to construction.

**Table 2.1: Contact details of site personnel and their roles**

Organisation	Role	Name	Contact Number	Email
To be confirmed				
To be confirmed				
To be confirmed				

## 3 Design Approach

### 3.1 Proposals for Managing Waste Arisings

Waste arisings will be managed in accordance with the principles outlined in the Waste Management Hierarchy as illustrated in Figure 1.3.

In order of priority, the Waste Management Hierarchy sets out the most desirable approaches to waste management in the following order:

1. Prevention
2. Reduction/Minimisation
3. Re-use
4. Recycle
5. Other Recover (including energy recovery)
6. Disposal

#### 3.1.1 Opportunity for Prevention and Reduction

Opportunities for the prevention of waste will be considered throughout all stages of the project. Contractors will plan the construction process to eliminate / reduce waste; specifically, careful planning will minimise the volume arising on-site, facilitate the use of reclaimed materials in the works, and influence wastage caused by poor materials handling.

*Design Out Waste* (EPA, 2015) notes that 33% of all on-site waste is due to a failure to implement waste reduction measures during the design stages. Materials logistics, specifically the avoidance of overstocking of materials, is a critical factor for material optimisation in preventing wasted material. A review assessment of this plan and detailed design plans will inform the appropriate quantities of materials required for the project thereby minimising, and potentially preventing, the generation of certain waste streams. In accordance with *Best Practice Guidelines* (EPA, 2021) and *Design Out Waste*, the following measures will be implemented at a minimum:

- Materials will be ordered on an 'as needed' basis to prevent over-supply to site;
- Materials required will be purchased in shape, dimensions, and form that minimise the creation of excessive scrap waste on-site;
- Storage and handling procedures and systems will be introduced to minimise generation of damaged materials / waste e.g. deliveries will remain unpacked until ready for use, sufficient space will be made available for manoeuvring of machinery etc.;
- The correct sequence of operations will be determined and implemented;
- Agreements will be made with suppliers, where possible, to ensure take back / buy back of surplus and sub-standard / rejected materials; and
- The primary Contractor will assign individual responsibility (through appropriate contractual arrangements) to sub-contractors for the purchase of raw materials and for the management of wastes arising from their activities.

Waste generated during the project will be re-used on-site, where practicable. Opportunities for recycling will be employed for any waste that cannot be re-used. Waste will only be sent for disposal if no other reasonable economically or technically feasible alternative can be found.

All wastes will be handled in a responsible manner with due regard to relevant legislation, codes and best practice guidelines.

Only authorised waste contractors with appropriate waste collection permits will be authorised to collect waste streams from the facility. Waste will only be transferred to facilities authorised to treat or dispose of the material in accordance with the requirements of the Waste Management Act 1996 (as amended) and associated Regulations.

Copies of all permits and licences will be retained with other waste-related documentation. Comprehensive waste descriptions will be provided on all documentation.

Appropriate and adequate waste segregation areas will be provided at secure locations on site. The number and size of containers and the number of uplifts required will be determined at a later stage in the project. The Contractor will ensure that containers are not filled beyond the maximum loading capacity of the collection vehicle. Effective inspection, containment and control measures will be implemented to ensure that no litter escapes from the construction site. Litter pickers will be employed within the construction site as required.

### 3.1.2 Opportunity for Re-use/Recycling

Material that is generated will be reused on site or salvaged for subsequent reuse to the greatest extent possible or recycled. Disposal will only be considered as a last resort. Initiatives will be put in place to maximise the efficient use/reuse of materials.

All metals are salvable and can earn a rebate which can offset collection and transportation costs. Clean, uncontaminated cardboard and certain hard plastics can be recycled. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste. Timber can be recycled as chipboard. If waste are segregated, waste contractors will charge considerably less as sorting and processing of waste reduces.

#### 3.1.2.1 Concrete

The contractor will be encouraged to process excavated concrete to be reused as general fill.

#### 3.1.2.2 Soil

All material will be tested and in the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material and disposed of appropriately. Soil will be reused where possible.

#### 3.1.2.3 Hazardous Waste Arisings

Waste fuel and oil and nominally empty containers will be appropriately contained and stored in designated areas on drip trays to prevent loss through drips and spills. Paints will be stored in appropriate containers in designated areas on drip trays, where practicable, non-hazardous paints will be used.

Hazardous wastes will be collected by appropriately authorised waste contractors for recovery or disposal as appropriate. Nominally empty containers will not be sent for disposal unless a determination can be made that the residual content does not exhibit any of the hazardous characteristics associated with hazardous waste.

#### 3.1.2.4 Scrap Metal

Scrap metal will be sent to an appropriately authorised waste contractor for recycling.

#### 3.1.2.5 Bitumen/Tarmacadam

Opportunities for bitumen / tarmacadam recycling will be investigated. If no alternatives are available, the waste arising will be sent for disposal.

### 3.1.2.6 Miscellaneous Waste Arisings

Small volumes of a variety of waste streams will be generated including packaging waste, plastic pipe and cable cut-offs, green, and mixed municipal type waste. The generation of surplus waste streams will be minimised through careful planning; however, it will not be possible to eliminate all surplus waste arisings e.g. cable and pipe cut-offs.

- Cardboard will be flattened while paper and cardboard containers will be covered to prevent ingress of water.
- Plastic will be segregated at source and kept as clean as possible prior to placement in a covered container.
- Paper, cardboard and plastics will be recycled whereas mixed municipal waste arising will be sent for disposal.

### 3.1.3 Green Procurement

Tender specifications, selection and award criteria and contract conditions will require procurement of products and services that prevent and reduce waste.

## 4 Key Materials, Quantities and Cost

### 4.1 Proposals for Managing Waste Arisings

The main waste stream arisings (including surplus materials) which are likely to be generated during the demolition and construction phase, are presented in Table 4.1 hereunder.

**Table 4.1: Waste Types and Associated EWC codes**

Waste Type	European Waste Classification (EWC) Code <sup>4</sup>	Waste Classification
Soil and Stones	17 05 04	Non-hazardous
Nominally Empty Containers containing residues of or contaminated by dangerous substances	15 01 10*	Hazardous
Waste Diesel and Oil	13 07 01*	Hazardous
Waste Fuels (Miscellaneous)	13 07 03*	Hazardous
Scrap Metal	17 04 07	Non-hazardous
Bitumen / Tarmacadam	17 03 02	Non-hazardous
Surplus Bitumen / Tarmacadam	17 03 02	Non-hazardous
Gypsum-based construction material	17 08 02	Non-hazardous
Mixed construction and demolition waste	17 09 04	Non-hazardous
Surplus Cabling	17 04 11	Non-hazardous
Plastic Pipe Cut-offs	17 02 03	Non-hazardous
Plastic Packaging	15 01 02	Non-hazardous
Paper and Cardboard Packaging	15 01 01	Non-hazardous

### 4.2 Waste Management Targets

The Contractor will be obliged to aim for an overall recycling rate of 70% of C&D material, in accordance with EU targets under Waste Framework Directive (2008/98/EC) as well as regional waste management targets. Waste management targets for anticipated waste arisings regarding reuse / recycling / recovery and disposal rates will be confirmed by the appointed Contractor

The appointed Contractor shall dispose of all debris, sewage, surplus material (including surplus excavated material) and all other waste materials arising from or connected with the Works to an appropriate licensed waste disposal site/facility, fully in accordance with the requirements of current waste management legislation the Waste Management Acts 1996 (as amended) and associated Regulations and to the satisfaction of the Engineer and relevant local authorities.

<sup>4</sup> The selected European Waste Classification (EWC) codes provided are provisional only. In a number of instances more than one EWC may be considered appropriate. Care should be taken to ensure that the waste collectors permit includes all EWC codes specified in the appropriate documentation. In addition, there will be a requirement for a technically competent person to assess waste as it arises and to make a determination as to the classification of the material in accordance with the Hazardous Waste List.

## 4.3 Waste Management Costs

### 4.3.1 Financial Cost Associated with Waste

The total cost of implementing the CRWMP will have to consider costs such as, handling, storage, transportation, revenue from rebates and disposal costs.

### 4.3.2 Re-use / Recovery

Reusing of materials on site will reduce disposal costs. Clean and inert soils, gravel, stones etc. which cannot be reused on site may be classified as a by-product (under Article 27 of the 2011 Waste Directive Regulations). This material may be used as capping material for landfill sites, or for the reinstatement of quarries etc. subject to approvals by the EPA. This material is often taken free of charge for such purposes, or when used as capping in landfills will not attract the landfill tax levy, thereby reducing final waste disposal costs.

### 4.3.3 Recycling

All metals are salvable and can earn a rebate which can offset collection and transportation costs. Clean, uncontaminated cardboard and certain hard plastics can be recycled. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste. Timber can be recycled as chipboard. If wastes are segregated, waste contractors will charge considerably less as sorting and processing of waste reduces.

### 4.3.4 Disposal Charge

The total cost of waste management associated with the Proposed Development will be calculated in regard to the purchase costs of materials, handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc. Costs will be recorded for the range of C&D materials and waste arising. At this stage, it is difficult to determine indicative total waste management costs as the CRWMP is preliminary in nature. When exact quantities and volumes of waste material cannot be determined the full disposal costs can be calculated.

A template for the recording of costs is provided in Table 4.3. This record will be live and will be developed as the project progresses.

**Table 4.2: Indicative Costs Breakdown for Waste Management**

Waste Type	Estimated Quantity (Tonnes)	Estimated Cost (€)
Quantity of Material	To be confirmed	To be confirmed
Purchase Cost	To be confirmed	To be confirmed
Materials Handling Costs	To be confirmed	To be confirmed
Material Storage Costs	To be confirmed	To be confirmed
Material Transportation Costs	To be confirmed	To be confirmed
Material Treatment Costs	To be confirmed	To be confirmed
Total Waste Management Cost	To be confirmed	To be confirmed
Unit Waste Management Cost	To be confirmed	To be confirmed

## 5 Site Management

### 5.1 Resource Manager

The Resource Manager will take responsibility for all aspects of waste management at the different stages of the Proposed Development and overall implementation of the CRWMP and associated procedures.

The Resource Manager, as appointed by the Contractor, will be technically competent and appropriately trained, and will take responsibility to ensure that the objectives and measures contained within this CRWMP are transposed into the detailed CRWMP, and are subsequently implemented including associated target re-use / recycling rates. The Resource Manager will also facilitate effective communication of the waste management objectives with all operatives associated with the project (including site staff, external contractors and suppliers).

Another key objective of the Resource Manager will be the maintenance of accurate records on the quantities of waste / surplus materials generated and the real cost (including purchasing) associated with waste generation and management. The recording of summary information will further assist the implementation of the plan.

The Resource Manager will ensure that reporting and recording requirements are met, and all necessary resources are in place to support the implementation of the plan.

### 5.2 Site Personnel

All site personnel will be instructed about the objectives of the CRWMP and informed of the responsibilities to effectively implement the plan. Where waste prevention, source segregation, material reuse techniques, and best practice guidelines apply, each member of staff will be given instructions on how to comply with the CRWMP.

### 5.3 Training

Copies of the CRWMP will be made available to all relevant personnel on site. The Resource Manager will arrange for all site personnel to receive training on the objectives of the plan and materials management. The topics to be covered will include:

- Project programme and requirements;
- Project commitments and targets;
- Health and safety requirements;
- Materials to be segregated;
- Segregation systems and protocols;
- Arrangements for the storage and handling of reusable materials and recyclables;
- Instruction on hazardous wastes and the dangers of each hazardous waste; and
- Document control requirements.

Toolbox talks on resource management will be provided on a regular basis to ensure that site personnel are aware of the resource management practices associated with their work and the appropriate control measures that are required to carry out their work in compliance with this CRWMP.

## 5.4 Record Keeping and Communications

A system will be developed to ensure that all details of generation, movement and treatment of C&D waste is recorded. Where practicable, a computerised monitoring tool will be employed to assist in facilitating waste reduction via benchmarking. As such, this system will enable the Contractor to measure and record the quantity of waste generated and identify wastage more readily as well as identify successes or failures as measured against performance targets. An indicative template is provided in Appendix A *Tracking Template*.

Verifiable and validated tracking and authorisation documentation will be maintained for all wastes destined for re-use, recovery, recycling, other recovery (including energy recovery), or disposal. Justification will also be provided where a disposal option has been employed.

In addition, a record will be kept of all materials as they arrive on site detailing the assignment of specific uses within the works. This will enable the monitoring of the quantity and type of waste produced at various stages throughout the project.

All waste material will be managed in accordance with the Waste Management Act 1996 (as amended) and associated Regulations e.g. all hauliers will hold waste licences and/or Certificates of Registration (COR) for the specified EWC and the appropriate local authority at the final destination. Waste will only be sent to facilities authorised to accept, treat and / or dispose of the material. Copies of all waste accreditations relevant to the waste treatment / collection will be retained with other waste records.

## 5.5 Communications

The Resource Manager will be responsible for internal reporting of resource statistics to ESB and the Contractor management. This will include performance relative to agreed targets and objectives which will be included as an agenda item at site meetings.

The Resource Manager will engage with the relevant local authorities and the EPA on any site inspection or enforcement audits undertaken at the site. All follow-up actions and corrective actions will be logged and reported to the local authority, as appropriate.

The Resource Manager will engage with other stakeholders (the public, etc.) as appropriate in relation to the resource management on site.

Upon completion of construction, the Resource Manager will prepare a final report summarising the outcomes of resource management processes adopted, the total reuse and recovery figures and the final destinations of all resources taken off-site. This report will be issued to ESB, Contractor management and the local authorities.

## 5.6 Waste Auditing

The effectiveness of the plan, and its implementation, will be subject to regular audits by the Resource Manager throughout the duration of the project. The purpose of the waste audit is to highlight the problems that waste can cause and the benefits of prevention and minimisation.

The audits will focus on material inputs to the project (assignment of materials to specific uses within the works) and the waste outputs for each operation, identifying additional opportunities for waste reduction, re-use and recycling. The audits will also investigate the operational factors and management policies that contribute to the generation of waste and identify appropriate corrective actions, where necessary.

The audit findings will reflect the success or failure of reaching performance targets and subsequent Action Plans will be developed to address any issues and highlight corrective actions that may be taken in relation to management policies or site practices in order to bring

about further waste reductions. Inspections of the waste storage areas will be undertaken on a weekly basis, issues relating to housekeeping, inappropriate storage and / or segregation will be actioned at the earliest practicable opportunity.

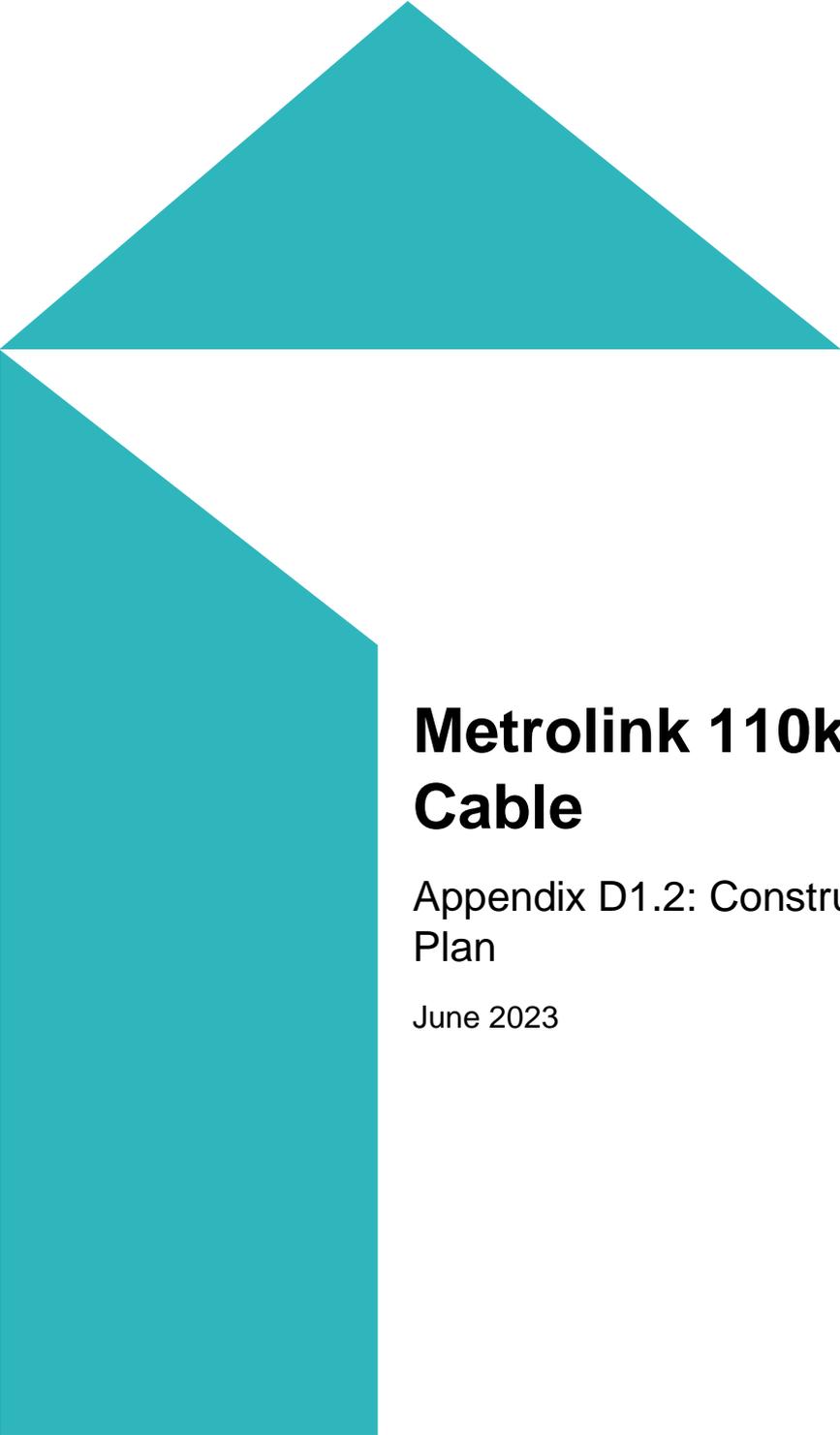
## 6 Site Infrastructure

This section relates to on-site signage, separation, and storage for handling and managing of waste and resources.

- Prior to construction, the site layout will be reviewed by ESB to ensure that the proposed Waste Storage Areas (WSAs) have adequate space for storage and handling.
- WSAs include stockpiles, skips or secure containers for hazardous materials. All WSAs will be assessed as fit for purpose and suitably contained, or banded as required.
- The WSA will be set out to reduce any potential impact on sensitive human or natural environments and a suitable buffer will be applied to mitigate any impact.
- Labelling and signage will be used onsite to inform personnel of key WSA requirements and restrictions, with clear signage provided on all WSAs.
- Signage will provide information to assist good resource practice across the site.

## A. Tracking Template



A large teal graphic on the left side of the page, consisting of a triangle at the top and a vertical rectangle below it, with a diagonal cutout in the upper right corner.

# **Metrolink 110kV Underground Cable**

Appendix D1.2: Construction Traffic Management Plan

June 2023

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# 1 Introduction

The Construction Traffic Management Plan (CTMP) is targeted at minimising disruption and enhancing safety in traffic operations during the construction phase of the MetroLink Underground grid cable (UGC) development (hereafter referred to as ‘the Proposed Development’). It incorporates measures which will specifically mitigate transport impacts identified in the Roads and Traffic chapter of the Environmental Impact Assessment Report (EIAR).

## 1.1 General

The CTMP has been developed in support of the Proposed Development. The CTMP provides details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the Proposed Development to minimise disruption and enhance safety.

Mott MacDonald produced the EIAR **Chapter 17: Roads and Traffic** to support the EIAR process for the Proposed Development. It was identified through the EIAR process that a bespoke CTMP would be required.

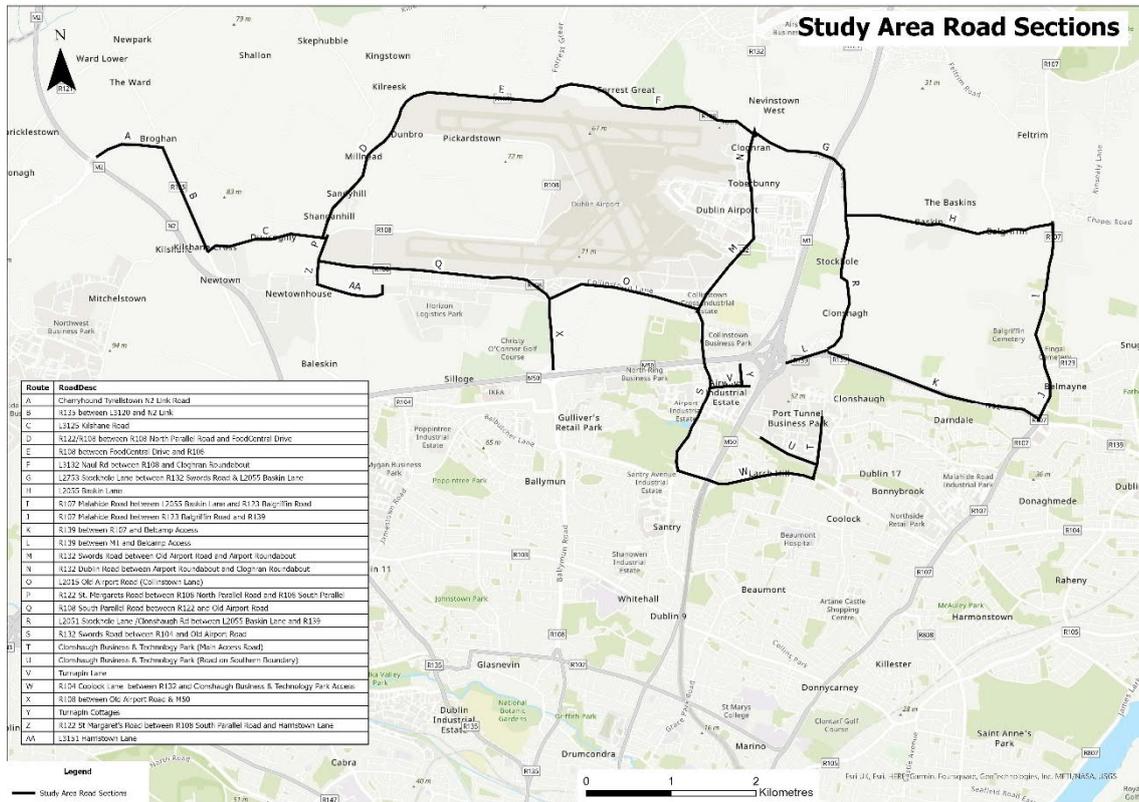
The CTMP will remain a ‘live’ document which will be updated in response to any relevant conditions of the Approval, and to reflect the detailed design of the Approved development – in collaboration and agreement with the relevant Roads Authorities (Fingal County Council (FCC), Dublin City Council (DCC) and Dublin Airport Authority (DAA)). Subsequently, the CTMP will be administered by the appointed contractor and will accordingly be reviewed regularly and revised as necessary to ensure that the measures implemented are effective.

## 1.2 MetroLink UGC Project

The CTMP considers anticipated Proposed Development traffic movements and the general traffic implications for worksite arrangements on or immediately adjacent to public roads directly on the Proposed Development cable routes and traffic movements on other public roads likely to be used for construction access. These locations have been defined in **Chapter 17: Roads and Traffic** of the EIAR, as submitted with the application for Approval of the Proposed Development.

The Study Area for the Roads and Traffic Chapter is the public road network associated with the construction of three high voltage (HV) cable routes as shown as shown indicatively in **Figure 1.1**.

Figure 1.1: Study Area



Source: Mott MacDonald, TII, ESNB

The three proposed HV cable routes are:

- 110 kV Newbury – Ballystruan.
- 110 kV Ballystruan – Forest Little; and
- 110 kV / 220 kV Forest Little – Belcamp (Option 1 or Option 2).

Construction of the Proposed Development will necessitate the establishment of several temporary construction compounds. The locations and general arrangements for these compounds will be defined by the appointed contractor.

### 1.2.1 Structure of this Report

The report is sub-divided into the following Sections:

- **Section 2** outlines the background context attributed to the project
- **Section 3** lists the proposed traffic management mitigation measures to be implemented during the construction phase of the Proposed Development
- **Section 4** presents the measures to monitor and implement the CTMP
- **Section 5** provides a summary statement for the CTMP

## 2 Construction Traffic

### 2.1 Construction Programme

The overall construction programme spans c. five years with the 110 kV Forest Little – Ballystruan Cable HV cable route implementation expected to commence in Q4 2026 and the 110 kV Ballystruan – Newbury HV cable route implementation is expected to be complete during Q1 2031. A construction information summary is shown in **Table 2.1**. The indicative construction programmes for both the civil and electrical works are outlined in **Table 2.2** and **Table 2.3**. The Electrical works would likely be less disruptive and would be undertaken following the Civil works (schedule to be determined).

**Table 2.1: Construction Information Summary**

HV Cable Route	Programme	Construction Worker Requirements	Working Hours
110 kV Forest Little – Ballystruan	Subject to the grant of statutory approval, it is anticipated that the construction phase (civil works only) will commence in Q3 of 2026 and the construction works (civil) will be complete in Q4 of 2027.	The total number of construction workers on-site will vary during the construction phase of the works but are expected to peak at approximately fifteen (15) persons.	Standard construction hours are Monday to Friday 07:00 to 19:00 and 08.00 to 17.00 on Saturday. Night working may also be a requirement in highly congested areas and these works will be completed in full compliance with the local authorities' requirements. There may be instances where extended hours / days are required however should working outside these hours / days be required they will only be undertaken with prior agreement with all relevant statutory authorities.
110 kV/220 kV Forest Little – Belcamp (Option 1 and Option 2)	Subject to the grant of statutory approval, it is anticipated that the construction phase (civil works only) will commence in Q3 of 2027 and the construction works (civil) will be complete in Q1 of 2029.		
110 kV Ballystruan – Newbury	Subject to the grant of statutory approval, it is anticipated that the construction phase will commence in Q2 of 2030 and the construction works (civil) will be complete in Q1 of 2031.		

Source: Mott MacDonald

**Table 2.2: Construction Programme (Civils)**

Phase	Duration			
HV Cable Route	110 kV Newbury - Ballystruan Cable	110 kV Ballystruan – Forest Little Cable	110 kV/220 kV Forest Little – Belcamp Cable – Option 1	110 kV/220 kV Forest Little – Belcamp Cable – Option 2
Pre-construction works	6 weeks	6 weeks	6 weeks	6 weeks

Phase	Duration			
	110 kV Newbury - Ballystruan Cable	110 kV Ballystruan – Forest Little Cable	110 kV/220 kV Forest Little – Belcamp Cable – Option 1	110 kV/220 kV Forest Little – Belcamp Cable – Option 2
Trenching and ducting works and temporary reinstatement (based on two crews)	16 weeks	40 weeks	48 weeks	24 weeks
Joint Bay Installation & temporary reinstatement	7 weeks	9 weeks	18 weeks	9 weeks
Permanent Reinstatement of trench	3 weeks	8 weeks	7 weeks	4 weeks
<b>Total</b>	<b>32 weeks</b>	<b>63 weeks</b>	<b>79 weeks</b>	<b>43 weeks</b>

Source: Mott MacDonald

**Table 2.3: Construction Programme (Electrical)**

Phase	Duration			
	110 kV Newbury - Ballystruan Cable	110 kV Ballystruan – Forest Little Cable	110 kV/220 kV Forest Little – Belcamp Cable – Option 1	110 kV/220 kV Forest Little – Belcamp Cable – Option 2
Pre-construction works	3 weeks	3 weeks	3 weeks	3 weeks
HV cable joint bay re-excavation (min 3 max 5 at time) – based on 12 Joint Bays	7 weeks (jointing works in parallel after initial 5 JB's open)	7 weeks (jointing works in parallel after initial 5 JB's open)	10 weeks (jointing works in parallel after initial 5 JB's open)	5 weeks (jointing works in parallel after initial 5 JB's open)
Proving of ducting / HV cable installation	7 weeks	8 weeks	14 weeks	7 weeks
HV cable jointing	6 weeks	9 weeks	17 weeks	8 weeks
HV cable commissioning (sheath test, cross bonding and HV/AC testing)	3 weeks	3 weeks	3 weeks	3 weeks
Permanent Reinstatement of Joint Bays (Civil Contractor)	6 weeks	6 weeks	11 weeks	5 weeks
<b>Total</b>	<b>32 weeks</b>	<b>36 weeks</b>	<b>58 weeks</b>	<b>31 weeks</b>

Source: Mott MacDonald

## 2.2 Construction Traffic

The wide geographic spread of the Proposed Development necessitates that construction related traffic will utilise several public roads in the FCC and DCC local authority areas as well as public roads or verges administered by the DAA.

As detailed in **Chapter 6**, the construction phase will include deliveries of construction material such as ducting, cabling, and bulk material like concrete or pre-cast joint bay materials.

Excavated material (from any carriageway works), will be disposed of offsite to suitably licenced waste facilities as necessary during the construction phase.

A number of robust assumptions have been made to estimate the number of HGV construction vehicles per HV cable route which are detailed in **Chapter 17**.

The estimated average daily HGV traffic generation, throughout the entire construction phase, by number of vehicles and movements (two movements = one inbound journey + one return journey) per HV cable section are summarised in **Table 2.4**.

**Table 2.4: Average Daily HGV Movements**

HV Cable Route	Civil		Electrical	
	HGVs	HGV Movements	HGVs	HGV Movements
110 kV Newbury – Ballystruan; and	26	52	3	6
110 kV Ballystruan – Forest Little.	26	52	3	6
110 kV / 220 kV Forest Little – Belcamp Option 1	42	84	7	14
110 kV / 220 kV Forest Little – Belcamp Option 2	29	58	0*	0*

Source: Mott MacDonald

\*The joint bays are off road, resulting in a 0 daily average

### 2.2.1 Construction Worker Movements

The total number of construction workers on site will vary during the construction phase but is expected to peak at fifteen persons (per HV cable route). This would mean a maximum of 30 two-way movements of cars and small vans per day; categorised as light good vehicles (LGVs). This estimate is considered robust as it is likely that some construction workers will car share or use public transport (for at least some of their journey) if practical.

### 2.2.2 Abnormal Load Deliveries

No abnormal loads are anticipated to be required to facilitate construction of the Proposed Development.

## 2.3 Construction Access and Public Road Impacts

For the purposes of a robust assessment, it has been assumed in **Chapter 17**, that for each of the HV cable routes, all construction generated traffic (i.e., HGVs and LGVs) will utilise each road section assigned to each cable route shown in **Appendix B** and detailed in **Chapter 17, Section 17.4.2**.

### 2.3.1 Construction Compounds

For the purposes of a robust assessment, it has been assumed in **Chapter 17** that there would be construction compounds at each of the four substations (Belcamp, Ballystruan, Newbury and Forest Little). It has been assumed that each compound would feature adequate parking to accommodate construction worker vehicles.

### 2.3.2 Full Road and Lane Closures

The width of the joint bays and the nature of the road network in the local area necessitates that full rolling (localised) road closures, lane closures and diversions will be required at some locations during construction.

The road closures and lane closure proposals are described below.

Similar mitigation would be adopted if any other road sections not described in this section, are identified following further assessment to require temporary road/lane closures.

### 2.3.2.1 L2055 Baskin Lane Road Closure

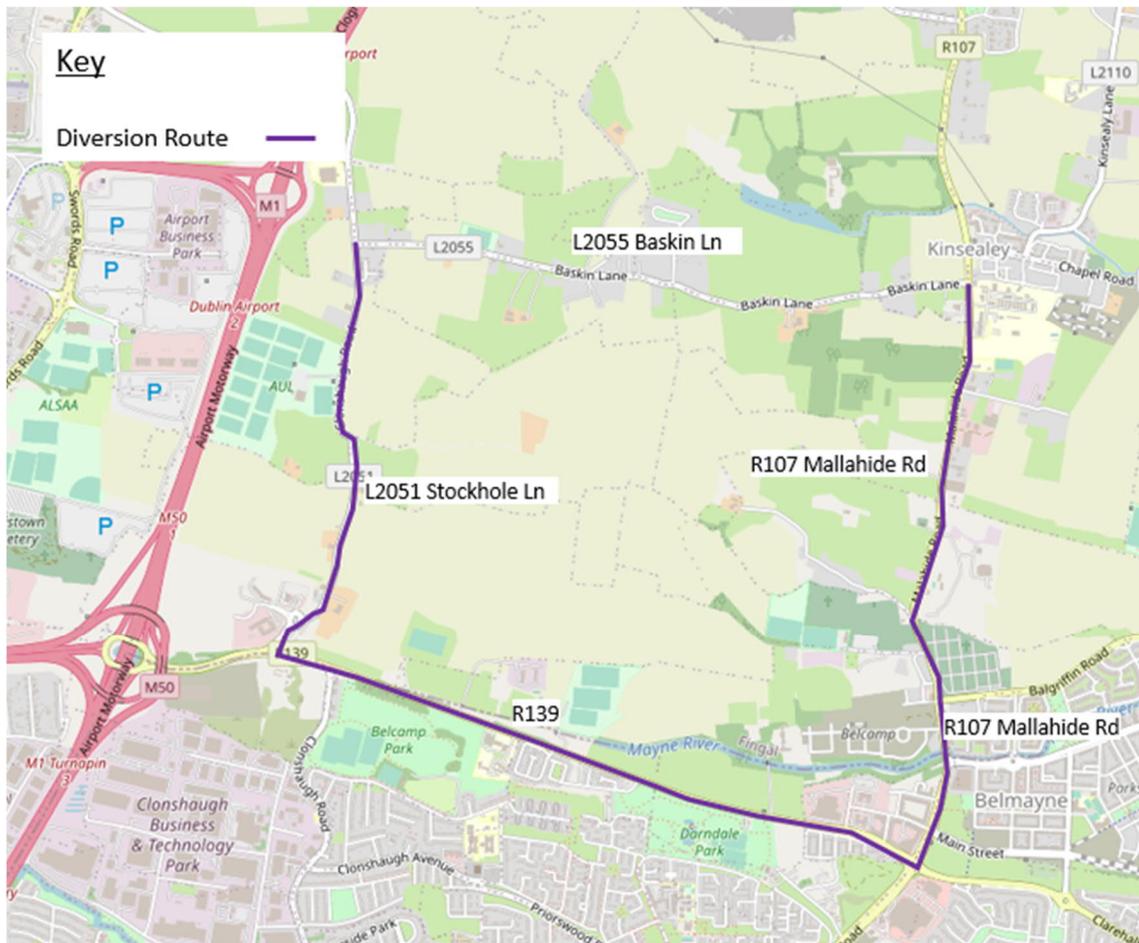
L2055 Baskin Lane will be locally closed (with a rolling road closure) to through traffic for a period unlikely to exceed eight weeks during the Civil works. It would remain open for local or emergency access. Baskin Lane may be subject to a shorter duration closure during the Electrical works. Some level of driver delay and inconvenience will arise as a result of the road closure of L2055 Baskin Lane.

Although not currently envisaged, there remains some potential of localised underground obstruction (e.g., existing infrastructure apparatus) which may necessitate localised cable route realignment and the associated temporary closure of Baskin Road, and if such a scenario were to occur then the appointed contractor would agree appropriate and safe working arrangements in consultation with the reviewing authority.

**Figure 2.1** shows planned diversion routes due to the temporary closure of L2055 Baskin Lane. Whilst it is assumed some vehicles may use this diversion route it is likely that many drivers will utilise other routes.

The additional length of the diversion route would be up to 4.3kms and would add six to ten minutes travel time onto journeys previously utilising the L2055 Baskin Lane.

**Figure 2.1: L2055 Baskin Lane Diversion Route (Both Directions)**



Source: Mott MacDonald, OpenStreetMap.org

**Specific traffic management requirements and localised arrangements for access will be developed by the appointed contractor(s) and will be agreed upon in advance of implementation with the appropriate reviewing authority/authorities.**

#### 2.3.2.2 Lane Closures

Road sections which will be subject to a localised lane closures and the durations of the closures are described in **Table 2.5**.

**Table 2.5: Duration of Lane Closures During Civil Works**

Road Section	Expected No. of Lanes Closed	HV Cabling Works Expected Duration of Closure	Joint Bay Works Expected Duration of Closure
<b>110 kV Newbury – Ballystruan</b>			
Clonsaugh Business & Technology Park (Road on Southern Boundary)	1 lane	5 weeks	4 weeks
R132 Swords Road between R104 and Old Airport Road	1-2 lanes	1 day	No joint bays on road section
<b>110 kV Ballystruan – Forest Little</b>			
R122 St. Margaret’s Road between R108 North Parallel Road and R108 South Parallel Road	1 lane	1 week	No joint bays on road section
R122/R108 between R108 North Parallel Road and FoodCentral Drive	1 lane	9 weeks	3 weeks
R122 St Margaret’s Road between R108 South Parallel Road and L3151 Harristown Lane	1 lane	1 week	1 week
R108 between FoodCentral Drive and R108	1 lane	6 weeks	3 weeks
L3132 Naul Rd between R108 and Cloghran Roundabout	1 lane	9 weeks	4 weeks
<b>110 kV / 220 kV Forest Little – Belcamp Option 1</b>			
L2753 Stockhole Lane between R132 Swords Road & L2055 Baskin Lane	1 lane	6 weeks	No joint bays on road section
L2051 Stockhole Lane /Clonsaugh Rd between L2055 Baskin Lane	1 lane	6 weeks	No joint bays on road section
L2055 Baskin Lane	1 lane	9 weeks	See Section 17.5.6.1
R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road	1 lane	6 weeks	6 weeks
R107 Malahide Road between R123 Balgriffin Road and R139	1-2 lanes	2 weeks	3 weeks
R139 between R107 and Belcamp Access	1-2 lanes	7 weeks	6 weeks
R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	1-2 lanes	2 days	No joint bays on road section

Road Section	Expected No. of Lanes Closed	HV Cabling Works Expected Duration of Closure	Joint Bay Works Expected Duration of Closure
<b>110 kV / 220 kV Forest Little – Belcamp Option 2</b>			
L2753 Stockhole Lane between R132 Swords Road & L2055 Baskin Lane	1 lane	6 weeks	No joint bays on road section
L2051 Stockhole Lane /Clonshaugh Rd between L2055 Baskin Lane	1 lane	7 weeks	No joint bays on road section
R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	1-2 lanes	2 days	No joint bays on road section

Source: Mott MacDonald

### 2.3.2.3 L3151 Harristown Lane

L3151 Harristown Lane is approximately 3m wide and experiences very low levels of traffic (likely to be fewer than 20 movements per day). This road will be subject to both cable and joint bay installation works (one joint bay) which would occupy the full road carriageway width.

In order that Harristown Lane can continue to accommodate local vehicular access, local traffic management arrangements will be implemented as necessary (e.g., temporary steel plates may be placed over open excavations).

**Specific traffic management requirements and localised arrangements for access will be developed by the appointed contractor(s) and will be agreed upon in advance of implementation with the appropriate reviewing authority/authorities.**

## 3 Measures identified to Minimise and Mitigate Traffic Impacts

### 3.1 General

Road sections in the Study Area have been reviewed with the principal aim being to minimise potential disruption to local communities, and general traffic. There are a range of traffic management measures proposed to minimise potentially disruptive impacts associated with construction works and construction traffic. These measures are hereafter described.

#### 3.1.1 Time Control

Construction working hours will be conditionally defined through planning agreement or road opening license. Normal working hours are expected to be Monday to Friday 07:00 to 19:00 and 08.00 to 17.00 on Saturday, but overnight working may also be a requirement in highly congested areas. In instances where extended hours / days are required works will only be undertaken with prior agreement with the relevant statutory authority.

The appointed contractor will plan and manage construction works activities to minimise potential disruption on the surrounding road network and any other detrimental impact to the local community.

The appointed contractor will liaise with Fingal County Council (FCC), Dublin City Council (DCC) and Dublin Airport Authority (DAA) upon finalisation of the construction programme to ensure (as far as is reasonably practicable) that no conflict with planned road works in the vicinity of any construction works occurs so as not to impact motorists further.

Deliveries will be scheduled, as far as is reasonably practicable, to avoid network peak hours and passing by schools around typical drop-off and pick-up times. Where practically achievable, diversion routes will not apply outside of the compound's hours of operation.

Accordingly, the appointed contractor will discuss and agree with FCC, DCC and DAA on times to be avoided at schools and other community receptors at peak periods of the construction programme to minimise disruption.

The appointed contractor will liaise with FCC, DCC and DAA regarding local events dates and seek to avoid traversing affected route sections at agreed times.

#### 3.1.2 Diversion Routes

Where practical, localised traffic management (e.g., single lane alternate working) or temporary passing bays will be implemented. However, at locations where local traffic management or passing bays are not practical then local road diversions will be implemented. In all cases all reasonable and practically achievable measures, such as moving of equipment and placing steel plates over the trenches to allow essential access for vehicles, will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes.

An indication of the location of and potential implications of diversions are set out in **Section 2.3.2** of the CTMP. Confirmed diversion routes will be agreed before construction between the appointed contractor and relevant authorities.

Once the construction programme, construction methodologies and associated compound layout requirements are firmly established, there will be a process of approvals for signage and information provision regarding essential traffic diversions. These will be discussed and agreed upon with FCC, DCC, DAA and other authorities as required.

When a road closure is required, the procedure set out in *Section 75 of the Roads Act 1993* will be followed and the proposed diversion route will be approved by the relevant Road Authority.

When a closure is required, there will be a provision for a diversion route suitable to accommodate the types and volumes of traffic. Diversion route signage will be clear and consistent, guiding the traffic through each decision point until it re-joins the route from which it was diverted.

Diversion routes will be maintained in a satisfactory condition throughout the period of the diversion. **Figure 3.1** below shows some examples of diversion signage and is not exhaustive.

**Figure 3.1: Temporary Traffic Measures and Signs for Roadworks**



Source: 'Temporary Traffic Measures and Signs for Roadworks'. Traffic Signs Manual Chapter 8 (August 2019). Department of Transport, Tourism and Sport.

### 3.1.3 Transportation Protocol

All contractors will adhere to the agreed CTMP and any agreed conditions imposed by ABP, FCC, DCC and DAA.

All construction vehicles associated with the proposed development will:

- Display a unique identification number shown on a plate clearly visible.
- Be securely sealed.
- Record origin, destination, and route of the vehicle.
- Not leave in convoy.

- Ensure all vehicle identifications including registration plates on the vehicle are clearly visible.

En route to and from their destinations drivers of all construction vehicles will:

- Access their destination compound via an approved route; this is to be determined by the approved contractor in conjunction with the administering local authority.
- Strictly observe speed limits.
- Drive in a safe and courteous manner with due care and consideration for other road users both vehicular and pedestrian.
- Be aware and alert whilst driving through towns and villages particularly at school times.
- Strictly adhere to the hours of operation detailed by the TMP.
- Not deliberately wait or stack on any public road.

The appointed contractor will maintain a management system whereby the following records are kept and are available to FCC, DCC and DAA:

- The number of vehicles arriving and leaving their destination.
- All complaints received regarding transport and resultant action taken.
- All instances where a protocol has been breached and resultant action taken.

The appointed contractor will supply the following information to FCC, DCC and DAA, which will be treated in confidence:

- Action to be taken when a protocol is breached; and
- A log of vehicle movements.

#### 3.1.4 Road Cleaning/Sweeping

To reduce the potential for debris being deposited onto the local road network in the road sections/compound areas of HV cable construction, the appointed contractor will ensure that public roads and footways are cleaned and swept during and after the works. This cleansing regime will minimise the amount of deleterious material deposited on the road surface and the appointed contractor will ensure that the nearest public road will be kept clear of debris by monitoring and then utilising a road sweeper where necessary.

#### 3.1.5 Speed Restrictions

All construction workers, including contractor managed HGV drivers, will be briefed on the absolute requirement to adhere to posted speed limits on public roads through induction sessions and through regular briefings (toolbox talks). Other parties responsible for site deliveries will also be instructed per the requirement for compliance with posted speed limits on all roads.

Speed limits posted within compounds will be considered mandatory and, therefore will be complied with.

#### 3.1.6 Temporary Signage

During the construction phase, signage will be installed to warn road users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.

General information signage will be installed to inform road users and local communities of the nature and location of the works, including contact details should they require additional information.

Indicative signage for use on these routes is illustrated in **Figure 3.2**.

**Figure 3.2: Indicative Warning Signs**



Source: Mott MacDonald

Temporary signage will be formally agreed with FCC, DCC and DAA prior to installation and commencement of construction. All signing will also be provided in accordance with the Traffic Signs Manual.

### 3.1.7 Temporary Traffic Management

The construction worksite requirements in conjunction with existing road corridor geometry in some locations necessitates that localised road closures and diversions will be required.

Other forms of traffic management include:

- Localised lane closure and traffic management signing on dual carriageway sections.
- Localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic on dual carriageway sections
- Single alternate lane operation controlled by temporary traffic signals on two lane single carriageway sections.
- Single alternate lane operation controlled by temporary traffic signals and convoy operation (to control vehicle speed) on two lane single carriageway sections.
- Single alternate lane operation manually controlled using stop/go signs.
- Temporary passing bays to enable traffic to bypass works.

### 3.1.8 Public Transport

The appointed contractor will discuss with FCC, DCC, DAA and local bus operators regarding matters that could affect the flow of buses and, will implement reasonable and practically achievable measures to mitigate any disruption to bus services and inconvenience to service users.

Public Transport services that may be affected by local traffic management are listed below in **Table 3.1**.

**Table 3.1: Public Transport services that utilise road sections affected by construction activity**

Route Number	Operator	HV Cable Route/Construction Traffic	Detail	Frequency (during normal construction hours)
2**	Expressway	110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R104 Cooloch Lane between R132 and Colnshaugh Business & Technology Park Access	7 days a week: 06:00 – 22:00 (every 60 mins). 1 service at 00:00.
4**	Dublin Bus	110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b> R108 between Old Airport Road and M50	Mon – Fri: 05:30 – 07:00 (every 15 minutes). 07:00 – 19:00 (every 12 minutes). 19:00 – 23:20 (every 20 minutes). Sat: 06:00, 06:30, 07:00, 07:15. 07:15 – 19:00 (every 15 minutes). 19:00 – 23:20 (every 20 minutes). Sun: 08:00 – 11:30 (every 30 minutes). 11:30 – 19:00 (every 15 minutes). 19:00 – 23:30 (every 30 minutes).
13**	Dublin Bus	110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b> R108 between Old Airport Road and M50	Mon – Fri: 05:30 – 23:30. (approximately every 15 minutes) Sat: 06:10 – 08:30 (every 20 minutes). 08:30 – 23:30 (every 15 minutes). Sun: 07:00 – 11:00 (every 30 minutes). 11:00 – 23:30 (every 15 minutes).
15**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1	Travels through R107 Mallahide Road/R139 signalised junction	Mon-Fri: 04:00-06:00 (every 30 minutes). 06:00-17:00 (approximately every 10 minutes). Sat: 04:00-05:30 (every 30 minutes). 06:00-23:30 (every 15 minutes)
16**	Dublin Bus	110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout and Dublin Airport	Mon – Fri: 06:00 – 23:30. (approximately every 15 minutes). Sat: 06:00 – 23:30. (approximately every 15 minutes). Sun: 08:00 – 23:30 (every 15 minutes).
22**	Expressway	110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> R104 Cooloch Lane between R132 and Colnshaugh Business & Technology Park Access R12 Swords Road between Old Airport Road and Airport Roundabout R139 between M1 and Belcamp Access	7 days a week: 3 services per day. 06:30, 09:30, 12:30.
23**	Expressway	110 kV Newbury – Ballystruan 110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R104 Cooloch Lane between R132 and Colnshaugh Business & Technology Park Access R108 between Old Airport Road and M50 R12 Swords Road between Old Airport Road and Airport Roundabout R139 between M1 and Belcamp Access L2015 Old Airport Road	Mon – Wed: 4 services per day. 01:00, 06:30, 12:15, 15:30. Thurs: 4 services per day. 06:30, 08:00, 12:15, 15:30 Fri – Sat: 5 services per day. 01:00, 06:30, 08:00, 12:15, 15:30 Sun: 4 services per day. 01:00, 06:30, 12:15, 15:30
27**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1	Travels through R107 Mallahide Road/R139 signalised junction	Mon-Fri 05:15-06:50 (approximately every 15 minutes) 06:50 – 19:30 (every 10 minutes). Sat- 08:00 – 11:00 (approximately every 20-30 minutes). 11:00- 19:00 (every 15 minutes).
27b**	Dublin Bus	110 kV Newbury – Ballystruan 110 kV Ballystruan – Forest Little	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R104 Cooloch Lane between R132 and Clonshaugh Business & Technology Park Access	Mon – Fri: 06:40 – 23:30. (approximately every 30 minutes). Sat: 07:15 – 23:30. (approximately every 25 minutes). Sun: 09:35 – 23:30. 3 services between 09:35 – 11:50. 11:50 – 23:30 (approximately every 30 minutes).
N6	Go Ahead Ireland	110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b>	Mon – Fri: 05:20 – 23:16. (approximately every 15 minutes)

Route Number	Operator	HV Cable Route/Construction Traffic	Detail	Frequency (during normal construction hours)
			R104 Coolock Lane between R132 and Clonshaugh Business & Technology Park Access	Sat: 05:20 – 23:20 (approximately every 15 minutes) Sun: 07:20 – 23:20 (approximately every 20-30 minutes)
27X**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1	Travels through R107 Mallahide Road/R139 signalised junction	Mon-Fri only: 1 – 2 services per day.
30**	Expressway	110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R104 Coolock Lane between R132 and Colnshaugh Business & Technology Park Access R108 between Old Airport Road and M50 R12 Swords Road between Old Airport Road and Airport Roundabout L2015 Old Airport Road	7 days a week. 7 services per day. 00:30, 06:30, 09:30, 12:30, 15:30, 18:30, 21:30.
32**	Expressway	110 kV / 220 kV Forest Little – Belcamp Option 1 110 kV Newbury – Ballystruan	<b>On Cable Route</b> L2753 Stockhole Lane between R132 Swords Road and L2055 Baskin Lane <b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R104 Coolock Lane between R132 and Colnshaugh Business & Technology Park Access	7 days a week. 06:15 - 22:45 (services approximately every 2 hours).
33**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	Mon- Fri: 06:30 – 13:20. 1 to 2 services per hour. Sat: 8 services throughout day.
33e**	Northcliffe Heights	110 kV / 220 kV Forest Little – Belcamp Option 1 110 kV Ballystruan – Forest Little 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R12 Swords Road between Old Airport Road and Airport Roundabout	Fri only: 1 service at 07:00.
33N**	Nitelink, Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 110 kV Ballystruan – Forest Little 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R12 Swords Road between Old Airport Road and Airport Roundabout	Mon: Thurs: No service. Fri: Sat: 4 services per day. 00:00, 01:30, 02:30, 04:00 Sun: No service.
40b**	Dublin Bus	110 kV Ballystruan – Forest Little	<b>On Cable Route</b> R122 St. Margaret's Road between R108 North Parallel Road and R108 South Parallel Road	Mon-Fri: 6 services per day. 07:05, 12:20, 15:45, 17:25, 18:20, 23:30 Sat: 5 services per day. 06:55, 12:35, 15:15, 17:35, 23:30 Sun: 4 services per day. 12:30, 15:30, 18:00, 23:30

Route Number	Operator	HV Cable Route/Construction Traffic	Detail	Frequency (during normal construction hours)
41**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	Mon-Fri: 04:00 to 18:30 2 to 4 services an hour. Sat: 04:00-09:00 service every 30 minutes. 09:00-19:00 approximately every 20 minutes.
41b**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	Mon-Fri: 4 services per day. 06:20, 11:35, 16:25 18:35 Sat: 3 services per day. 08:20, 11:20, 17:00
41c**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	Mon-Fri: 07:00-09:40 – 2 services per hour. 10:00-18:45 – 3 services per hour Sat: 07:15-08:45- 2 services per hour. 09:15-18:45- 3 services per hour.
41d**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2 110 kV Newbury – Ballystruan	<b>On Cable Route</b> R132 Swords Road between R104 and Old Airport Road <b>On Construction Road Section</b> R132 Swords Road between Old Airport Road and Airport Roundabout R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	Mon-Fri: 2 services per day at 07:30 and 07:40 Sat: no service
42**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1	<b>On Cable Route</b> R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road R107 Malahide Road between R123 Balgriffin Road and R139	Mon-Fri: 2 to 3 services an hour between 06:45 and approximately 19:00.
43**	Dublin Bus	110 kV / 220 kV Forest Little – Belcamp Option 1	<b>On Cable Route</b> R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road R107 Malahide Road between R123 Balgriffin Road and R139	Mon- Fri: 6:20-07:20- every 30 minutes. 07:35-08:55 every 15 minutes. 09:10-10:10 – 1 per hour. 11:05 – 2 per hour, 12:45-14:20- 1 per hour. 15:10 -15:40 – 2 per hour, 16:00- 17:40 – 3 per hour and following on 1 per hour until 23:00
83**	Dublin Bus	110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b> R108 and R122	Mon – Fri: 05:45 – 23:20. 3 services per hour. Sat: 06:00 – 23:20. 3 services per hour. Sun: 07:20 – 23:20. 4 services per hour.
83A	Dublin Bus	110 kV Ballystruan – Forest Little	<b>On Construction Road Section</b> R108 and R122	Mon – Fri: 09:20 – 22:40. Hourly. Sat: 09:30 – 22:20. Hourly. Sun: 09:40 – 22:40. Hourly.
101**	Bus Éireann	110 kV / 220 kV Forest Little – Belcamp Option 1 110 kV Ballystruan – Forest Little 110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> Dublin Airport and R132 and R104 Swords Road	Daily: 00:30 – 05:30. 4 services,. 05:30 – 23:30 (every 60 minutes).
102**	Go Ahead	110 kV / 220 kV Forest Little – Belcamp Option 1 or Option 2	<b>On Cable Route</b>	Weekdays: 05:45 – 23:45 (every 30 minutes).

Route Number	Operator	HV Cable Route/Construction Traffic	Detail	Frequency (during normal construction hours)
		110 kV Ballystruan – Forest Little	L3132 Naul Road between R108 and Cloghran Roundabout <b>On Construction Road Section</b> R132 Dublin Road between Airport Roundabout and Cloghran Roundabout	
102c**	GoAheadIreland	110 kV / 220 kV Forest Little – Belcamp Option 1	<b>On Cable Route</b> R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road	Two services (Tuesday only).
103**	Bus Éireann	-	<b>On Construction Road Section</b> R135	Daily services, approximately 2-3 services per hour.
196**	Local Link Louth Meath Fingal	-	<b>On Construction Road Section</b> R108 Naul Road and L2030 Brackenstown Road	Mon – Sat: 9 services per day. Sun: No services.
717**	Avalen	110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> M1 Junction 1 to Dublin Airport R132 Dublin Road between Airport Roundabout and Cloghran Roundabout R104 Cooloch Lane between R132 and Colnshaugh Business & Technology Park Access	Mon/Tue/Wed/Fri/Sat/Sun: 01:30 - 18:00 service at least every two hours. Thurs: 05:00 – 18:00 service at least every two hours.
760**	Citylink	110 kV Ballystruan – Forest Little 110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> R132, Old Airport Road and R108	Daily. Service runs between 01:15 – 04:15 and 05:30 – 14:30 approximately every 60 minutes.
X30**	Expressway	110 kV Ballystruan – Forest Little 110 kV Newbury – Ballystruan	<b>On Construction Road Section</b> M1 to Dublin Airport, R132, Old Airport Way, R108	Fri only: 4 services per day. 06:45, 07:30, 07:50, 08:10.

Source: Dublinbus.ie, Moovit.app, Google Maps. Note: Normal construction hours refers to Monday to Friday 07:00 to 19:00 and Saturdays 08:00 to 17:00.

### 3.1.9 Pedestrian, Cyclist or Equestrian Routes

Appropriate signage advising of dates and hours of working will be installed on the pedestrian, cyclist, and recreational routes, among others, in advance of road crossing points to warn users of construction traffic.

Indicative signage for use at these locations is illustrated in **Figure 3.3**. The exact details and location of the signage would be agreed with FCC, DCC and DAA.

**Figure 3.3: Recreational Routes Warning Signage**



Source: Mott MacDonald

### 3.1.10 Parking for Vehicles of Construction Workers, Operatives and Visitors

To avoid detriment associated with obstructive parking, adequate car parking space for permanent construction workers, visitors and deliveries will be provided within the site compounds. Car parking will not be permitted on any public road network adjacent to the site to minimise the potential for obstruction and delay for other road users. The requirement for construction workers not to park their private vehicles on public roads will be a mandated and advised to all construction workers prior to commencement of works and reinforced via 'toolbox talks'.

Vehicle sharing will be promoted to construction workers by the contractor during the induction process.

## 4 CTMP Implementation and Monitoring

### 4.1 General

The implementation of the CTMP will be the responsibility of the appointed contractor who will also be responsible for monitoring. Further evolution of the CTMP will be required during the detailed proposed development planning stages and during the construction phase.

The appointed contractor may employ several sub-contractors, and all in such cases sub-contractors' activities will fall under the requirements of the CTMP and therefore sub-contractor construction workers and sub-contractor managed construction vehicle drivers will have an obligation to adhere to the CTMP. This obligation will form part of the procurement process and will be written into any relevant employment or commissioning contract.

CTMP compliance will be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures in the CTMP and record any complaints. The appointed contractor will stipulate that all contractors circulate these rules to their sub-contractors.

Non-compliance with the CTMP will constitute a breach of contract, and action will be taken against the contractor or supplier should repeated non-compliance continue. Details of the proposed monitoring and enforcement regime will be supplied to FCC, DCC, or DAA upon request.

### 4.2 Responsibilities

The appointed contractor will nominate a person responsible for the coordination of all elements of traffic and transport during the construction process, a nominated Liaison Officer. The Liaison Officer will be the direct point of contact for the developer organisation with the local community. Accordingly, local residents and business holders can contact the Liaison Officer for information purposes or discuss specific matters about traffic management or site operation.

Contact details for the Liaison Officer will be made available to relevant parties and more generally, as agreed with local authorities, to the local community prior to commencement of works on-site.

The appointed contractor (or their appointed agent) will review the number of construction workers, traffic numbers, and the construction programme as the proposed development progresses. Any proposed or unplanned substantive changes will be discussed and agreed with FCC, DCC, or DAA as far as is reasonably practicable.

As necessary, meetings would be held with FCC, DCC, or DAA and the appointed contractor to discuss the CTMP and to discuss any relevant issues raised by the local community.

### 4.3 Transport Co-ordination

The appointed contractor will be responsible for the co-ordination of all elements of HGV transport to and from the compounds and worksites. The appointed contractor (or their appointed agents) will be responsible for co-ordination and liaison with sub-contractors, FCC, and DCC, DAA, TII, emergency services and the local community.

The Liaison Officer will inform FCC, DCC, DAA (or agents thereof) of any important matters that could affect traffic movement through reports issued at regular intervals or by day-to-day reports of any substantial, essential changes to transport plans necessitated by circumstances.

#### 4.4 Communication and Consultation

As indicated above, the appointed contractor will nominate a Liaison Officer to act as a point of contact with the local community. The Liaison Officer would be responsible for keeping the local community informed of progress on the site and communicating upcoming activities which could give rise to increased construction vehicle movements.

The Liaison Officer will be able to attend Community Council meetings to provide a report and to be on hand to answer any questions that the local community may have. Contact details will be provided for the Liaison Officer (telephone number and email address) and will be made available locally so that members of the public have an opportunity to ask questions and provide feedback.

The appointed contractor will utilise local media channels to circulate information regarding traffic management.

Signs will be erected at access points to construction compounds to provide contact details of the appointed contractor's Project Manager. These contact details will also be provided directly to the emergency services.

#### 4.5 Liaison with Other Developers/Contractors

It is recognised that the construction period associated with the proposed development could coincide with the construction of other proposed developments whereby construction related traffic will travel through the same area and use the same public roads.

If the construction phase of any notably sized development(s) appears likely to overlap with the proposed development, the appointed contractor will seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.

#### 4.6 CTMP Review

The CTMP, as a 'live document' will be reviewed on a regular basis by the appointed (as needed, in tandem with the appointed contractor(s) prior to and during the project construction phase. The CTMP, during the project's evolution, will be subject to change to enable the most effective and suitable measures for implementation and where needed, approved by FCC, DCC, and DAA.

# 5 Summary Statement

## 5.1 Summary

The CTMP represents a commitment to satisfy reviewing Authority requirements and sets out proposed traffic management and contingency planning measures to enhance road safety and limit adverse effects of construction works and construction traffic on the existing road network and the communities it serves.

It is anticipated that once the contractors are appointed, further useful information would become available, including a finalised construction programme. Such details would be submitted to FCC, DCC and DAA for information and/or agreement as appropriate.



# **Appendix D2 – ESB Construction Methodology**



Energy for  
generations

## DN0566 Metrolink – Advanced Work Package



Energy for  
generations

## Construction Methodology of HV Cable Routes

Document No.: PE424-F1159-R00-003-000

Date: 03/08/2021

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DN0566 Metrolink – Advanced Work Package  
Construction Methodology of HV Cable Routes

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**Template Used:** T-020-017-Engineering and Major Projects Report Template

## Change History of Report

Date	New Revision	Author	Summary of Change
03/08/2021	000	G. Kane	First Issue

## Executive Summary

This report has been compiled as a guide to provide suitable information on the standard trenching and ducting techniques required to complete a HV cable project. The completion of ducting works has been provided in a step by step guide along with the civil work aspects regarding joint bay construction, typical water crossing procedures and High Voltage (HV) cable installation.

The report has provided information on the standard aspects of a HV cable civil project with project specific methodologies for non-standard aspects of project work, being addressed in this report.

The methodologies in this report are the current expected methodologies for the construction of a project. These approaches may require local variation during the detailed design and construction of a project depending on the best working practices and preferred construction techniques of the selected contractor, following on the ground detailed design and survey; however, it is considered that such methodologies are adequate for an understanding by the Planning Authority of the proposed development, particularly in the context of determining a planning application request for a project.

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## 2 Introduction

It is the policy of ESB that, in so far as possible, high voltage underground cables shall only be installed under public roads. One of the key advantages of laying cables under roadways is that there is usually no permanent impact on the environment additional to that caused by the presence of the roadway. When an underground cable is laid under an existing roadway the potential for impact is normally only a short term impact during the construction phase.

The joint bays proposed along the cable route shall be predominantly located in the road carriageway, however where the road and margin widths permit, in some instances the joint bays can also be located off-road. The selection of joint bay locations involves technical and environmental evaluation of the sites to ensure that the area is suitable for construction works. A working area is defined which provides adequate space for cable pulling and jointing around the joint bay. This working area shall also provide space for movement of all construction vehicles. The working area shall immediately adjoin the public road, as the cable shall be diverted from the road into the off-road joint bay. Due consideration must also be given to the possible presence of existing underground and overhead services, traffic management requirements, landowner agreements and existing ground conditions. Once agreements with each landowner are reached, site investigations shall be carried out to prove these locations suitability and allow the civil works commence. For information purposes only, see drawing of typical joint bay and chamber layouts in appendix A for 220 kV and 110 kV installations. Drawing PE424-D3025-019-001-001 in appendix A shows a typical joint bay and passing bay arrangement for certain locations where a passing bay, if possible to construct, may be needed to reduce any obstructions to traffic flow.

A civil contractor carrying out the standard HV trenching and ducting specification shall typically complete between 30 to 50 linear metres of trench in a roadway per day depending on the site conditions. All road works involving cable and pipe laying e.g. watermains, broadband, television etc., require traffic management procedures when installing within public roads. It may be a temporary requirement that some roads are closed along particular sections of the cable route. This can have a disruptive effect locally on residents over the period of the installation works. In the case of wider roads, one carriageway may be closed with use of the other carriageway restricted and controlled by temporary traffic lights or a “stop and go” traffic management system. The traffic management plan and corresponding works shall be carried out with the agreement of the local authority.

## 3 Trenching and Ducting

### 3.1 Site Investigations

Site investigations along the proposed route shall be carried out in advance of the approved designs being finalised and before the contractor commences trenching and ducting civil works. These site investigations shall include slit trenches along the road ways to detail the route and to ensure that there is sufficient space to install a 110 kV cable trench typically measuring approximately 1.25 m by 0.6 m, and a 220 kV trench measuring 1.1 m of 1.7 m in width. Construction drawings which detail the cable alignment and off road joint bay locations and river crossing proposals shall be made available to the contractor. Further site investigations may be required to gather additional information on the road cover available over existing bridges and culverts with the relevant local authority approval. This information may be used to prove the requirement for off-road alignments if insufficient cover exists. There shall be additional trial holes or bore holes required at the off-road locations for joint bays and river crossings.

### 3.2 Contractors Duties

In advance of starting the works, the contractor or the appointed wayleave officer shall liaise with all directly impacted landowners. The design engineer shall also set out the route alignment, off road joint bay positions and river crossing alignments for the contractor.

The contractor shall obtain plans, maps and other relevant information about buried services from statutory authorities and other public utilities. The contractor shall also ensure that the relevant road opening concessions have been obtained from the local authority.

The contractor's general work requirements shall be:

- Present professionally drafted traffic management plans for each stage of the works.
- Secure each work area with adequate protective barriers and organise traffic signs and traffic management controls to the approval of the Engineer.
- In off road locations, a temporary hardstand working area shall be created and fenced to facilitate the joint bay construction and associated traffic. These working areas shall be removed upon completion of the cable installation and jointing works.
- Provide secure and clean storage facilities for all ducting and trenching materials, cable installation equipment and cable drums.
- Carry out a surface check for underground services with appropriate detection equipment.
- Clean and sweep adjacent public roadways and footpaths during and after the works.
- Saw cut to full depth of existing asphalt/bitmac layers and/or concrete surfacing. In grassed fields, carry out the works in accordance with specification.
- A rock breaker or other approved method shall be used to break the trench section of the road surface.

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- Commence excavation of this section of trench with due attention to the presence of other services and to the grade of the trench. Hand dig when within 500 mm of services and around trees. Note that a length of 12 m of proven excavation should be exposed ahead of any commencement of ducting. This is to allow for the bending of ducts to avoid obstacles and the possible requirement for digging back on re-commencement of new excavation if an obstacle is encountered within the 12 m.
- Where possible, crossing of existing services shall be carried out at right angles. The contractor shall provide a standard minimum 300 mm vertical clearance between the proposed ducts and the existing services to be crossed.
- Where possible, the contractor should ensure a minimum distance of 500 mm horizontal separation is maintained between the edge of the power ducts and existing services.
- Simultaneously load and remove soil, and dispose of properly to a site or sites to be selected by the contractor and agreed with the relevant authority. In grassed fields the excavated soil shall be stored within the wayleave.
- Protect all services against damage due to trenching, ducting, backfilling and compaction.
- Remove all ground water from the trench. Treat and dispose of the waste water in accordance with current legislation and best practice, under permit from the local authority if required.

### 3.3 General Methodology

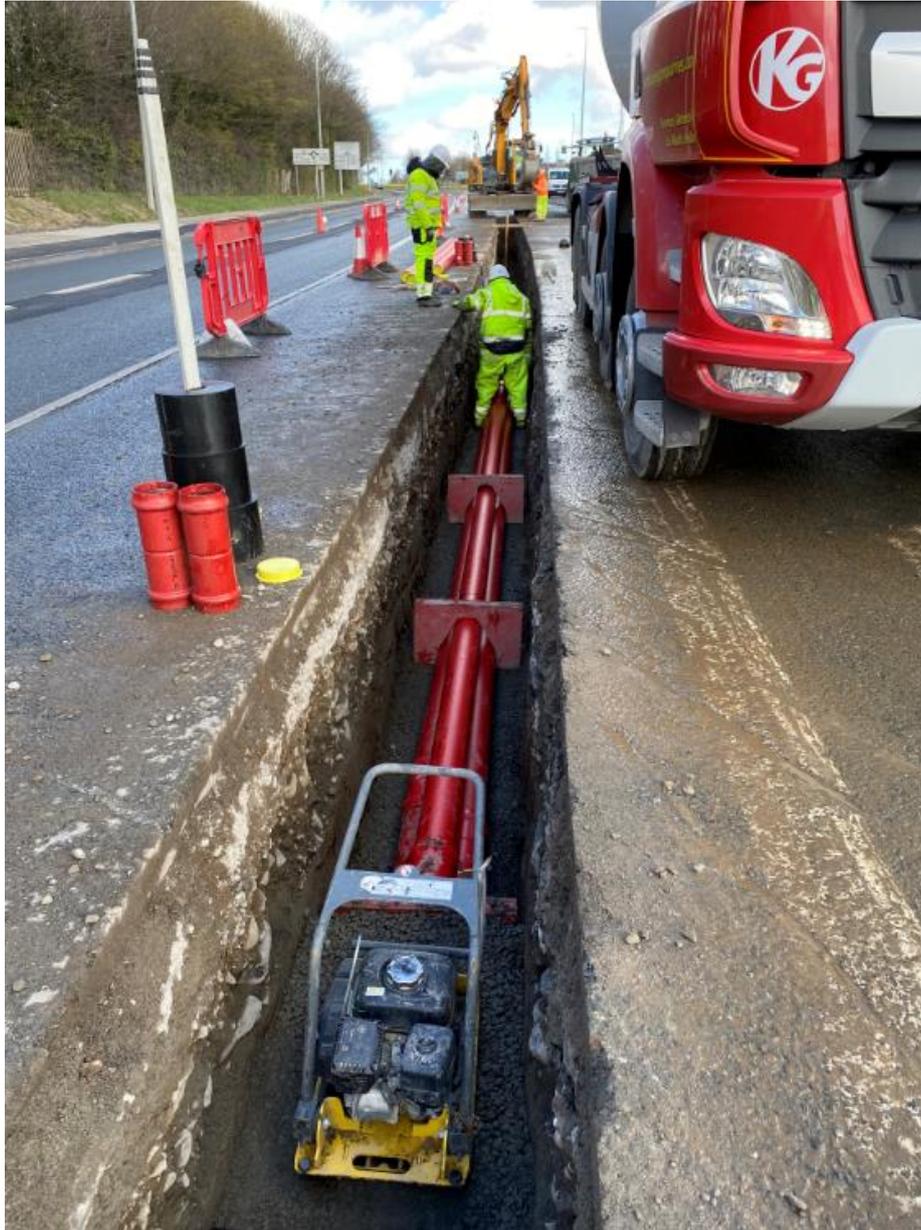
For the trenching and ducting works the following step by step methodology shall apply:

1. Grade, smooth and trim trench floor when the required depth and width have been obtained.
2. Place bedding layer of Cement Bound Granular Mixture B (CBGM B) material in accordance with the specification and compact it so that the compacted thickness is as per the drawings.
3. Lay the bottom row of ducts in the formation as detailed on the design drawings. Use spacers as appropriate to establish horizontal duct spacing (see Figure 1). Fit a secure cap / bung to the end of each duct run to prevent the ingress of dirt or water.
4. Provide pits for lubrication and bentonite grouting the ducts at 100m-200m intervals.
5. Carefully surround and cover ducts with CBGM B in accordance with the design drawings and specifications and thoroughly compacted without damaging ducts.
6. Place cable protection strips on compacted CBGM B directly over the ducts.
7. Lay the top row of ducts onto the freshly compacted CBGM B including the cable protection strips above the bottom row of ducts. Place a secure cap at the end of each duct to prevent the ingress of dirt or water.
8. Carefully surround and cover ducts with CBGM B material in accordance with the drawings and thoroughly compact without damaging ducts.

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9. Place red cable protection strip on top of compacted CBGM B over each set of ducts as shown on the drawings.
10. Place and thoroughly compact CBGM B material or Clause 804 backfill or soil backfill as specified and place warning tape at the depth shown on the drawings.
11. For concrete and asphalt / bitmac road sections, carry out immediate permanent reinstatement in accordance with the specification and to the approval of the local authority and/or private landowners, unless otherwise agreed with local authorities. (See Figure 2)
12. For unsurfaced/grass sections, backfill with suitable excavated material to ground level leaving at least 100 mm topsoil or match existing level at the top to allow for seeding or replace turves as per the specification of the local authority or landowner.
13. Clean and test the ducts in accordance with the specification by pulling through brush and mandrel. Install 12 mm polypropylene draw rope in each duct and seal all ducts using robust duct end seals fitted with rope attachment eyes in preparation for cable installation at a later date. All the works should be witnessed by a Clerk of Works (CoW)

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**Figure 1 - Typical HV Trench Cross Section**



**Figure 2 - Reinstatement of Road Surface Over Trench**

### 3.4 A Project Specific Methodology

Particular attention is required for the aspects of the trenching and ducting works which shall be confined to within an existing road corridor except where the route needs to deviate slightly from the public road at joint bay locations or at watercourse crossings. Aspects of trenching which require particular attention in this instance include: 1. management of trench spoil, 2. trench de-watering, 3. adding CBGM B and 4. bentonite injection to ducts. Industry accepted best practice shall be applied at all times in dealing with the above.

1. **Soil management:** For all trenching along a road, all excavated material shall be taken off site in trucks and disposed of, under licence from the relevant authority, thus preventing any contaminated run-off to roadside drains during heavy rainfall. In off road areas where the top 400 - 500 mm of topsoil shall be set aside within the wayleave for later reinstatement, these stockpiles shall be stored at least 15 m back from drains and watercourses on level ground with a silt fence inserted at the base.
2. **Trench de-watering:** Ground water and surface water accumulating in the base of trenches shall not be pumped directly to roadside drains or watercourses unless it is clean and free from solids. The trench water will be pumped through silt socks on to grass areas. Solids-contaminated water shall be discharged to a designated percolation area designated by a competent person if the soil is not water logged. In the case of heavy contamination, the water shall either be tankered off site for disposal in a licensed facility or pumped to a portable on-site settlement tank for treatment. These operations shall be monitored by a designated competent

member of the construction team on a regular basis to ensure that they are working effectively.

3. Adding CBGM B: CBGM shall be installed directly from the chute of the truck into the trench avoiding any risk of cement laden run-off entering any water courses. On occasion it may be necessary to stock pile small amounts of CBGM for placement in trenches where truck access is not safe or possible. In such instance's hardstands will be installed for storing the CBGM. Hardstand areas shall only be located where there is no direct drainage to surface waters and where the area has been bunded e.g. using sand-bags and geotextile sheeting or silt fencing to contain any solids in run-off.
4. Bentonite injection: Bentonite grout injection is considered to be a low risk activity given that the injection process happens within a bunded pit inside of the cable trench. Nevertheless, the fact that the grout itself could be harmful to aquatic life, if it reaches watercourses, means that the construction team undertaking this work shall be made aware of the risks associated with the use of the material, and the process shall be carefully monitored, especially when being undertaken on off-road trench sections sloping toward watercourses. Unused bentonite grout and any spillages within the bentoniting pit shall be removed off site for disposal under licence in an approved facility.

## 4 Joint Bay Details

### 4.1 Typical Construction

Joint bay dimensions are typically in the order of 6 m or 8 m in length for 110 kV and 220 kV installations respectively, with a width of approx. 2.5 m and a depth of approx. 2.5 m. The joint bays are designed to be covered over with the land above to be potentially available for agricultural use following reinstatement. The installation of precast joint bays is preferred and the construction methodology for the joint bays is outlined below.

The following steps outline the methodology for joint bay construction and reinstatement:

1. The contractor shall excavate a pit for joint bay construction, including for a sump in one corner.
2. Grade and smooth floor; then lay a 50 mm thick sand (for pre-cast concrete construction) on 200 mm thick Clause 804 granular material.
3. Pre-cast concrete construction. Place pre-cast concrete sections on sand bedding. (See Figure 3 and Figure 4)
4. Carry out temporary reinstatement of surface as specified.
5. Temporary joint bay covers may be used as temporary reinstatement. These covers are placed over the constructed joint bay and are then removed at the cable installation stage of the project.
6. At a later date to facilitate cable installation and jointing, reinstate traffic management signage, secure individual sites, re-excavate three consecutive joint bays and store excavated material for reuse.

7. The cable is supplied in pre-ordered lengths on large cable drums (See Figure 5). Installing “one section” of cable normally involves pulling three individual conductors into three separate ducts. The cable pulling winch must be set at a predetermined cut off pulling tension as specified by the designer. The cable shall be connected to the winch rope using approved suitably sized and rated cable pulling stocking and swivel or the pulling head fitted by the cable manufacturer (See Figure 6). A sponge may also be secured to the winch rope to disperse lubricant through the duct. Lubrication is also applied to the cable in the joint bay before it enters the duct.
8. Once the “two sections” of cable (total of 6 conductors) are pulled into the joint bay (see Figure 7), a jointing container is positioned over the joint bay and the cable jointing procedure is carried out in this controlled environment. (See Figure 8 and Figure 9)
9. Following the completion of jointing and duct sealing works in the joint bay, thermal sand shall be placed and thoroughly compacted in approximately 150 mm layers to the level of the cable and cable joint base to provide vertical support. Additional layers of thermal sand shall be installed, and each layer compacted by hand until the thermal sand is 100 mm above the top of the cable and the cable joint. Cable protection strip shall be installed. Backfill with thermal sand to a depth of 300 mm below the top of the joint bay walls and with well compacted CBGM B to the top of the joint bay walls and carry out permanent reinstatement including placement of warning tape at 300 mm depth below the finished surface. (See Figure 10 and Figure 11)

## 4.2 A Project Specific Construction Methodology

Due diligence for the location of joint bays shall be observed to minimise conflict with other services and to facilitate the ease of installation and maintenance. The joint bays proposed along the cable route shall be predominantly located in the road carriageway. However, where the road and margin widths permit, in some instances the joint bays can also be located off-road.

Associated communications chambers and link boxes shall be installed off the carriageway where possible. Joint bays, link boxes and C2 chambers shall be accessible by heavy vehicles (10 tonne) to accommodate cable installation and maintenance/fault repair as required. The location of the link box at joint bays shall not exceed a maximum distance of 10 m from the centre of the joint bay, see 220/110 kV typical joint bay and chamber layouts drawing PE424-D3025-022-001-000 in appendix A for reference.

Activities associated with joint bay construction which could give rise to harm to Annex II and other species include: 1. site access and ground preparation, 2. soil excavations, 3. pit de-watering, 4. concrete pouring and 5. back-filling with cement-bound sand. The following aspects of best practice construction have been listed in the same order and are based on the assumption that the joint bay is near a water course or surface drainage channels. Clearly, in open level ground with few drains, the risks are much lower.

1. Site access and ground preparation: The access track from the road to the joint bay and back shall have the surface layers of soil stripped and terram laid,

Construction Methodology of HV Cable Routes

followed by a layer of Clause 804 aggregate to form a working surface for vehicles, thereby preventing soil damage and rutting. Bog mats shall also be provided in areas where peat is present. This surface shall be regularly assessed for damage and additional aggregate added if required. The area around the edge of the proposed joint bay which shall be used by heavy vehicles shall also be surfaced with a terram cover and stone aggregate to minimise ground damage. Any roadside drains within the temporary works area shall be culverted and check dams made from stone or sandbags covered with terram shall be inserted upstream and downstream of these culverts to intercept any solids generated during the insertion or which wash out during the works. If the ground slopes from the working area toward a watercourse or if there is evidence of solids washing off the works area toward nearby watercourses or drains, a silt fence with straw bales, shall be interposed between the works area and the watercourse.

2. Soil excavations: All soil temporarily stockpiled on site shall be placed at least 15 m back from the nearest watercourse on level ground and shall be ringed at the base by silt fencing and be regularly monitored by a designated competent person for signs of solids escape. In which case an additional line of silt fencing with straw bales shall be added.
3. Pit de-watering: If the joint bay needs to be dewatered, this shall be pumped to a percolation area if the soil is not saturated, otherwise a settlement tank shall be used to remove any solids from the de-watering's.
4. Concrete pouring: The risk of concrete reaching surface waters is considered very low given that all concrete shall be poured into the pit excavated for the joint bay so that spills shall be contained. The requirement therefore is that all pouring operations be constantly supervised to prevent accidental spillages occurring outside the pit.



**Figure 3 - Typical Joint Bay under construction (pre-cast)**

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**Figure 4 - Completed Joint Bay prior to Cable Installation (pre-cast)**

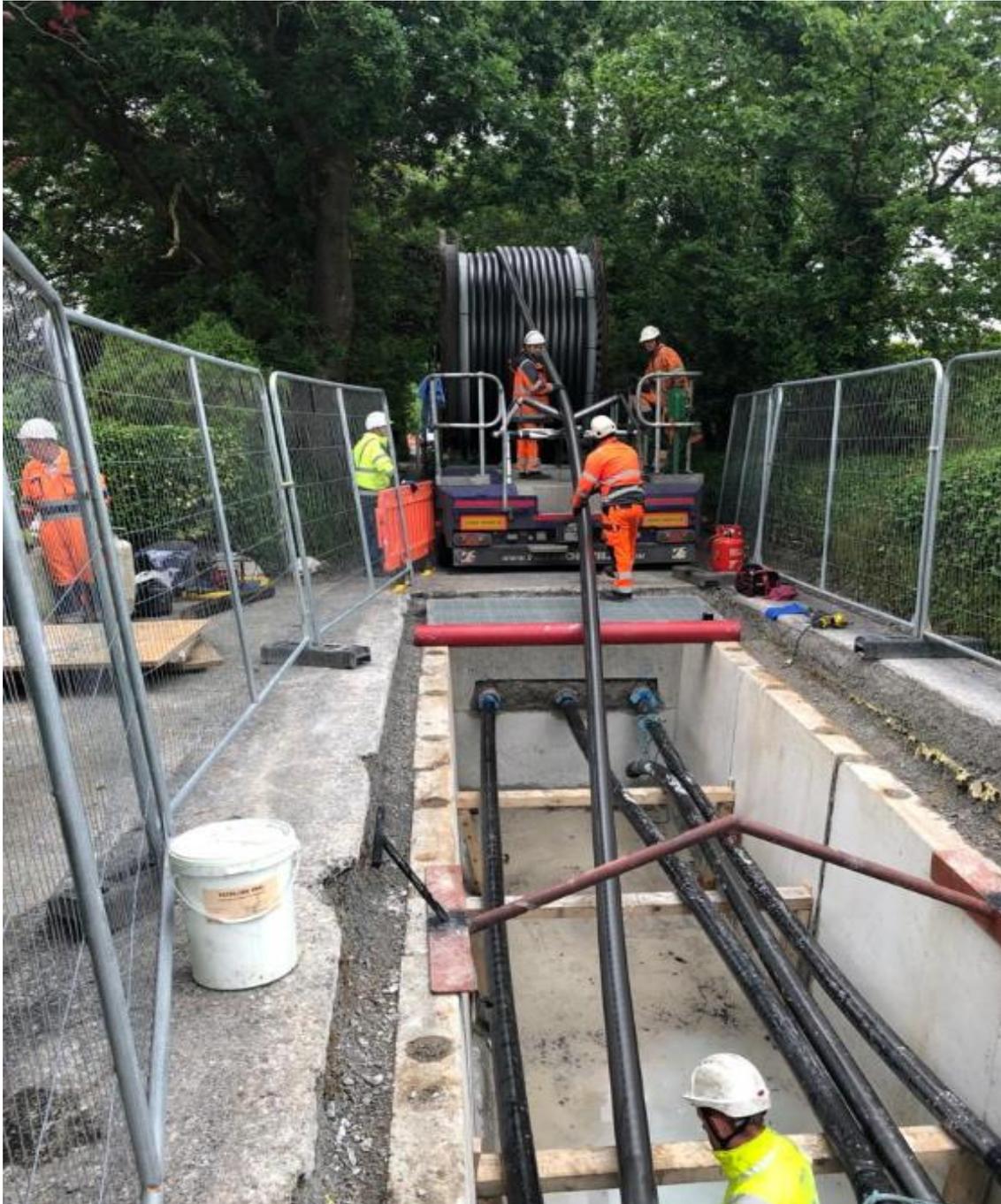


Figure 5 - Typical Set-Up of HV Cable Pulling Procedure

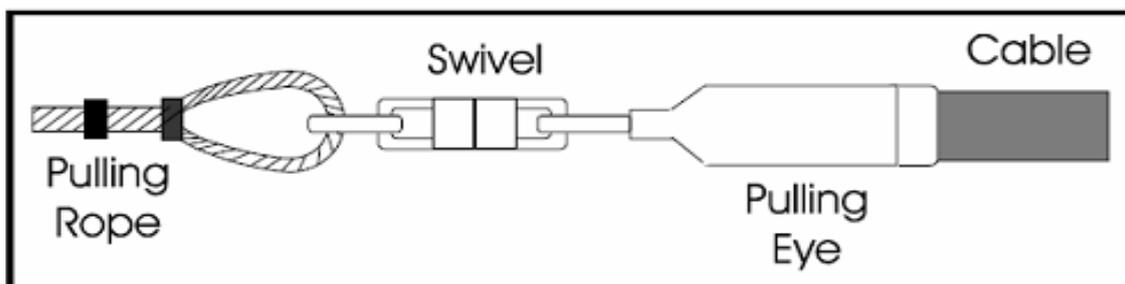


Figure 6 - Swivel & Pulling Eye

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**Figure 7 - Typical Winch Set Up for HV Cable Pulling Procedure**



**Figure 8 - Typical HV Cable Jointing Container**

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**Figure 9 - HV Cable Jointing Procedure**



**Figure 10 - Typical Joint Bay Backfilling Procedure**



## 5 Water Crossings

Existing road bridges over water courses cannot always accommodate high voltage cables. In such cases it shall be necessary to pass underneath the water course. Crossings of smaller ditches and drains shall be carried out by open trench using damming and overhead pumping.

The crossing of streams and rivers shall be carried out by open trench method or trenchless methods. The open trench method crossing of streams and rivers can be carried out by “damming and fluming” or “damming and pumping” as discussed below.

The method adopted shall be implemented only with the approval of Inland Fisheries Ireland (IFI). Where applicable, the construction shall take place outside the salmon spawning period from October to April unless otherwise agreed with IFI.

Appropriate measures shall be put in place by the contractor to prevent ground damage on the access routes to watercourse crossings on both banks, particularly where the ground is soft or slopes steeply toward a crossing. This shall prevent solids reaching a watercourse from damaged access tracks.

### 5.1 Ditch / Drain Crossings

#### 5.1.1 Open Trench (Damming and Pumping)

The crossing of ditches and drains along the HV cable route shall be achieved by damming and pumping of the water flow overhead. Silt traps, such as geotextile membrane, straw bales etc. shall be placed downstream of the trenching location prior to construction to minimise silt loss. A dam shall be constructed using sand bags and suitable clay material. Temporary pump sump(s) shall be provided to house the pumps used to move the water downstream. The pumping rate shall be suitable to move the flow rates. The cable ducts shall then be installed in the ditch / drain bed as described in Section 3. Following the installation of the cable ducts, the bed of the ditch / drain shall be re-instated with original or similar material. The duration of this process shall vary depending on the site location, crossing length, ground/weather conditions etc.; however, it would typically take 3-7 days to complete each crossing.

### 5.2 Stream / River Crossing

#### 5.2.1 Option 1 – Open Trench (Damming and Fluming)

The crossing of the stream/river shall be achieved by fluming the existing river flow through one or more pipes depending on the size of the flows in the stream/river. The flume pipe(s) shall be approx. 10 m long and the diameter suitable to accommodate the existing flows.

Where applicable, under the supervision of an aquatic ecologist, spawning gravels shall be removed at the stream crossing areas where construction shall take place. The extent of spawning gravel removal shall be agreed for each site with IFI prior to construction commencing.

1. The flume pipe(s) shall be set out on the bed of the existing stream.

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2. A dam shall be constructed using sand bags and suitable clay material around the flume pipe(s) and across the stream so that all the flows are diverted through the pipe(s).
3. Silt traps, such as geotextile membrane, straw bales etc. shall be placed downstream of the in-river trenching location prior to construction, to minimise silt loss.
4. Excavate the proposed trench in the dry stream bed and under the flume pipe(s). If required, a temporary pump sump can be established and a pump used to remove any additional water.
5. Install the cable ducts in the stream bed as described in Section 3 or install a precast concrete slab incorporating the ducts, ensuring the designed cable route alignment is maintained.
6. Following the installation of the cable ducts, the stream bed shall be re-instated with original or similar material and the spawning gravels replaced under the supervision of the aquatic ecologist.
7. Once the stream bed is appropriately re-instated the dam and the flume pipe(s) shall be removed thus restoring the stream to its original condition.

### 5.2.2 Option 2 – Open Trench (Damming and Pumping)

1. The crossing of the stream/river shall be achieved by damming the existing river upstream of the proposed crossing area.
2. Where applicable, under the supervision of an aquatic ecologist, spawning gravels shall be removed at the stream crossing areas where construction shall take place and shall be stored appropriately to be used during the reinstatement stage of the crossing. The extent of spawning gravel removal shall be agreed for each site with IFI prior to construction commencing.
3. Silt traps, such as geotextile membrane, straw bales etc. shall be placed downstream of the in-river trenching location prior to construction, to minimise silt loss.
4. A dam shall be constructed using sand bags and suitable clay material.
5. Temporary pump sump(s) shall be provided to house the pumps used to move the water downstream. The pumping rate shall be suitable to move the flow rates of the existing stream.
6. Install the cable ducts in the stream bed as described in Section 3 or install a precast concrete slab incorporating the ducts.
7. Following the installation of the cable ducts the stream bed shall be re-instated with original or similar material and the spawning gravels replaced under the supervision of the aquatic ecologist.
8. Once the stream bed is appropriately re-instated the dam and the pumps shall be removed thus restoring the stream to its original condition.

### 5.3 A Project Specific Methodology – Open Cut Crossing

If required, all open-cut watercourse crossings will be carried out during the May to September period in order to avoid the period of salmon and trout spawning. Subject to approval, aspects of these crossing methods which are highlighted for best practice construction are detailed below and relate to the following headings: 1. site access and ground preparation, 2. In-stream habitat damage within the footprint of the crossing and immediately downstream, 3. watercourse damming process, 4. trench excavation, 5. de-watering of the trench excavation, 6. pumping over, and 7. site reinstatement.

1. Site access and ground preparation: The access track to the watercourse crossing shall be prepared in the same way as that for the joint bays, i.e. topsoil stripping, followed by terram laying and the addition of a layer of aggregate to protect the ground from rutting. This shall also be undertaken parallel to the crossing point in order to protect the bank from heavy vehicle damage. Bog mats shall also be provided in areas where peat is present.
2. In-stream habitat damage: All clean coarse surface material (gravel, cobbles and boulders) on the bed of the river or stream to a depth of 200 mm shall be removed. A thinner layer shall be removed if deeper material is mainly clay or sand. This shall be set aside back from the watercourse on a geotextile base for use to reinstate the stream bed surface.
3. Watercourse damming: At damming and pumping sites the damming shall be undertaken using sand bags and/or clean stone covered with an impermeable layer of thick polythene or similar material in order to minimise the use of clay materials. If managed carefully, these materials should be reusable at several crossing sites. At sites to be flumed the diameter of the flume pipe shall be chosen to accommodate flows at the time with spare capacity to cover that predicted over the following 3-7 days that the works would be expected to last. Construction of the dam around the flume pipe shall require use of clay material to create a practical seal. In this case the dam shall be designed to reduce to a minimum the amount of clay to be used. The clay used shall be puddle clay or equivalent.
4. Trench excavation: material excavated from the trench (and an upstream pump sump if required) shall be placed on terram on level ground as far back from the watercourse's edge as is practicable and surrounded on its downslope side by a silt-fence to prevent solids re-entering the stream. This material if deemed suitable can be used to partially backfill the trench. However, a significant amount shall be in excess and shall be removed off site under licence from the County Council.
5. De-watering of watercourse crossing excavation: Dewatering's of the excavation shall be treated on site using settlement tanks before the settled water is returned to the watercourse. A second tank in series with the first shall be used if the first isn't sufficient to remove enough solids.
6. Pumping over: Pumped over water shall be directed to a splash plate to prevent erosion of the river bed at the downstream side.

7. Site reinstatement: The surface coarse substrate which was set aside shall be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed as well as all the damming materials. All surfaces shall be reinstated to the satisfaction of the landowner and re-seeded to assist soil stabilisation. A silt fence shall be placed along the river bank where the works were undertaken in order to prevent solids washed off the works area during heavy rainfall entering the stream while the surface adequately re-vegetates. This measure shall be particularly important at sites which slope to the edge of the watercourse.

## 5.4 Stream / River Crossing – Option 3

### 5.4.1 Trenchless Installation

It is common practice to use trenchless technology to install cable ducting under wider watercourses where technically viable. The trenchless technology chosen may depend upon many different factors such as the length of the trenchless section, ground conditions at the specific site, the suitability of staging areas either side of the trenchless section and budget costs. These trenchless installation methods may involve horizontal directional drilling, micro tunnelling, pipe ramming, pipe jacking or auger boring. The most commonly used method of trenchless installation utilised on HV cable circuits in Ireland at present is Horizontal Directional Drilling (HDD) and a detailed methodology of this procedure can be found in Appendix B.

## 5.5 A Project Specific Methodology – Trenchless Watercourse Crossings

Aspects of this crossing method which could give rise to potential impacts shall be addressed by best practice construction methods under the following headings: 1. site access and ground preparation, 2. bentonite preparation, injection and re-cycling, 3. bentonite blow-out and 4. site re-instatement.

1. Site access and ground preparation: The access track and works area around the HDD launch and reception areas at both sides of the river shall be top-soil stripped, laid with terram and surfaced with suitable aggregate material to prevent ground damage and associated wash-out of solids toward the river. The works area shall be a minimum of 15m back from the river and within this zone, the natural vegetative cover shall not be altered and no construction traffic shall use the area so that the natural filtering capacity of the vegetation if required shall remain intact. Stripped topsoil shall be stored on level ground at least 15 m back from the river and ringed by silt fencing to prevent solids washout.
2. Bentonite preparation, injection and re-cycling: The area around the bentonite batching, pumping and re-cycling plants shall be bunded using terram and sandbags in order to contain any spillages. One or more lines of silt fences shall be interposed between the works area and the river on both banks to prevent solids laden runoff from the works areas reaching the watercourse. Spills of bentonite or bentonite contaminated with drill arisings from any aspect of the bentonite handling process shall be cleaned up immediately and transported off site for disposal at a

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Construction Methodology of HV Cable Routes

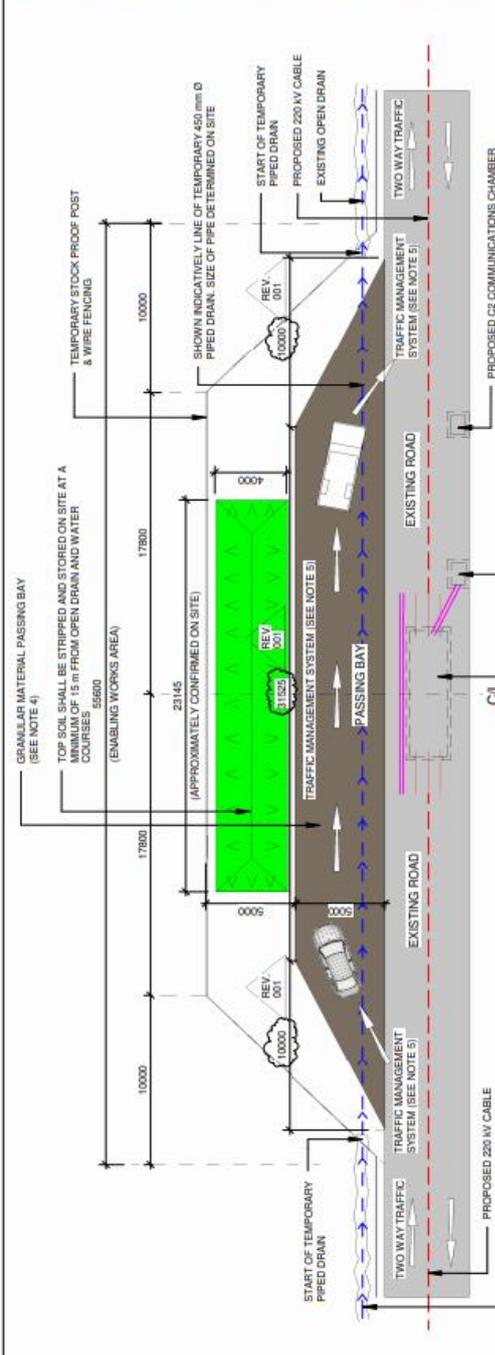
- licensed facility. As these operations shall take place within or adjacent to the road network, any watercourses involved would be roadside ditches or field drains in some cases and not true watercourses, i.e. their connectivity with a watercourse with aquatic life of ecological interest would be limited. Any bentonite spills on the road shall be immediately visible and be removed to secure skips on site. In addition, as stated above it is proposed to locate any bentonite pits a minimum of 15 m from streams and rivers to prevent any possibilities of bentonite entering these watercourses. If arisings are being temporarily stored on site, they shall be held in adequately sized skips with adequate freeboard to accommodate intense rainfall during the storage period without overflowing.
3. Bentonite blow-out: A number of geologies are considered unsuitable for HDD because they increase the chances of bentonite being lost and eventually breaking up through the overburden into the watercourse. A typical example is fissured or fractured rock. A thorough geotechnical assessment of the possible routes shall be undertaken to determine the suitability of the site for this installation method. The drilling process shall be constantly monitored to detect any possible leaking of bentonite into the surrounding geology and possible breakout. This can be gauged by monitoring pumping rates and pressures as well as observing for a bentonite plume. If any of these signs appear, then drilling and bentonite pumping shall be stopped immediately and an attempt made to bypass the affected section by using a higher viscosity bentonite mix. If this fails then an alternative crossing alignment or an alternative crossing method shall be considered. This would only arise in cases where the soil through which the HDD was directed is unsuitable for this process. Prior site investigation including detailed geotechnical investigations shall ensure that HDD shall only be employed where the soil and geological conditions are suitable. The possibility of any bentonite breaking through into the watercourse above during the HDD process is therefore negligible.
  4. Site reinstatement: While silt fences remain in place, all the temporary surface dressings on access tracks and working areas shall be removed for offsite disposal and stored topsoil replaced and reseeded. The area shall be reinstated to the satisfaction of the landowner.



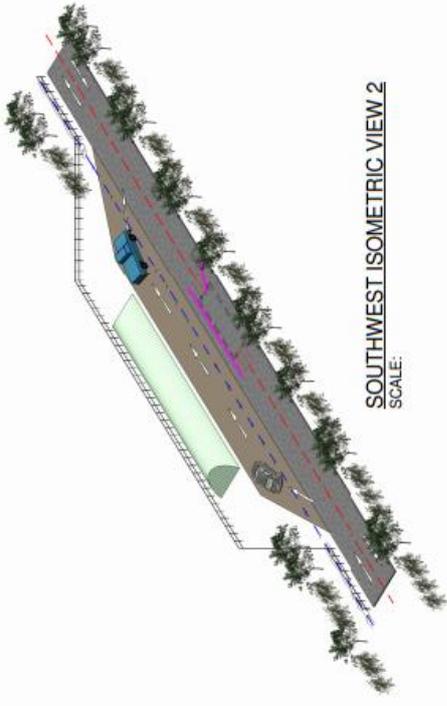
# DN0566 Metrolink – Advanced Work Package

## Construction Methodology of HV Cable Routes

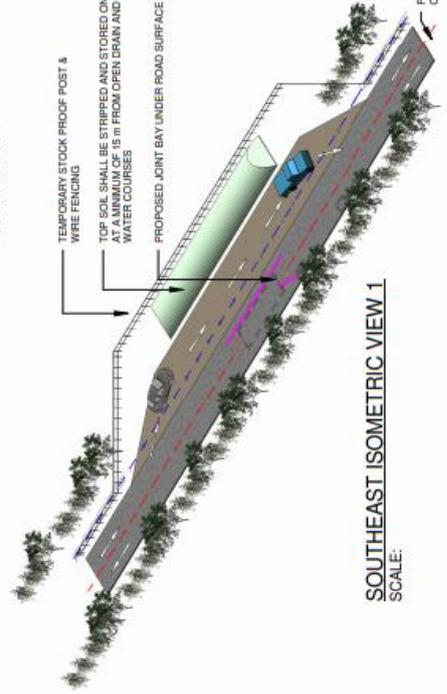
- NOTE:**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. TEMPORARY POST & WIRE FENCE TO COMPLY WITH NSA DRAWING RD03604.
  3. THE PROPOSED ENABLING WORKS AREA LAYOUT IS INDICATIVE. LAND ACCESS AGREEMENTS SHOULD BE OBTAINED FROM THE LANDOWNER FOR THE ENABLING WORKS AREA AT EACH PASSING BAY.
  4. IT IS THE CONTRACTOR'S SCOPE TO DETERMINE THE LEVELS OF CUT AND FILL, AND THE SIZE AND LEVELS OF TEMPORARY DRAIN ETC.
  5. PASSING BAY MAKE-UP SHALL CONSIST OF MINIMUM 250 mm THICK LAYER OF COMPACTED CL 8/4 MATERIAL ON APPROVED GEOTEXTILE LINER. EXACT THICKNESS LAYER TO BE DETERMINED BY CONTRACTOR AT EACH LOCATION BASED ON THE CONTRACTOR'S TEMPORARY WORKS DESIGN.
  6. TRAFFIC MANAGEMENT CONSISTING OF TRAFFIC LIGHTS OR STOP/GO SYSTEM SHALL BE PROVIDED AT EACH LOCATION.
  7. THE ENABLING WORKS AREA SHALL BE REINSTATED TO MATCH THE ORIGINAL GROUND LEVELS AND PROFILES. FENCE LINES, DRAINAGE AND PLANTING WILL BE REINSTATED TO MATCH ORIGINAL OR AS PER THE RELEVANT SPECIFICATION.
  8. JOINT BAY, LINK-BOX AND C2 COMMUNICATIONS CHAMBER WILL BE INSTALLED BY OTHERS. REFER TO DRAWING PE424-D3025-011-002 TO 008 FOR INDICATIVE LOCATIONS.



**PLAN VIEW OF JOINT BAY & PASSING BAY**  
SCALE: 1 : 250



**SOUTHWEST ISOMETRIC VIEW 2**  
SCALE:



**SOUTHEAST ISOMETRIC VIEW 1**  
SCALE:

<p><b>Client</b> One Dublin Airport Central, Dublin Airport, Cloughran, Co. Dublin Tel: 353 1 703 9000 Email: marketing@edc.ie Web: www.dublinairport.ie</p>		<p><b>Client</b> ESB NETWORKS</p>	
<p><b>Project</b> Kilpaddoge - Knockanure 2 220 kV Cable Project Trenching &amp; Ducting Contract</p>		<p><b>Project</b> Kilpaddoge - Knockanure 2 220 kV Cable</p>	
<p><b>Contract</b> CP0726 Kilpaddoge Knockanure 2 220 kV Cable Project Trenching &amp; Ducting Contract</p>		<p><b>Contract</b> Kilpaddoge - Knockanure 2 220 kV Cable</p>	
<p><b>Production Unit</b> Civil &amp; Environmental Engineering</p>		<p><b>Production Unit</b> Civil &amp; Environmental Engineering</p>	
<p><b>Drawing Title</b> Kilpaddoge - Knockanure 2 220 kV Cable Typical Joint Bay &amp; Passing Bay Arrangement</p>		<p><b>Drawing Title</b> Kilpaddoge - Knockanure 2 220 kV Cable Typical Joint Bay &amp; Passing Bay Arrangement</p>	
<p><b>Drawn</b> A. Gillespie</p>		<p><b>Drawn</b> A. Gillespie</p>	
<p><b>Checked</b> P. Friend</p>		<p><b>Checked</b> P. Friend</p>	
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<p><b>Version</b> 1</p>		<p><b>Version</b> 1</p>	
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<p><b>Drawn Date</b> 18/01/2018</p>		<p><b>Drawn Date</b> 18/01/2018</p>	
<p><b>Project Number</b> PE424-D3025-019-001-001</p>		<p><b>Project Number</b> PE424-D3025-019-001-001</p>	

## Appendix B – Typical HDD Procedure

### Setting up the Site

The drilling contractor prepares a site area of approximately 30 m x 25 m, accommodated within the agreed site area. If areas are overgrown with thick vegetation, a section of it shall be removed appropriately and disposed of via a licensed waste contractor. The area is then levelled where required by using the front bucket of a 180° excavator; however, there may be a requirement for the working area to be stripped of topsoil. Instead it may be overlain with a suitable geotextile material and 200 mm of appropriate stone. The boundaries of the rig up area and exit area would both be defined with security fencing positioned to ensure adequate access is maintained.

Entry and exit pits (1 m x 1 m x 2 m) are excavated using an 180° excavator and the resultant spoil banded in 0.5 mm PVC liner within the designated working areas. A steel box (1 m x 1 m x 2 m) is placed in the ground to control drilling fluid returns from the borehole. Drilling fluid is pumped down the drill string and through the down hole motor, which converts the fluids hydraulic power to mechanical power and rotates the drill bit. The drill bit is oriented by the surveyor, and the driller pushes the drill string into the ground maintaining the bore path. The drilled cuttings are flushed back by the drill fluid flowing via nozzles in the bit, up the annulus to surface, where they are separated from the fluid fraction for disposal.

### Drilling Fluids Circulation System

The drilling rig and fluid handling units may be placed on banded 0.5 mm PVC to contain any fluid spills and storm water run-off. The major components of the drill rig circulation system are five tanks, two solids separation cycles, a mud pump and a mud-mixing hopper. The solids removal system includes both a high-speed linear shale shaker and a desander/desilter. Centrifugal pumps circulate drilling fluid returns through the mud cleaners before being pumped back downhole. Solids removed from the drilling fluid are diverted into tipping skips. Drilling fluids returning to the surface are diverted through a conductor pipe to a mud pan on the surface. This mud is then lifted to the shale shaker by a hydraulically powered centrifugal pump. The ability to clean and re-circulate drilling fluids keeps the volume of drilling fluids required to a minimum. Constant monitoring of fluid volume, pressure, pH, weight and viscosity is undertaken. Constant attention is given to amount of cuttings produced so that no over cutting takes place and that hole cleaning is maintained. The mud returns are pumped to the circulation system trailer by means of a banded centrifugal pump.

### Bore Construction

A steering system, guided by tri-axial magnetometers and accelerometers that provide real time directional information to the surveyor at the driller's console, is used to navigate the bores. Once the first pilot hole has been completed a hole-opener or back reamer is fitted at the exit side and pulled back through the bore to the entry side. A drill pipe is added at the exit side to ensure that a mechanical presence is always present within the bore. On completion of the hole-opening phase a towing assembly consisting of tow heads, a swivel and a reamer shall be used to pull the ducts into the bore. Close attention is paid to modelled drag forces during pullback with constant monitoring of load stress undertaken to

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Construction Methodology of HV Cable Routes

ensure that modelled tensile stress, collapse pressures, hoop stress and buckling stress are not exceeded.

Waste Disposal

The drilling fluid used shall consist of sodium bentonite which is NSF/ANSI Standard 60 certified for use in drilling water wells etc.

During drilling, the control and minimisation of waste fluids are the responsibility of the Fluids Technician and the Drilling Superintendent. Fluids can be minimised by the following procedures:

1. Cleaning and recirculating the drilling fluid.
2. Maintaining excellent fluid properties (pH, density, viscosity, gel strength, shear strength) while drilling to eliminate the need for additional drilling fluid.
3. Monitoring of borehole volumes, flow rates, pressures and drag characteristics to ensure that all cuttings are being circulated out of the borehole and that critical annular fluid velocities are not exceeded maintaining laminar flow to prevent eddying and sloughing of the borehole.

The fluid used is inert clay and can be classified in the European Waste Catalogue under 01-05-04 as freshwater drilling muds and wastes. The cuttings circulated from the bore can be classified under 17-05-04 as soil and stones not containing dangerous substances. The fluid and the cuttings are non-hazardous wastes and therefore suitable for disposal to landfill. MSDS (Material Safety Data Sheets) and COSHH (Control of Substances Hazardous to Health) Sheets for all materials shall be kept on site.

Drilled cuttings are stored on site for disposal via a licensed waste contractor. The European Waste Catalogue reference is 17-05-04. Drilling fluid volumes shall be minimised. Excess fluid disposal shall be via a licensed waste contractor. The European Waste Catalogue reference is 01-05-04

The Contractor shall provide a site office, mess and welfare facilities. These units shall be powered by a bunded and silenced generator and water shall be stored in on-site tanks. The units shall be serviced on a weekly basis which includes removal of all wastewater by a licensed contractor.

Reinstatement of Site

Prior to reinstatement, the ducts shall be tested and proved and the duct bundles shall also be gyro-surveyed to provide an accurate as constructed record.

On completion of the works, the stone and geo-membrane shall be carefully removed using a backhoe or 360° excavator and transported to a licensed disposal unit. Topsoil shall be imported to sites where necessary and the area reseeded. The site area shall then be reinstated as per the landowner and statutory requirements.

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Construction Methodology of HV Cable Routes

Typical plant to be utilised on site would comprise the following: -

- 2 No. 4 x 4 Twin cab pick-up truck
- 1 No. Luton Box Van
- JCB 3CX 180° Backhoe Loader
- Terrain 7m Telehandler.
- JCB Fastrac and 2000 gallon bowser

A crew of approximately six people operate all of the above equipment.



## Appendix E - Land, Soils and Hydrogeology Drawings

# **Appendix E Land, Soils and Hydrogeology Drawings**

## **E1 – Landuse - Corine Land Cover 2018, waste facilities and integrated pollution control sites**

229100846-MMD-00-GIS-0001

## **E2 - Soils and Geology - Soils**

229100846-MMD-00-GIS-0006

## **E3 - Soils and Geology – Quaternary Subsoils**

229100846-MMD-00-GIS-0005

## **E4 - Soils and Geology – Bedrock Geology**

229100846-MMD-00-GIS-0008

## **E5 - Soils and Geology – Landscape Susceptibility**

229100846-MMD-00-GIS-0004

## **E6 – Hydrogeology – Bedrock Aquifer types, Karst Features, Wells and Springs**

229100846-MMD-00-GIS-0007

## **E7 - Hydrogeology – Groundwater Vulnerability in Relation to Bedrock Outcrop**

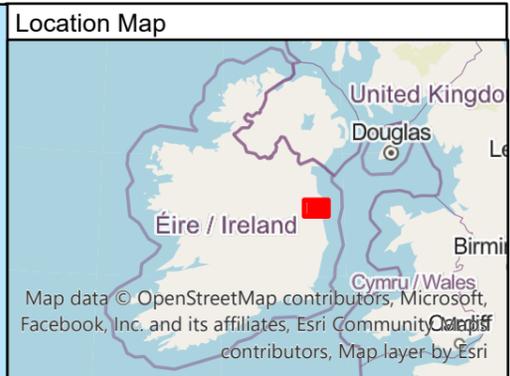
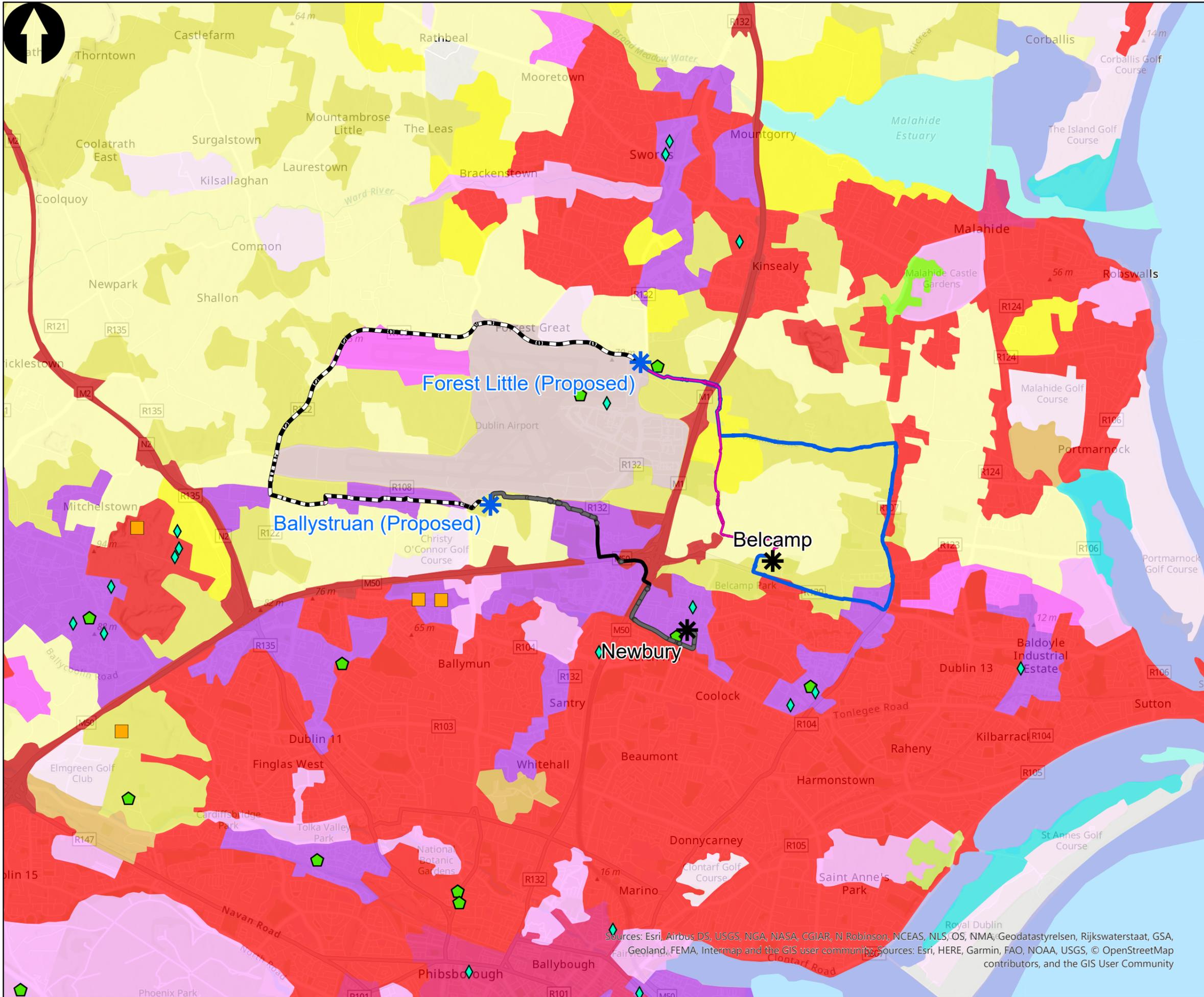
229100846-MMD-00-GIS-0003

## **E8 – WFD – WFD Groundwater Bodies and Nature Conservation Sites**

229100846-MMD-00-GIS-0002

**E1 – Landuse - Corine Land Cover 2018, waste facilities and integrated pollution control sites**

229100846-MMD-00-GIS-0001



### Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little To Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts

### Corine Landcover Type

- 111 Continuous urban fabric
- 112 Discontinuous urban fabric
- 121 Industrial or commercial units
- 122 Road and rail networks
- 124 Airports
- 131 Mineral extraction sites
- 133 Construction sites
- 141 Green urban sites
- 142 Sport and leisure facilities
- 211 Non-irrigated land
- 231 Pastures
- 242 Complex cultivation patterns
- 243 Land principally occupied by agriculture with areas of natural vegetation
- 311 Broad-leaved forest
- 313 Mixed forest
- 331 Beaches dunes sand
- 421 Salt Marshes
- 423 Intertidal flats
- 522 Estuaries

- EPA Licensed Facilities (Waste)
- EPA Licensed Facilities (PC)
- EPA Licensed Facilities (IE)

### Notes

04	22/05/2023	XW	Information	ET	MS
Rev	Date	Drawn	Description	Ch'kd	App'd

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Dublin 16  
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**MOTT MACDONALD**

Client

## Title

# MetroLink 110kV Cable Planning Design

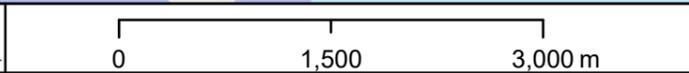
### Corine Land Use and Licensed Facilities Sites

Designed	X Wan	Eng Check	M Sterling
Drawn	X Wan	Coordination	M Sterling
GIS Check	E Tiri	Approved	M Sterling

Scale at A3	Status	Rev	Security
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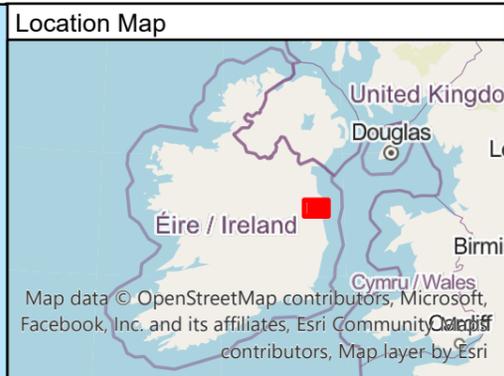
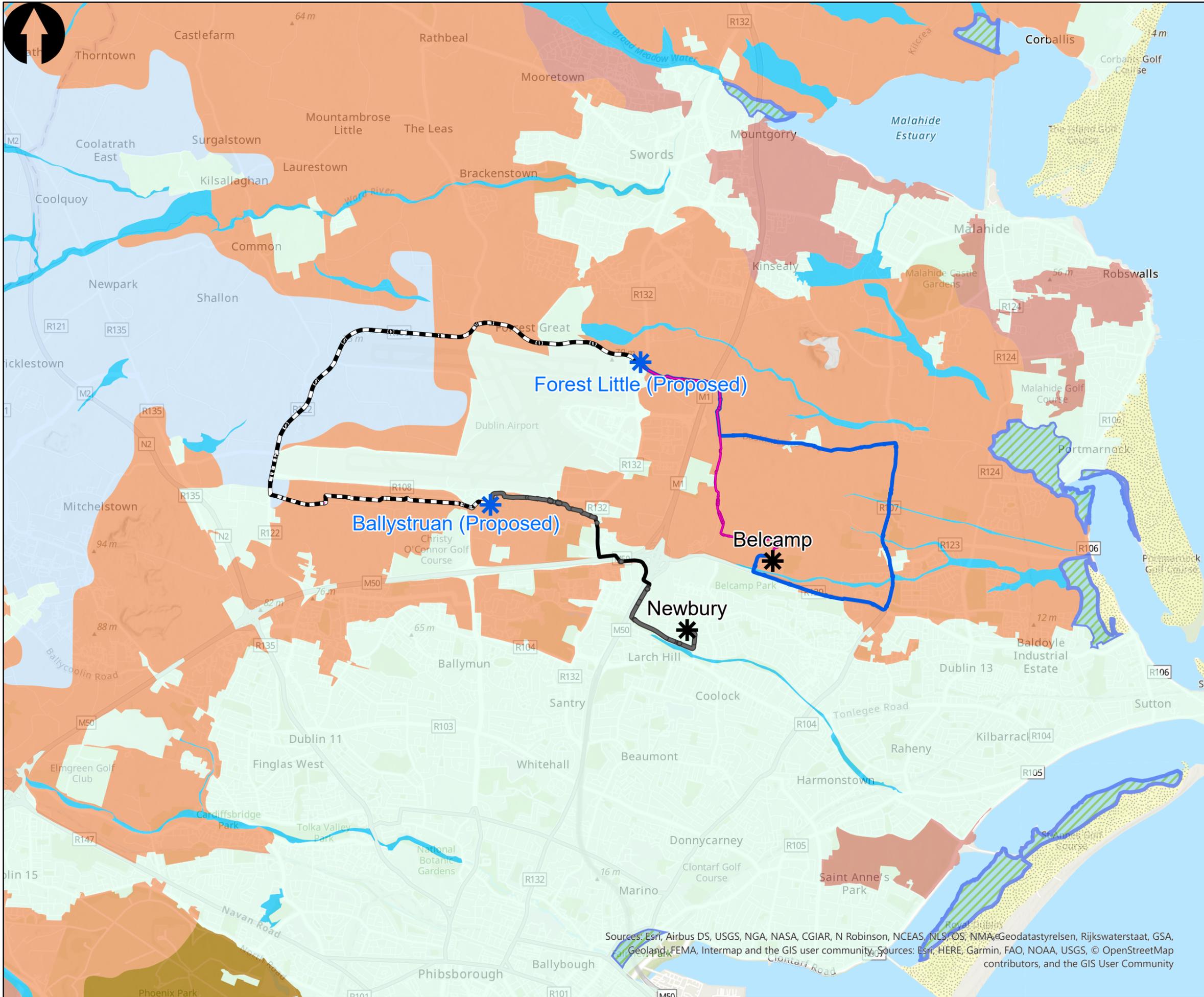
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**E2 - Soils and Geology - Soils**

229100846-MMD-00-GIS-0006



### Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little To Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts

### Teagasc Soil

- 05MAR
- 05RIV
- 0700d
- Beach/Sand dune
- 1000x
- 1030a
- 1150b
- Rock
- Tidal marsh
- Urban

### Notes

Rev	Date	Drawn	Description	Ch'k'd	App'd
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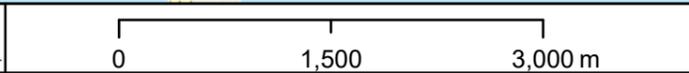
# MetroLink 110kV Cable Planning Design

### Teagasc Soils Map

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Drawn	X Wan	Coordination	M Sterling
GIS Check	E Tiri	Approved	M Sterling
Scale at A3	Status	Rev	Security
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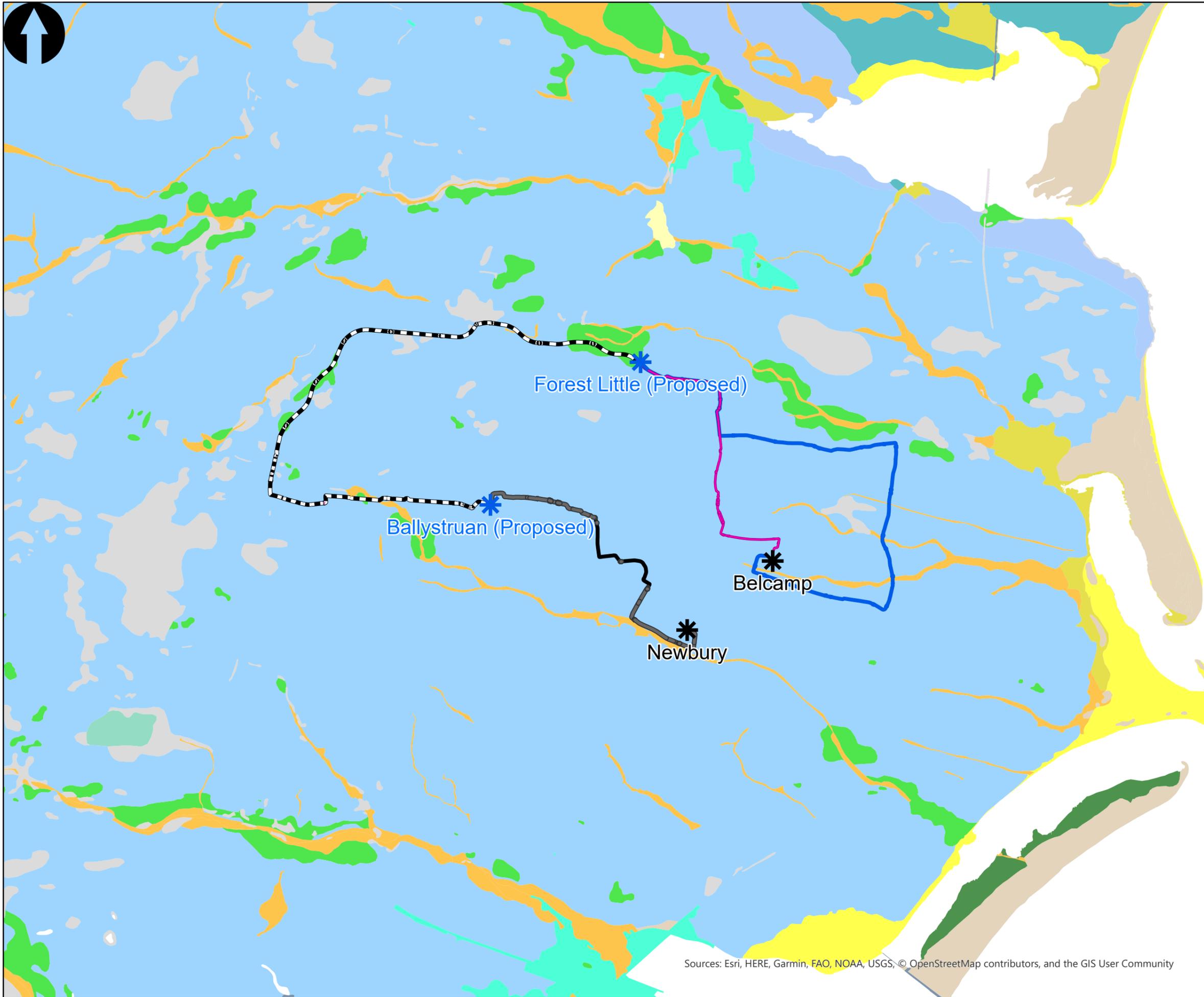
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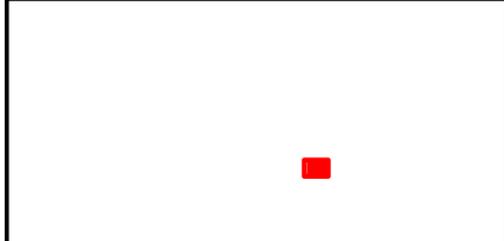
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## **E3 - Soils and Geology – Quaternary Subsoils**

229100846-MMD-00-GIS-0005



Location Map



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Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little to Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- A, Alluvium
- Ag, Alluvium (gravelly)
- As, Alluvium (sandy)
- Embankment
- GLs, Gravels derived from Limestones
- IrSTLPSsS, Irish Sea Till derived from Lower Palaeozoic sandstones and shales
- IrSTLs, Irish Sea Till derived from Limestones
- L, Lacustrine sediments
- Landfill
- Mbs, Marine beach sands
- Mesc, Estuarine silts and clays
- Pier
- Rck, Bedrock outcrop or subcrop
- TLs, Till derived from limestones
- TdlMr, Tidal Marsh
- Urban
- Water
- Ws, Windblown sands
- Wsd, Windblown sands and dunes

Notes

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Quaternary Sediments

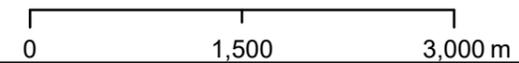
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GIS Check	E Tiri	Approved	M Sterling

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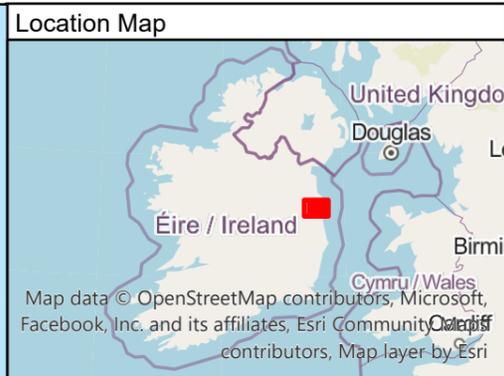
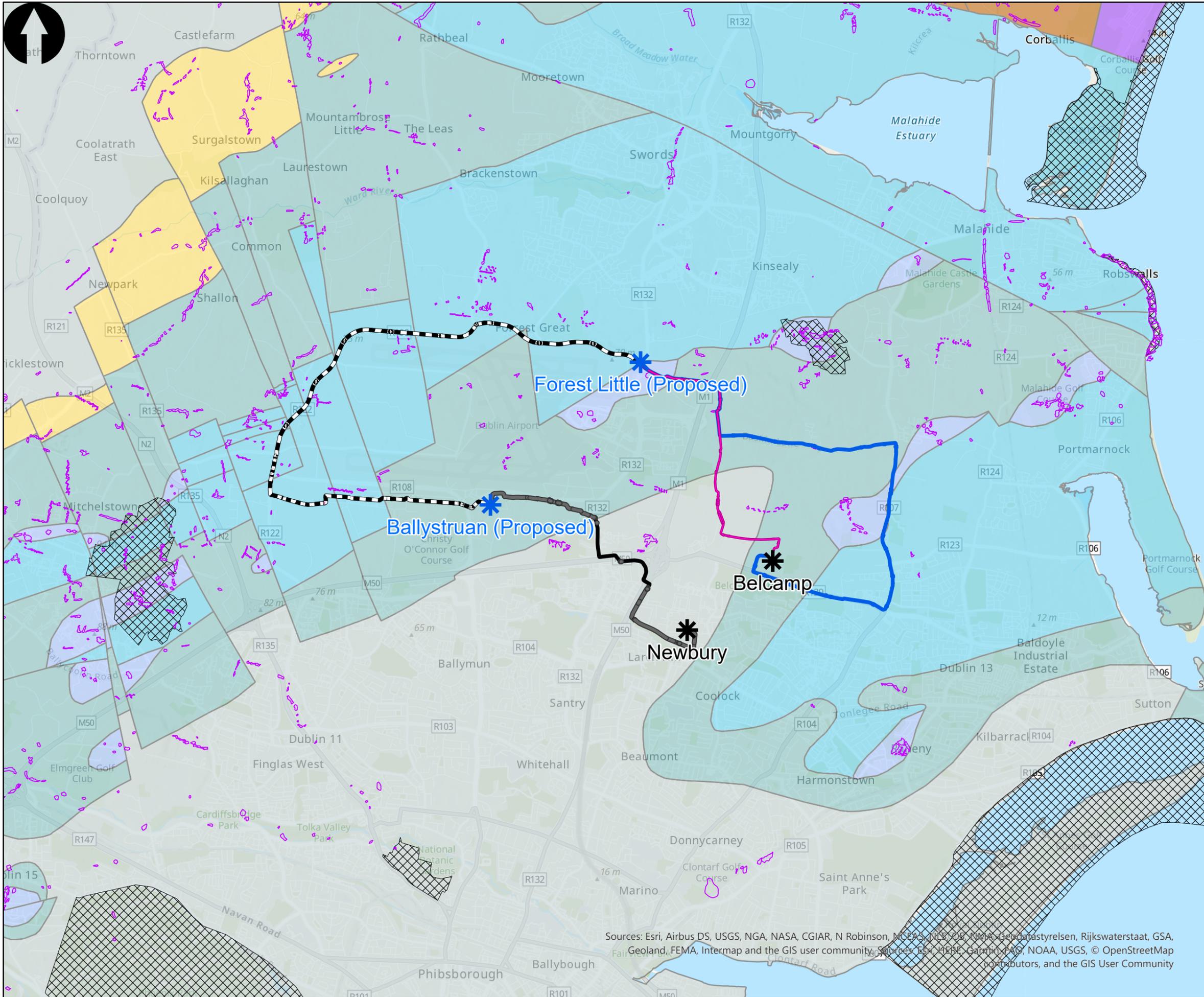
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## **E4 - Soils and Geology – Bedrock Geology**

229100846-MMD-00-GIS-0008



### Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little To Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Geological Heritage Audited Sites

### Geology - Stratigraphy

- Boston Hill Formation
- Donabate Formation
- Lucan Formation
- Malahide Formation
- Rush Conglomerate Formation
- Tober Colleen Formation
- Waulsortian Limestones
- Portrane Volcanic Formation
- Bedrock Outcrops 50K

### Notes

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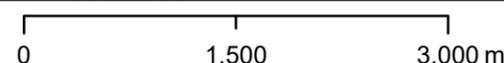
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Drawn	X Wan	Coordination	M Sterling
GIS Check	E Tiri	Approved	M Sterling
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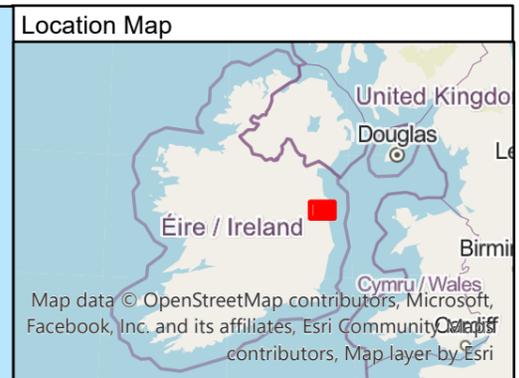
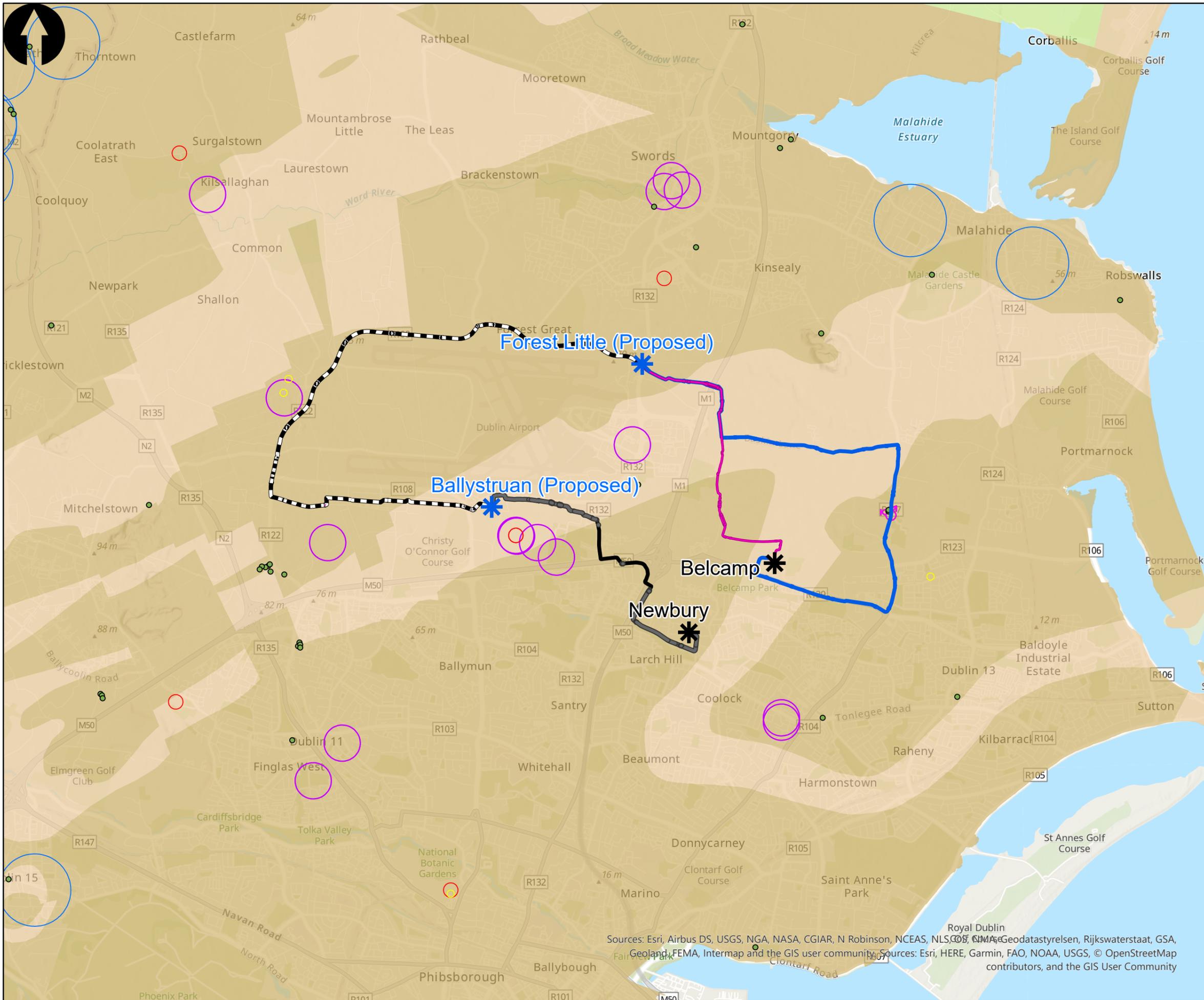
## **E5 - Soils and Geology – Landscape Susceptibility**

229100846-MMD-00-GIS-0004



## **E6 – Hydrogeology – Bedrock Aquifer types, Karst Features, Wells and Springs**

229100846-MMD-00-GIS-0007



### Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little to Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Wells 10 to 50
- Wells 100 to 50B
- Wells 200 to 100B
- Wells 500 to 250B
- Wells 1km to 500B
- Groundwater Aquifers**
  - Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
  - 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
- Groundwater Karst Features**
  - Spring

### Notes

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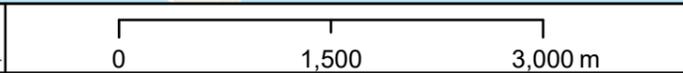
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### Bedrock Aquifer, Karst Features Wells, Springs and Boreholes

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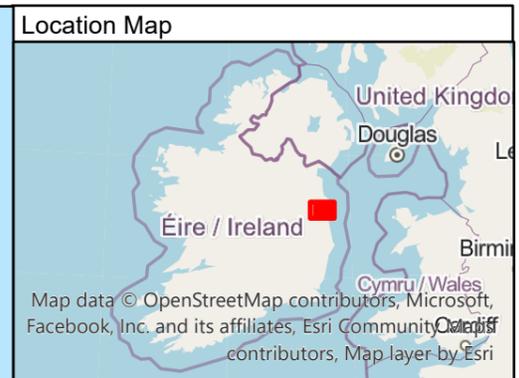
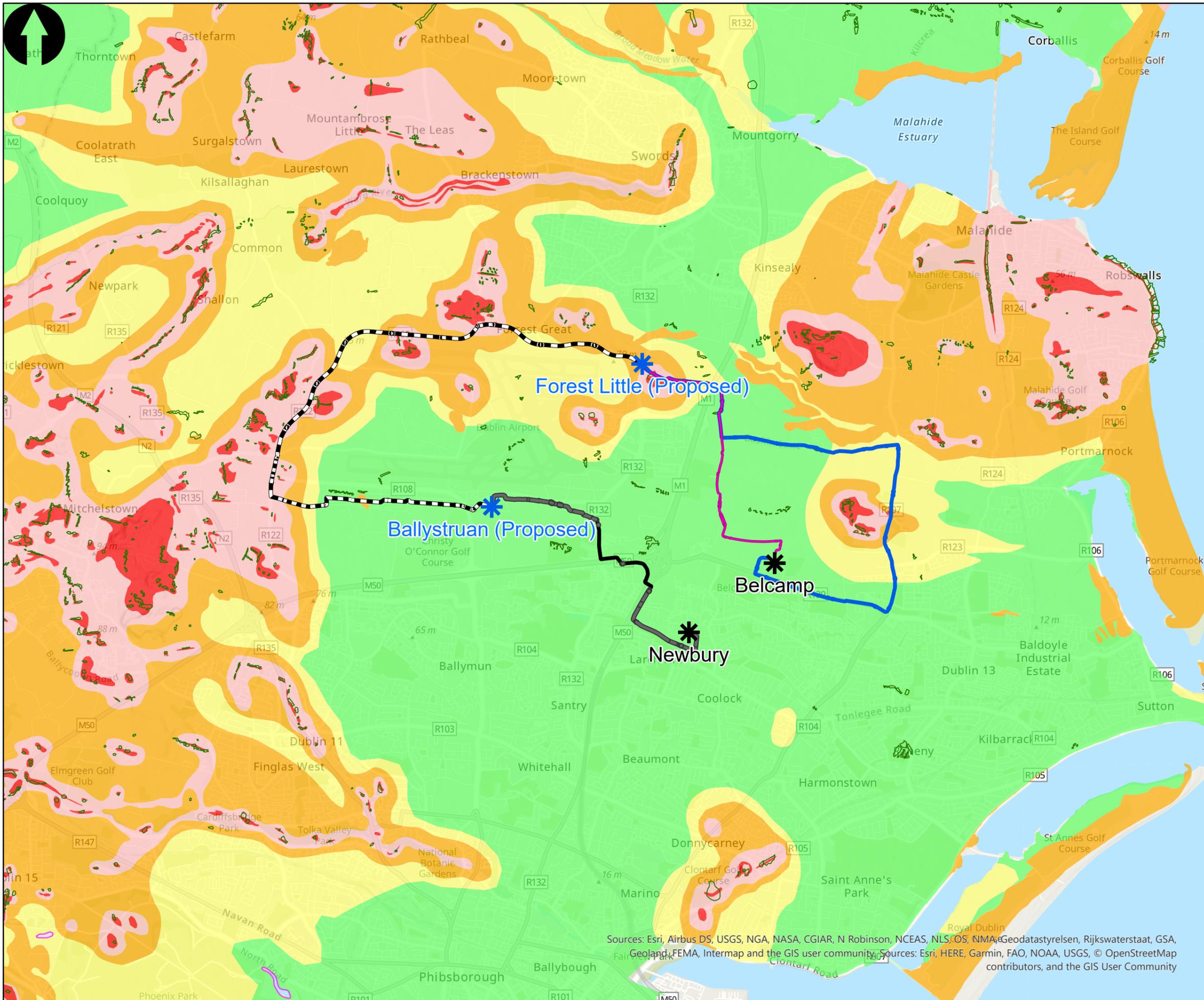
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## **E7 - Hydrogeology – Groundwater Vulnerability in Relation to Bedrock Outcrop**

229100846-MMD-00-GIS-0003



### Key to Symbols

- Proposed Substations
- Existing Substations
- Forest Little To Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Bedrock Outcrops 50K

### Groundwater Vulnerability 40K

- Extreme
- High
- Low
- Moderate
- Rock at or near Surface or Karst
- Water

### Notes

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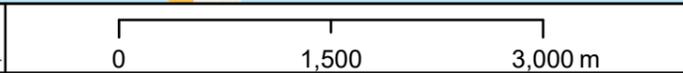
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### Groundwater Vulnerability in Relation to Bedrock Outcrop

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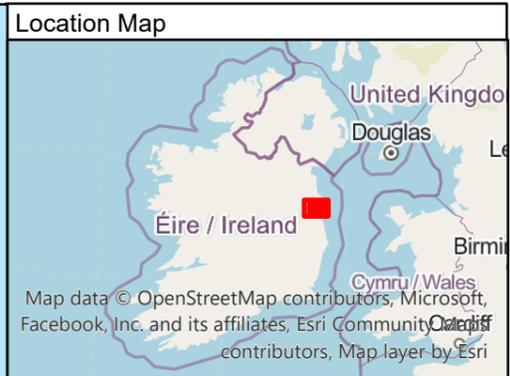
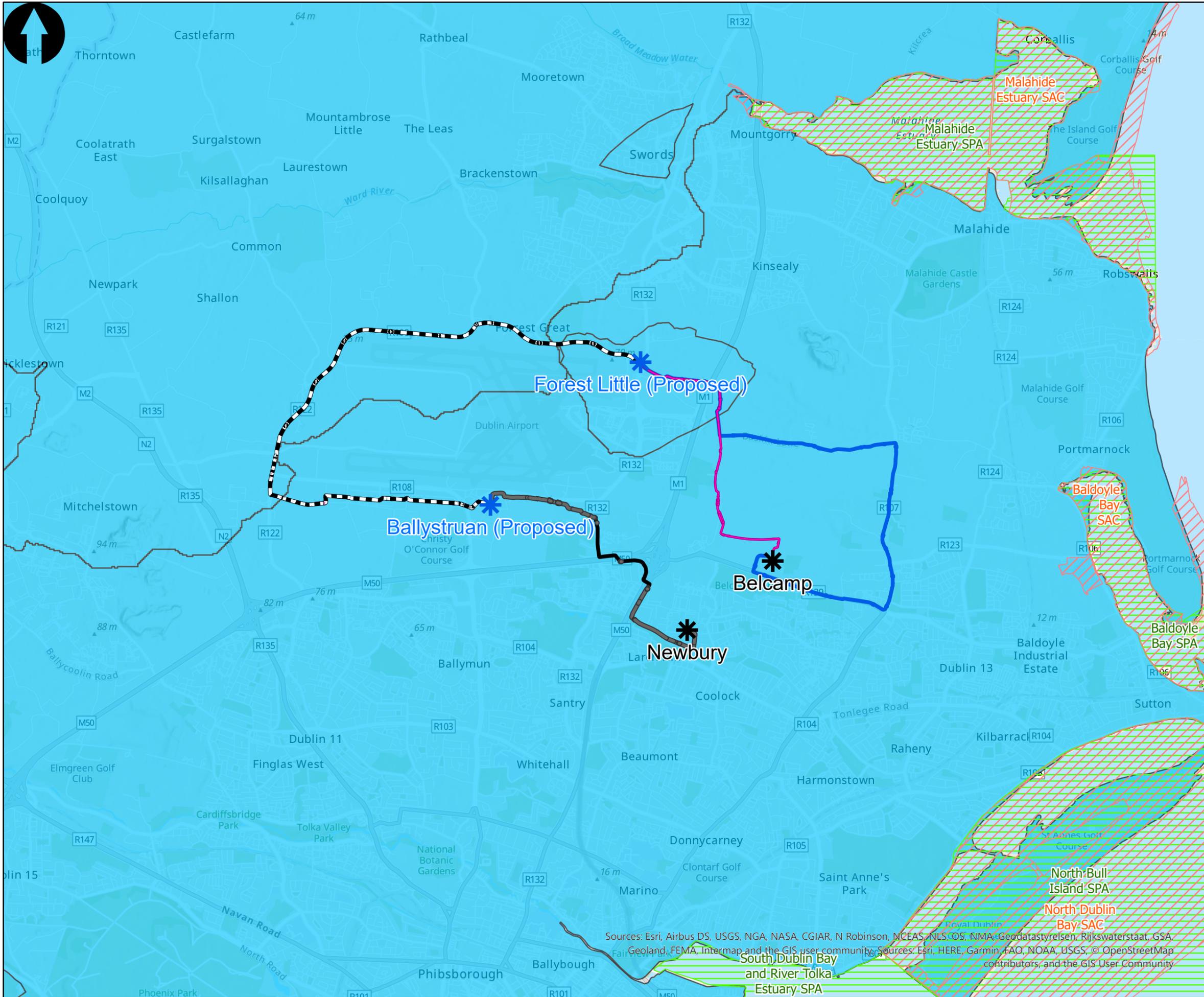
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**E8 – WFD – WFD Groundwater Bodies and Nature Conservation Sites**

229100846-MMD-00-GIS-0002



**Key to Symbols**

- Proposed Substations
- Existing Substations
- Forest Little To Belcamp
- Forest Little to Ballystruan Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- WFD Groundwater Bodies
- Special Area of Conservation (SAC)
- Special Protection Areas (SPA)

**Notes**

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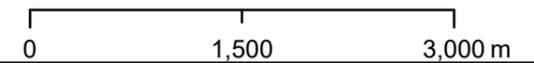
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Planning Design**  
Groundwater Bodies and Designated Sites

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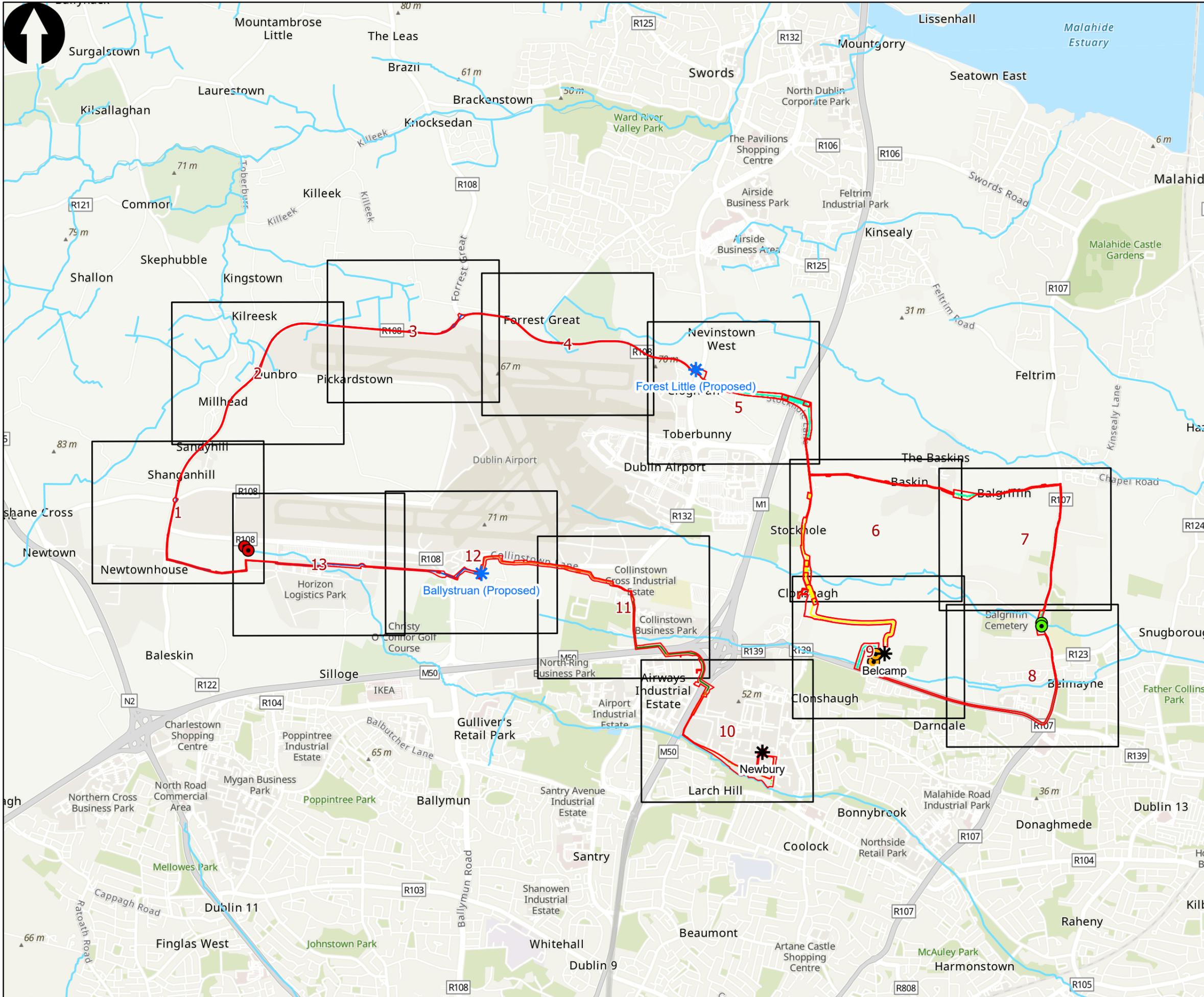
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## **Appendix F – Biodiversity Habitat Map**

# Appendix F – Biodiversity Habitat Map

F1 – Biodiversity Habitat Map



**Key to Symbols**

- Red Line Boundary
- Existing Substations
- Proposed Substations
- EPA River
- Forest Little to Belcamp Option 2
- Forest Little to Belcamp Option 1
- Forest Little to Ballystruan
- Ballystruan to Newbury Existing Ducts
- Ballystruan to Newbury

**Bat Roost Potential**

- High
- Moderate
- Low

**Notes**

Rev	Date	Drawn	Description	Ch'kd	App'd
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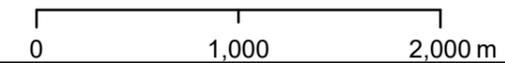
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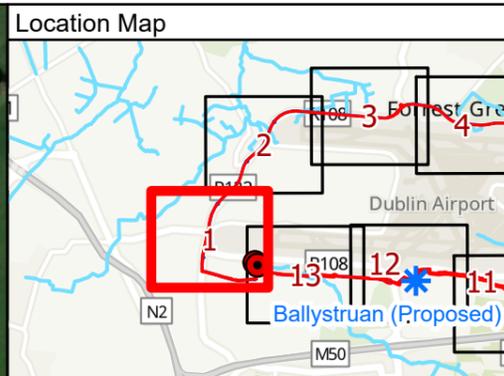
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GIS Check	E Tiri	Approved	R Macnaughton
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- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Belcamp Option 2
  - Forest Little to Ballystruan
- Fossitt**
- Amenity Grassland (GA2)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Calcareous and Neutral Grassland (GS1)
  - Scrub (WS1)
  - Hedgerow (WL1)
- Bat Roost Potential**
- High

**Notes**

02	25/05/2023	XW	Habitat Map	ET	RM
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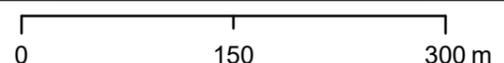
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Habitat Map

Page 1 of 13

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GIS Check	E Tiri	Approved	R Macnaughton
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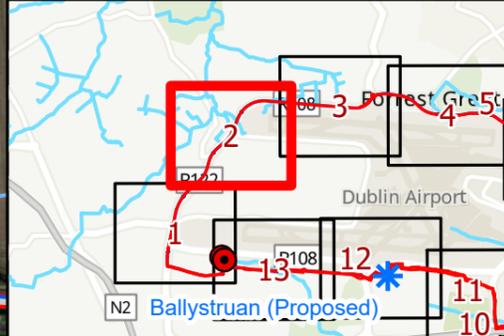
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Drawing Number  
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Location Map



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Ballystruan

**Fossitt**

- Buildings and Artificial Surfaces (BL3)

Notes

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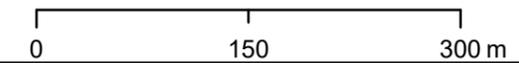
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Location Map



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Ballystruan

- Fossitt**
- Amenity Grassland (GA2)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Meadows and Grassy Verges (GS2)
  - Hedgerow (WL1)

Notes

02	25/05/2023	XW	Habitat Map	ET	RM
Rev	Date	Drawn	Description	Ch'k'd	App'd

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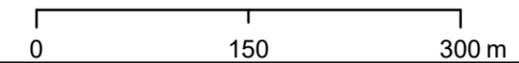
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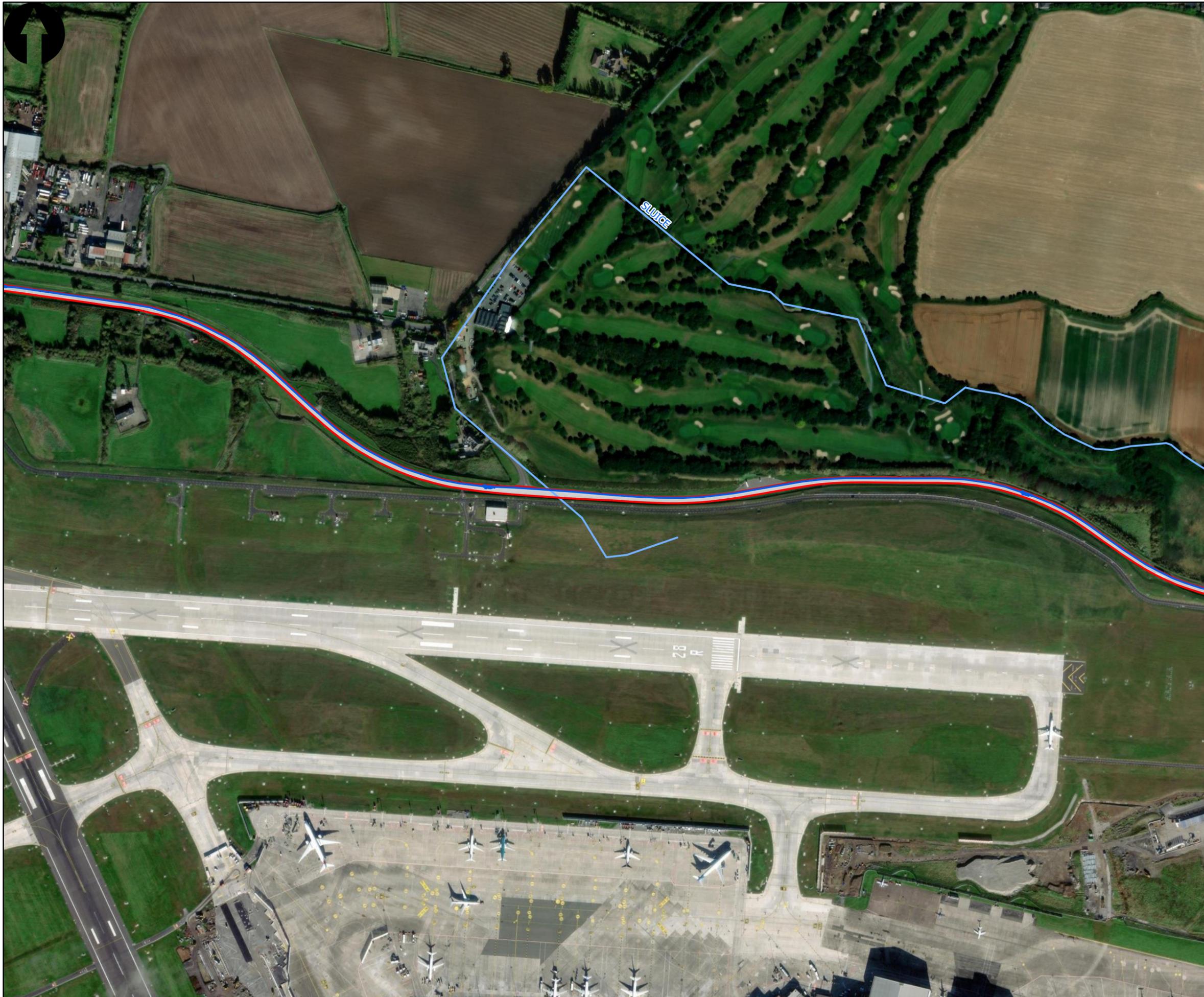
Habitat Map

Page 3 of 13

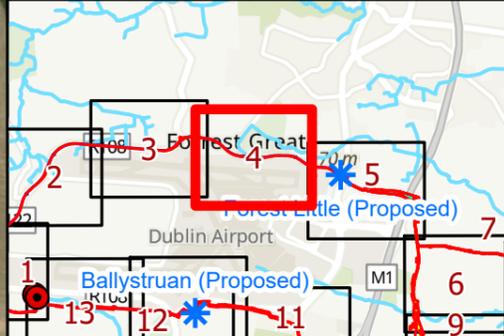
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Location Map



- Key to Symbols
- Red Line Boundary
  - EPA River
  - Forest Little to Ballystruan

Fossitt

- Buildings and Artificial Surfaces (BL3)

Notes

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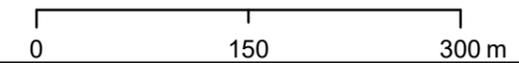
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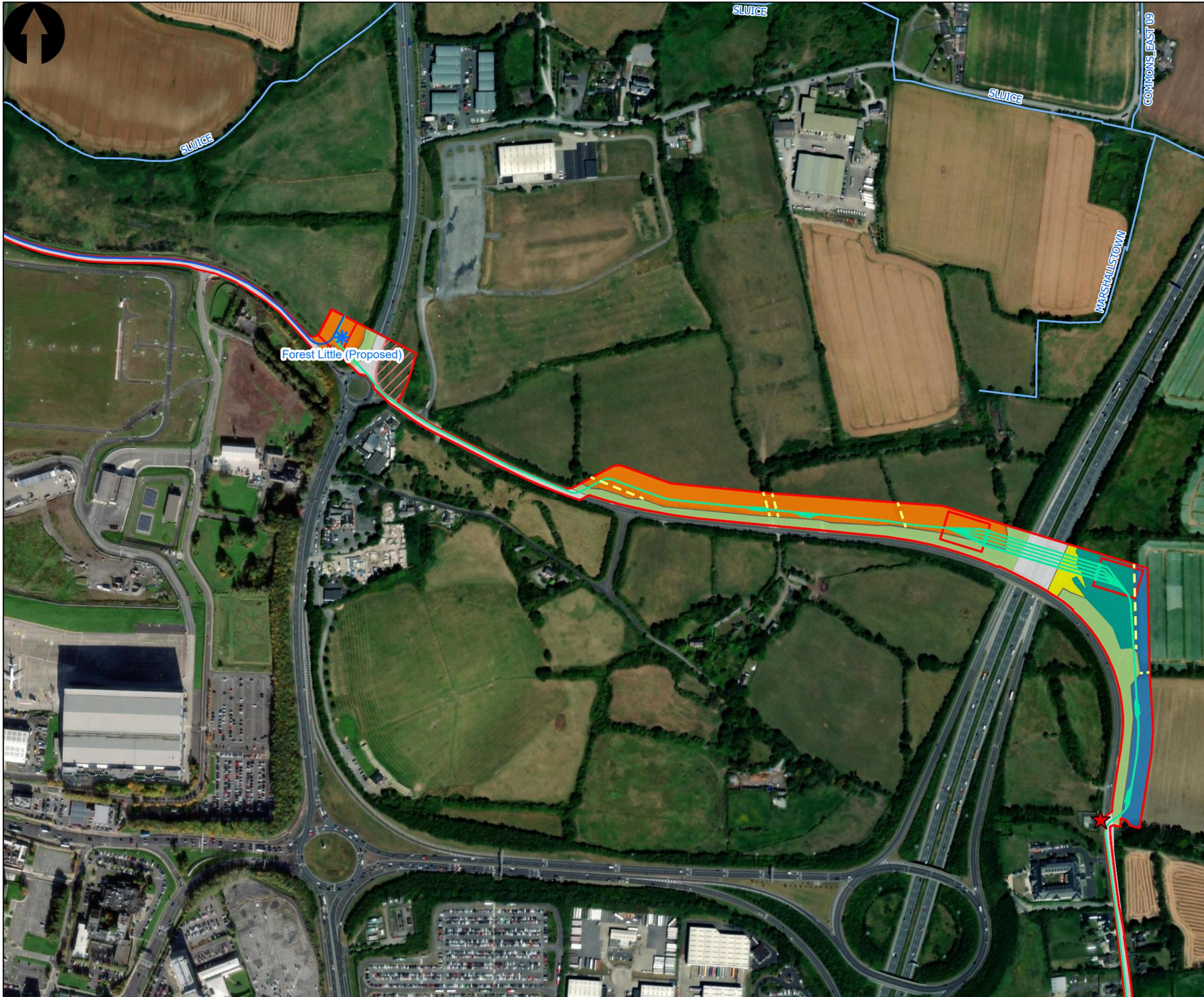
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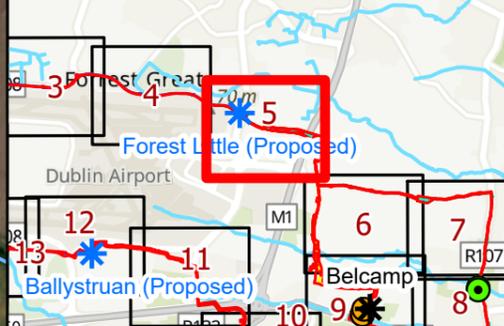
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Location Map



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - ★ Japanese Knotweed
  - Forest Little to Belcamp Option 2
  - Forest Little to Belcamp Option 1
  - Forest Little to Ballystruan
- Fossitt**
- Amenity Grassland (GA2)
  - Arable Crops (BC1)
  - Broadleaved Woodland (WD1)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Meadows and Grassy Verges (GS2)
  - Improved Agricultural Grassland (GA1)
  - Scrub (WS1)
  - Treeline (WL2)
  - ★ Proposed Substations

Notes

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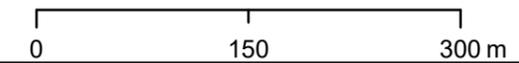
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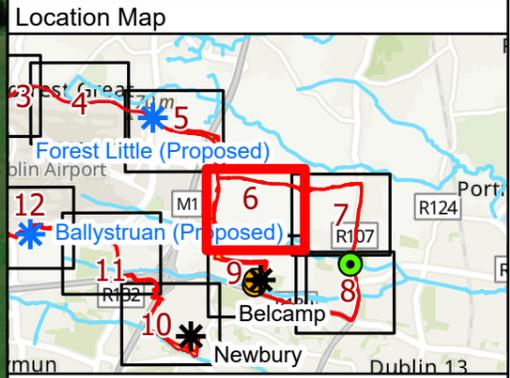
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- Key to Symbols
- Red Line Boundary
  - EPA River
  - ★ Japanese Knotweed
  - Forest Little to Belcamp Option 2
  - Forest Little to Belcamp Option 1
- Fossitt
- Amenity Grassland (GA2)
  - Arable Crops (BC1)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Calcareous and Neutral Grassland (GS1)
  - Improved Agricultural Grassland (GA1)
  - Scattered Trees and Parkland (WD5)
  - Scrub (WS1)
  - Hedgerow (WL1)
  - Treeline (WL2)

Notes

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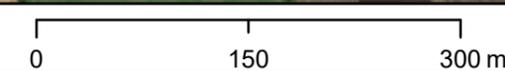
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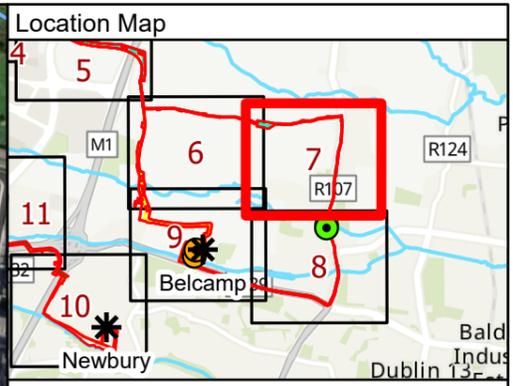
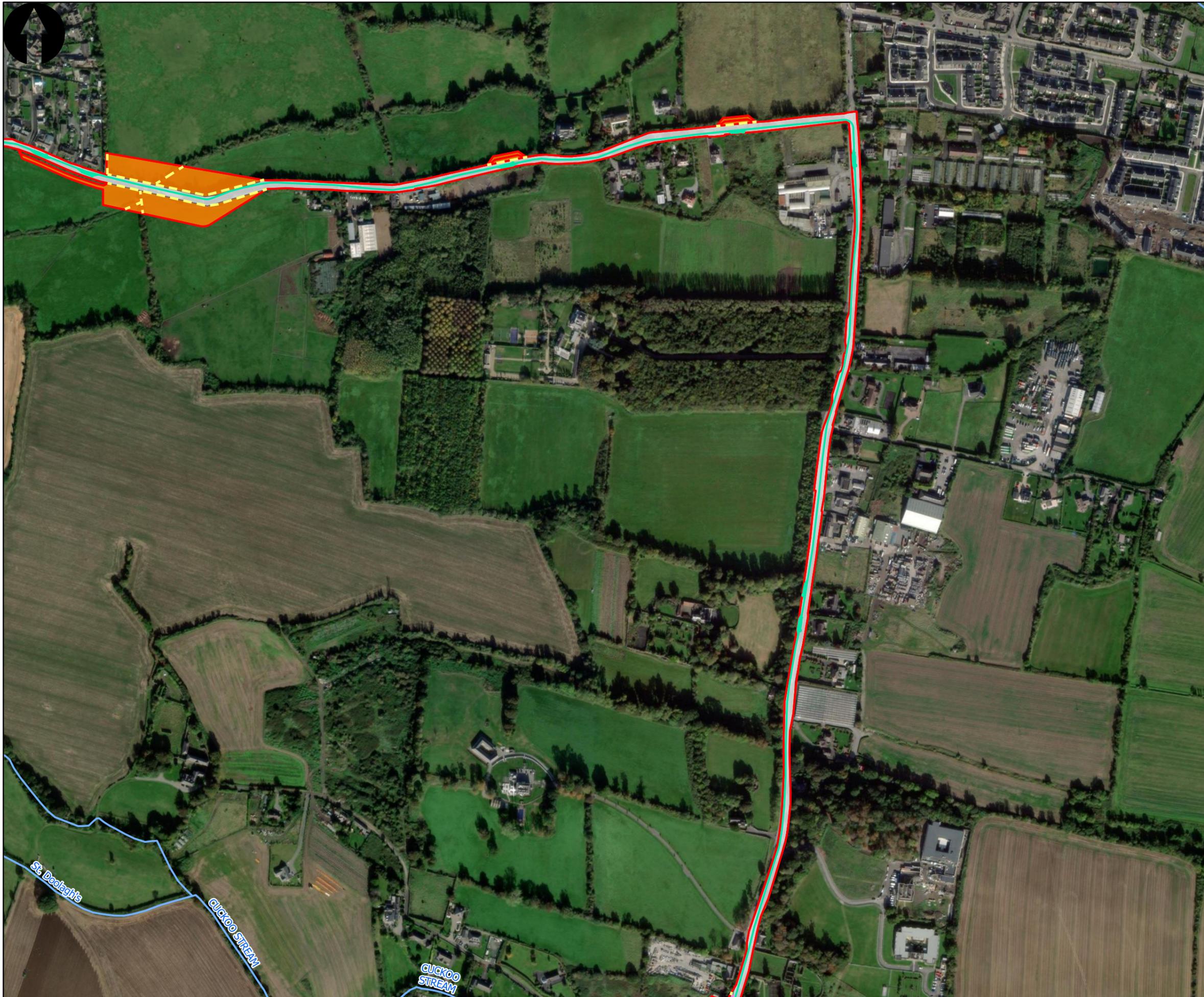
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Drawing Number  
**229100846-MMD-00-GIS-0011-6**



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Belcamp Option 1
- Fossitt**
- Buildings and Artificial Surfaces (BL3)
  - Dry Meadows and Grassy Verges (GS2)
  - Improved Agricultural Grassland (GA1)
  - Hedgerow (WL1)
  - Treeline (WL2)

**Notes**

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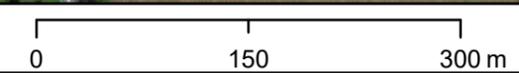
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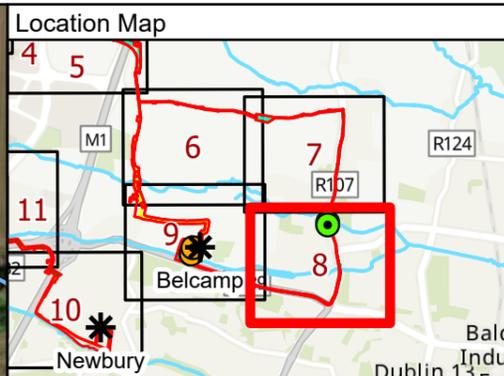
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Drawing Number  
**229100846-MMD-00-GIS-0011-7**



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Belcamp Option 1
- Fossitt**
- Buildings and Artificial Surfaces (BL3)
  - Dry Meadows and Grassy Verges (GS2)
  - Recolonising Bare Ground (ED3)
  - Scrub (WS1)
  - Scrub (WS1)/ Marsh (GM1)
  - Hedgerow (WL1)
  - Treeline (WL2)
- Bat Roost Potential**
- Low

**Notes**

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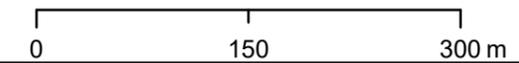
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Habitat Map

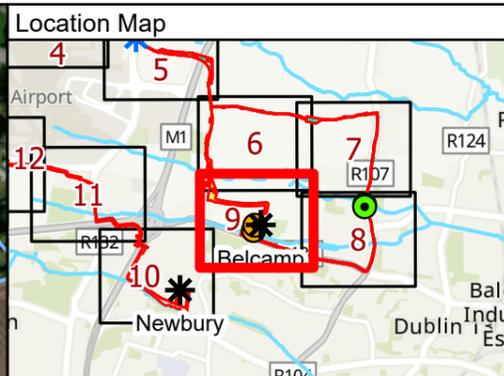
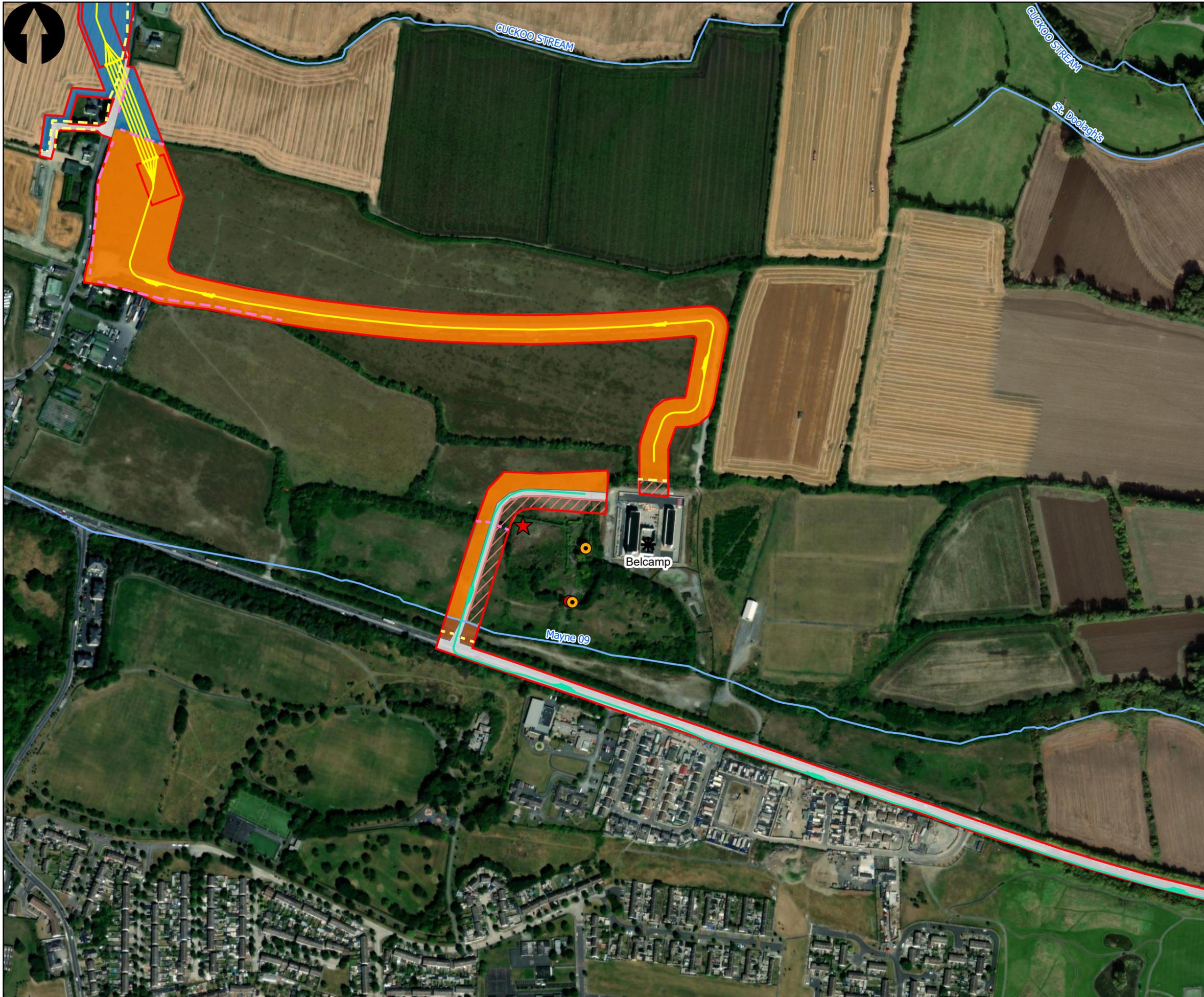
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Drawing Number  
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- Key to Symbols**
- Red Line Boundary
  - EPA River
  - ★ Japanese Knotweed
  - Forest Little to Belcamp Option 2
  - Forest Little to Belcamp Option 1
- Fossitt**
- Amenity Grassland (GA2)
  - Arable Crops (BC1)
  - Buildings and Artificial Surfaces (BL3)
  - Improved Agricultural Grassland (GA1)
  - Spoil and Bare Ground (ED2)
  - Hedgerow (WL1)
  - Treeline (WL2)
- Bat Roost Potential**
- High
  - Moderate
  - ✱ Existing Substations

**Notes**

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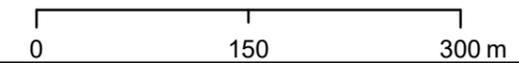
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Planning Design**  
Habitat Map

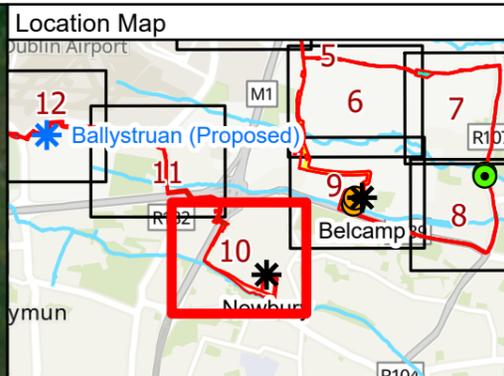
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Drawing Number  
**229100846-MMD-00-GIS-0011-9**



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - ★ Japanese Knotweed
  - Ballystruan to Newbury Existing Ducts
  - Ballystruan to Newbury
- Fossitt**
- Amenity Grassland (GA2)
  - Broadleaved Woodland (WD1)
  - Buildings and Artificial Surfaces (BL3)
  - Recolonising Bare Ground (ED3)
  - Scrub (WS1)
  - Wet Grassland (GS4)
  - Hedgerow (WL1)
  - Treeline (WL2)
  - ✱ Existing Substations

**Notes**

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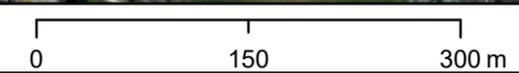
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Title  
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Planning Design**  
Habitat Map

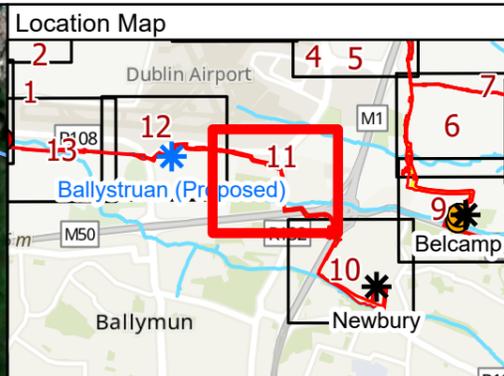
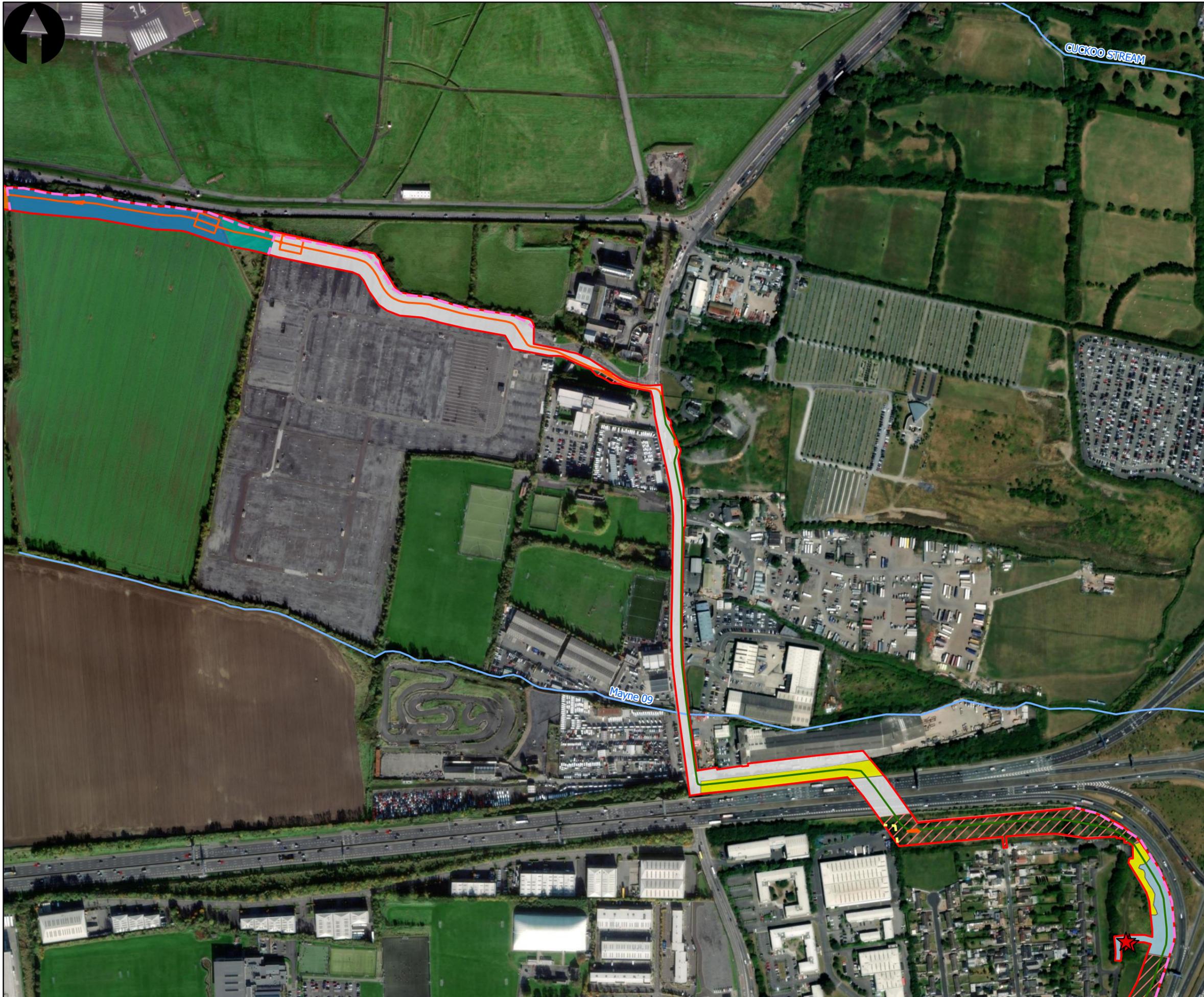
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Drawing Number  
**229100846-MMD-00-GIS-0011-10**



- Key to Symbols**
- Red Line Boundary
  - EPA River
  - ★ Japanese Knotweed
  - Ballystruan to Newbury Existing Ducts
  - Ballystruan to Newbury
- Fossitt**
- Amenity Grassland (GA2)
  - Arable Crops (BC1)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Meadows and Grassy Verges (GS2)
  - Improved Agricultural Grassland (GA1)
  - Scrub (WS1)
  - Wet Grassland (GS4)
  - Hedgerow (WL1)
  - Treeline (WL2)

**Notes**

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Habitat Map

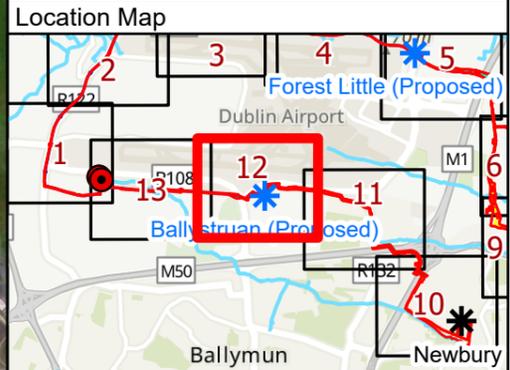
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- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Ballystruan
  - Ballystruan to Newbury
- Fossitt**
- Amenity Grassland (GA2)
  - Arable Crops (BC1)
  - Buildings and Artificial Surfaces (BL3)
  - Improved Agricultural Grassland (GA1)
  - Recolonising Bare Ground (ED3)
  - Scrub (WS1)
  - Spoil and Bare Ground (ED2)
  - Hedgerow (WL1)
  - Treeline (WL2)
  - ★ Proposed Substations

**Notes**

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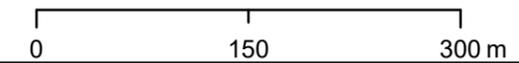
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Habitat Map

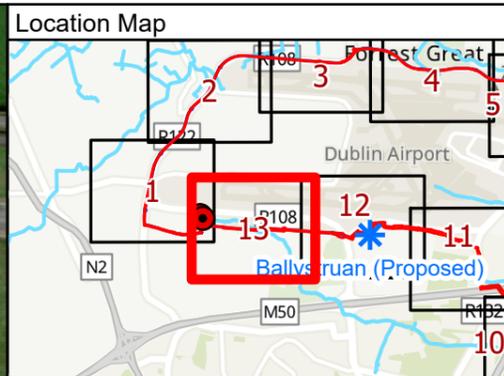
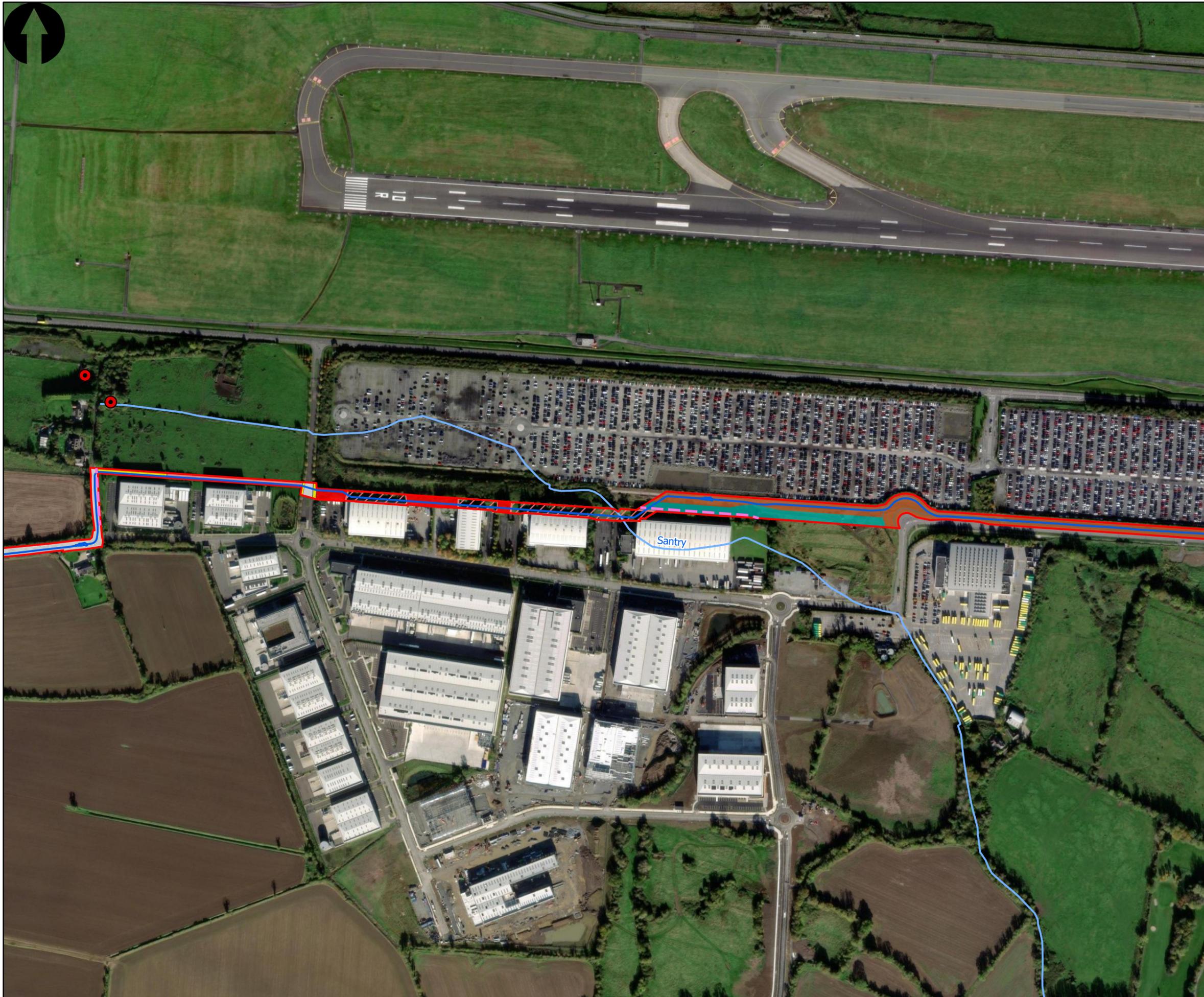
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Drawing Number  
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- Key to Symbols**
- Red Line Boundary
  - EPA River
  - Forest Little to Belcamp Option 2
  - Forest Little to Ballystruan
- Fossitt**
- Amenity Grassland (GA2)
  - Buildings and Artificial Surfaces (BL3)
  - Dry Calcareous and Neutral Grassland (GS1)
  - Dry Meadows and Grassy Verges (GS2)
  - Scattered Trees and Parkland (WD5)
  - Scrub (WS1)
  - Spoil and Bare Ground (ED2)
  - Hedgerow (WL1)
- Bat Roost Potential**
- High

**Notes**

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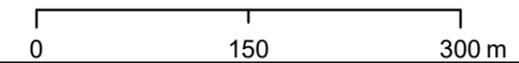
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Habitat Map

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## Appendix G – Air Quality

# Appendices

Appendix G – Air Quality Data

3

# Appendix G – Air Quality Data

## Construction Dust

**Table G.1: Determination of Dust Raising Magnitude (IAQM)**

Source	Large	Medium	Small
Demolition	Total building volume > 50,000m <sup>3</sup> , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities > 20m above ground	Total building volume 20,000m <sup>3</sup> - 50,000m <sup>3</sup> , potentially dusty construction material, demolition activities 10-20m above ground level	Total building volume <20,000m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months
Earthworks	Total site area >10,000m <sup>2</sup> , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes	Total site area 2,500m <sup>2</sup> – 10,000m <sup>2</sup> , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 tonne – 100,000 tonne	Total site area <2,500m <sup>2</sup> , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000tonne, earthworks during wetter months
Construction	Total building volume >100,000m <sup>3</sup> , piling, on site concrete batching; sandblasting	Total building volume 25,000m <sup>3</sup> – 100,000m <sup>3</sup> , potentially dusty construction material (e.g. concrete), piling, on site concrete batching	Total building volume <25,000m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber)
Track out	>100 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m	25-100 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m	<25 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m

**Table G.2: Receptor Sensitivity**

Source	High	Medium	Low
Sensitivities of people to dust soiling effects	Users can reasonably expect an enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks (See note B) and car showrooms.	Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Indicative examples include parks and places of work.	The enjoyment of amenity would not reasonably be expected (See note A); or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or Property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks (See note B) and roads.
Sensitivities of people to the health effects of PM10	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day - See note C) Indicative examples include residential properties. Hospitals, schools and residential care	Locations where the people exposed are workers (See note D), and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include office and shop workers, but will generally not include workers	Locations where human exposure is transient (See note E) Indicative examples include public footpaths, playing fields, the 24-hour objectives, a relevant parks and shopping streets.

	homes should also be considered occupationally exposed to PM10, as having equal sensitivity to residential areas for the purposes of this assessment.	as protection is covered by Health and Safety at Work legislation.	
Sensitivities of receptors to ecological effects (See note F)	Locations with an international or national designation and the designated features may be affected by dust soiling; or Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain (See note G). Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition. • Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a local Nature Reserve with dust sensitive features.

Notes:

(A) The public's expectations will vary depending on the existing dust deposition in the area

(B) Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with work place or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

(C) This follows Defra guidance as set out in LAQM.TG(16).

(D) Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason workers have been included in the medium sensitivity category.

(E) There are no standards that apply to short-term exposure, e.g. one or two hours, but there is still a risk of health effects, albeit less certain.

(F) A Habitat Regulation Assessment of the site may be required as part of the planning process, if the site lies close to an internationally designated site i.e. Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites.

(G) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

**Table G.3: Sensitivity of the area to dust soiling effects on people and property**

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

**Table G.4: Sensitivity of the area to human health effects**

Receptor Sensitivity	Annual Mean PM10 Concentration	Number of Receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m3	>100	High	High	Medium	Low	Low

		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24µg/m3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

**Table G.5: Sensitivity of the area to ecological effects**

Receptor Sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

**Table G.6: Risk of Dust Effects - Demolition**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Low Risk

**Table G.7: Risk of Dust Effects - Earthworks**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

**Table G.8: Risk of Dust Effects - Construction**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

**Table G.9: Risk of Dust Effects – Trackout**

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible



## Appendix H Climate Data

# Appendices

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# **Appendix H1 - Dublin Airport 1981–2010 averages (current baseline)**

Dublin Airport 1981–2010 averages (current baseline)

Climate variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
<b>Temperature (°C)</b>													
Mean temperature	5.3	5.3	6.8	8.3	10.9	13.6	15.6	15.3	13.4	10.5	7.4	5.6	9.8
Mean daily max	8.1	8.3	10.2	12.1	14.8	17.6	19.5	19.2	17.0	13.6	10.3	8.3	13.3
Mean daily min	2.4	2.3	3.4	4.6	6.9	9.6	11.7	11.5	9.8	7.3	4.5	2.8	6.4
<b>Rainfall (mm)</b>													
Mean monthly total	62.6	48.8	52.7	54.1	59.5	66.7	56.2	73.3	59.5	79.0	72.9	72.7	758.0
<b>Relative humidity (%)</b>													
Mean at 1500UTC	80.6	75.7	71.0	68.3	68.0	68.3	69.0	69.3	71.5	75.1	80.3	83.1	73.3
<b>Sunshine (hours)</b>													
Mean daily duration	1.9	2.7	3.5	5.3	6.2	5.8	5.3	5.1	4.3	3.3	2.4	1.7	3.9
<b>Wind (knots)</b>													
Mean monthly speed	12.5	12.0	11.6	9.9	9.2	8.6	8.7	8.7	9.2	10.4	11.0	11.3	10.3
<b>Weather (mean no. of days with...)</b>													
Snow or sleet	4.6	4.2	2.8	1.2	0.2	0.0	0.0	0.0	0.0	0.0	0.8	2.9	16.6
Thunder	0.3	0.2	0.3	0.2	0.9	0.8	0.8	0.9	0.3	0.3	0.2	0.2	5.5
Fog	3.3	3.1	3.6	3.6	3.4	2.8	3.3	3.8	4.2	3.2	3.1	4.1	41.5

## **Appendix H2 - Summary of key climate projections from the World Bank CCKP**

Summary of key climate projections from the World Bank CCKP (the latest publicly available projections for ROI)

Baseline (1995-2014)												
Climate variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean air temperature (°C)	5.5	5.62	6.2	7.89	10.52	13.34	15.03	15.01	13.21	10.31	7.8	6.1
Minimum air temperature (°C)	2.13	2.13	2.47	3.88	6.21	9.29	11	11.09	9.46	7	4.52	2.95
Maximum air temperature (°C)	8.57	9.12	9.98	11.84	14.67	17.64	19.24	19.24	17.19	14.03	11.14	9.48
Precipitation (mm)	132.44	104.23	96.69	78.27	63.8	49.13	50.76	53.38	62.72	105.87	128.61	138.26
2020-2039, SSP5-8.5, 50 <sup>th</sup> Percentile												
Climate variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean air temperature (°C)	+0.41	+0.17	+0.5	+0.39	+0.37	+0.78	+0.79	+1	+0.78	+0.83	+0.36	+0.65
Minimum air temperature (°C)	+0.44	+0.15	+0.58	+0.55	+0.43	+0.27	+0.86	+0.84	+0.81	0.74	+0.48	+0.53
Maximum air temperature (°C)	+0.6	+0.22	+0.47	+0.31	+0.49	+0.72	+0.94	+1.08	+0.82	+0.66	+0.41	+0.55
Precipitation change (%)	+1.88	-1.29	+5.21	+2.44	-1.46	-1.65	-5.7	-4.06	-4.88	+0.65	+2.97	+2.77
2040-2059, SSP5-8.5, 50 <sup>th</sup> Percentile												
Climate variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean air temperature (°C)	+0.87	+0.82	+1	+0.87	+0.97	+1.61	+2.01	+2.01	+1.43	+1.3	+0.99	+1.17
Minimum air temperature (°C)	+1.01	+0.86	+1.13	+0.93	+1.05	+0.91	+1.69	+1.82	+1.56	+1.3	+0.98	+1.04
Maximum air temperature (°C)	+1.14	+0.77	+0.92	+0.77	+1	+1.48	+2.02	+1.96	+1.27	+1.11	+1.15	+0.92
Precipitation change (%)	+8.08	+3.12	+5.94	+1.04	-5.75	-9.57	-14.63	-9.09	-3.56	-0.02	+7.06	+3.92
2060-2079, SSP5-8.5, 50 <sup>th</sup> Percentile												
Climate variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Mean air temperature (°C)	+1.55	+1.45	+1.55	+1.59	+1.74	+2.3	+2.93	+2.9	+2.31	+2.16	+1.82	+1.95
Minimum air temperature (°C)	+1.84	+1.62	+1.73	+1.61	+1.66	+1.87	+2.71	+2.85	+2.13	+2.08	+2.02	+1.81
Maximum air temperature (°C)	+1.88	+1.5	+1.6	+1.6	+1.74	+2.47	+3.05	+3.1	+2.56	+2.21	+1.85	+1.92
Precipitation change (%)	+13.94	+8.34	+9.51	-0.4	-6.3	-19.07	-14.54	-21.09	-9.15	+2.56	+13.03	+13.92

**2080-2099, SSP5-8.5, 50<sup>th</sup> Percentile**

<b>Climate variable</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
Mean air temperature (°C)	+2.45	+1.99	+2.26	+2.34	+2.57	+3.58	+4.43	+4.77	+3.74	+3.2	+2.52	+2.7
Minimum air temperature (°C)	+2.62	+2.31	+2.59	+2.56	+2.71	+3.29	+4.4	+4.73	+3.75	+3.37	+2.91	+2.75
Maximum air temperature (°C)	+2.57	+2.06	+2.24	+2.3	+2.75	+3.88	+4.35	+4.64	+4.29	+3.1	+2.71	+2.57
Precipitation change (%)	+22.52	+17.25	+16.31	+1.22	-6.09	-17.86	-24.44	-27.13	-9.11	+8.45	+15.8	+18.54



## Appendix I - Archaeology, Architectural & Cultural Heritage

# Appendices

Appendix I1 - Archaeology CH Sites

Appendix I2. – Chapter 15 - Scheme Location: MetroLink underground cable route options  
and study area (100m radius)

Appendix I3. – Chapter 15 - Cultural Heritage (CH) sites within the study area (100m radius) Drawings

# **Appendix I1 - Archaeology CH Sites**

**Table I.1 CH Sites**

CH Number	Type	ID	Long Description/Details	Townland	Baseline Value	ITM East	ITM North
CH001	Townland Boundary	TB01	Modern roadway within an industrial estate. Kilmore Big/Shrubs townland Boundary	Kilmore Big/Shrubs	Medium/Low	717811	740591
CH002	AAP	AAP01	Santry River forming Kilmore Big/Shrubs townland boundary	Kilmore Big/Shrubs	Medium/High	717988	740344
CH003	Townland Boundary	TB02	Modern roadway within an industrial estate. Kilmore Big/Santry townland Boundary	Kilmore Big/Santry	Medium/Low	717819	740726
CH004	Townland Boundary	TB03	Modern industrial estate. Shrubs/Primrose Castle townland Boundary	Shrubs/Primrose Castle	Medium/Low	717864	740711
CH005	Townland Boundary	TB04	Modern industrial estate. Santry/Primrose Castle townland Boundary	Santry/Primrose Castle	Medium/Low	717764	740831
CH006	Townland Boundary	TB05	Brownfield site to the west of M1. Santry/Clonshagh townland Boundary	Santry/Clonshagh	Medium/High	717746	741273
CH007	Townland Boundary	TB06	Part of modern carriageway. Possibly some remnants of boundary to the southwest of roadway - Clonshagh/Turnapin Little townland Boundary	Clonshagh/Turnapin Little	Medium/High	717691	741418
CH008	Bridge	UCH01	Turnapin Bridge marked on the 1st edition Ordnance Survey map	Turnapin Little	Medium/High	717083	741603
CH009	AAP	AAP02	Unnamed Stream marked on the 1st Edition Ordnance Survey Sheet- crossed by Turnapin Bridge	Turnapin Little/Turnapin Great	Medium/High	717090	741603
CH010	Townland Boundary	TB07	Modern Swords Road. Turnapin Great/Dardistown townland boundary	Turnapin Great/Dardistown	Medium/Low	717074	741776
CH011	Townland Boundary	TB08	Modern Old Airport Road. Ballystruan/Turnapin Great townland Boundary	Ballystruan/Turnapin Great	Medium/Low	716504	742244
CH012	Townland Boundary	TB09	Laneway to the south of old airport road. Coultury/Ballystruan townland Boundary	Coultury/Ballystruan	Medium/High	715798	742329
CH013	Townland Boundary	TB10	Field Boundary. Coultury/Ballymun townland Boundary	Coultury/Ballymun	Medium/High	715597	742228
CH014	Pump	UCH02	Pump marked on 1st Edition Ordnance Survey sheet	Turnapin Great	Medium/Low	717088	741467
CH015	Building	UCH03	Building marked on 25-inch Ordnance Survey sheet - no longer extant	Ballystruan	Medium/Low	716981	742059
CH016	Building	UCH04	Building marked on 25-inch Ordnance Survey sheet - Still Extant	Ballystruan	Medium/High	715814	742354
CH017	Pump	UCH05	Pump marked on 25-inch Ordnance Survey sheet	Turnapin Great	Medium/Low	717029	742036
CH018	Buildings	UCH06	Two adjacent roadside buildings located to the north of Turnapin Bridge on the 1st Edition Ordnance Survey Sheet - no longer extant	Turnapin Little	Medium/Low	717089	741668
CH019	Buildings	UCH07	Two adjacent roadside buildings located to the east of roadway - no longer extant	Dardistown	Medium/Low	717089	741777

CH020	Building	UCH08	L-plan roadside building located to the west of roadway marked on 1st Edition Ordnance Survey Sheet	Turnapin Great	Medium/High	717058	741811
CH021	Building	UCH09	Roadside building located to the west of roadway marked on 1st Edition Ordnance Survey Sheet	Turnapin Great	Medium/Low	717062	741872
CH022	Building	UCH10	Roadside building located to the east of roadway marked on 1st Edition Ordnance Survey Sheet	Dardistown	Medium/Low	717083	741877
CH023	Building	UCH11	Roadside building located to the east of roadway marked on 1st Edition Ordnance Survey Sheet	Dardistown	Medium/Low	717085	741952
CH024	Building	UCH12	Roadside building located to the west of roadway marked on 1st Edition Ordnance Survey Sheet	Turnapin Great	Medium/Low	717079	741476
CH025	Demesne Landscape	UCH13	Demesne Landscape associated with 'Willsborough' as outlined on the 1st Edition Ordnance Survey Sheet	Santry	Medium/Low	717721	741201
CH026	Demesne Landscape	UCH14	Demesne Landscape associated with 'Woodlawn' as outlined on the 1st Edition Ordnance Survey Sheet	Kilmore Big	Medium/Low	717795	740589
CH027	Townland Boundary	TB11	Modern roadway associated with Dublin Airport. Part of townland boundary may survive to the south. Silloge/Ballymun townland Boundary	Silloge/Ballymun	Medium/High	715049	742248
CH028	Townland Boundary	TB12	Modern roadway associated with Dublin Airport. Part of townland boundary may survive to the south Harristown/Silloge townland Boundary	Harristown/Silloge	Medium/High	714779	742267
CH029	Archaeological Excavation	03E0924	Archaeological Monitoring at Harristown, Co. Dublin for Dublin Bus Depot in 2003 - 03E0924			714576	742195
CH030	Demesne Landscape	UCH15	The southern portion of Harristown House Demesne landscape including a laneway	Harristown	Medium/Low	713574	742582
CH031	Building	UCH16	A building marked on the 1st Edition Ordnance Survey Sheet to the north of a laneway approaching Harristown House	Harristown	Medium/Low	713322	742524
CH032	Townland Boundary	TB13	Part of modern R108 roadway. Shanganhill/Harristown townland Boundary	Shanganhill/Harristown	Medium/Low	713264	742548
CH033	Archaeological Excavation	01E0760	Archaeological Monitoring at Harristown, Co. Dublin - No Archaeological Significance	Harristown	Very High	713304	742735
CH034	Buildings	UCH17	Two adjacent buildings located in the townland of Shanganhill marked on the 1st Edition Ordnance Survey sheet	Shanganhill	Medium/Low	712926	742571
CH035	Ringditch	DU03905	Aerial photograph (GB89. L.02) shows cropmark of a ring-ditch. Within relatively level tillage. DU014-098--- No visible remains	Shanganhill	Very High	712629	742496
CH036	Townland Boundary	TB14	Modern R108 roadway. Newtown/Shanganhill townland Boundary	Newtown/Shanganhill	Medium/High	712579	742817
CH037	Ringfort - unclassified	DU03906	"Aerial photograph (GB89. AF.01) shows cropmark of a curvilinear enclosure defined by a fosse. This is probably a ploughed out ringfort. Within rough pasture. No visible remains.	Shanganhill	Very High	712747	743085
CH038	Buildings	UCH18	A group of 3 roadside buildings, one L-plan located to the west of the road at a junction and marked on the 1st Edition Ordnance Survey sheet. The words 'Pass if you can' are marked at this location	Shanganhill	Medium/Low	712614	743086

CH039	Archaeological Excavation	05E 0236	A levelled site (SMR 14:6) and two further sites (14:16 and 14:53) which were recorded from aerial photography were tested in Coldwinters as part of a planning application for Logistic warehousing units. The site had been used as a golf course in the recent past. Site 14:6 was located and found to exhibit significant subsurface archaeological features. Whilst the monument displays characteristics of an early medieval multivallate ringfort, a feature within the monument complex has yielded a sherd of pottery of probable prehistoric date. Site 14:16 was not located, and testing did not reveal anything of archaeological significance. It is likely, therefore, that landscaping undertaken during construction of the golf course has removed any traces of the monument. Site 14:53 was not located during the testing. The many features such as bunkers and tees in the vicinity of the monument site, and the landscaping required to create the golf course, may have served to remove all traces of the monument	Coldwinters/Newtown	Very High	712639	742975
CH040	Townland Boundary	TB15	Part of R122 roadway St. Margarets/Shanganhill townland boundary	St. Margarets/Shanganhill	Medium/High	712706	743218
CH041	Possible Culvert	UCH19	Marked on the 1st Edition Ordnance Survey Sheet as 'Pass Ford' - possibly a culvert or other similar feature	Newtown	Medium/Low	712556	742691
CH042	Townland Boundary	TB16	Part of R122 roadway. St. Margarets/Shanganhill townland boundary	St. Margarets/Shanganhill	Medium/High	712865	743439
CH043	Ritual site - holy well	DU00582/Protected Structure - Fingal Council	Dedicated to St. Brigid, access is via laneway from rear of the Parochial Hall. This is an enclosed spring well. The well 'bath' area delineated by stone wall, iron railings and a gate. To south are steps down to a stone lined base. Lower course of bath red brick. According to a plaque attached to the west end of the tank, the well was enclosed by Sir. John Plunkett of Dunsoghly (d. 1582) although the present structure looks much later. The plaque was erected by Farrell & Son 1975. The well was frequented for its medicinal qualities. According to D'Alton it contained lime, muriate of soda, nitrate of kali and sulphur which led to constantly tepid water bubbling up. The well started drying up about twenty years ago and the base is now grassed over. - DU014-003----	St. Margarets	Very High	712768	743648
CH044	Building	DU03345	The southeast corner of the Parochial Hall at St. Margaret's contains a rectangular stone tablet with carvings in high relief of two rings side by side, one is plain interlace, the second is formed from interlocking animal heads. This may have been a date stone. Date is uncertain. - DU014-004----	St. Margarets	Very High	712832	743627
CH045	NMI - Topographical File	IA/16/75	Object type - Cemetery	St. Margarets	Very High	712835	743621
CH046	Protected Structure	PS01	"St. Margaret's Church (RC) -	St. Margarets	Very High	712885	743654

CH047	Enclosure	DU04466	A circular enclosure visible as a crop mark on an aerial photograph (SMR file; pers. comm. T. Condit). Located at low point within field with quite stark undulations. Arable. No visible remains	Sandyhill	Very High	713241	743742
CH048	Graveyard/cemetery	DU00579/11348001	Graveyard with various cut stone grave markers. Church, c.1720, now in ruins. Classical mausoleum with Serliana doorway having ornate marble frieze; date plaque, c.1746, and Latin inscription above architrave. - The remains of the medieval parish church (DU014-002001-) lies in the west end of a graveyard north of St. Margaret's village. The graveyard surrounded by a stone wall is sub-rectangular in plan. The ground slopes steeply down from south to north. An 18th century mausoleum which is dedicated to the Morgan family is located at the southern boundary of the graveyard (Anon 1835, 92; Healy 1975, 26; Tutty 1979, 155-157).	St. Margarets	Very High	712963	743902
CH049	Church	DU00578/PS02	The remains of the medieval parish church lie in the W end of a graveyard N of St. Margaret's village. This site has been described as the 'old church' in the Civil survey (1654-6) see Anon 1897, 450-51; Simington 1945, 209; Tutty 1979, 155-157). The church was originally called Donaghmore and probably fell into ruin between 1630 and 1650 (Walsh 1888, 155). Only the western portion survives. It is built of rough masonry with some evidence for re-building. The N jamb of the W window is present. There are traces of a doorway in the N wall. The SW angle has been robbed of its quoins (Dims. H of wall c. 1.80-3m, thickness of wall 0.82m). There is a possible buttress against the NW angle. It is extremely overgrown and has been subject to mortar wash-out.	St. Margarets	Very High	712966	743901
CH050	Chapel	DU00580	A chantry chapel, apparently built by the Plunkett family (Tutty 1979, 155-157) in the sixteenth century lies southeast of the St. Margaret's medieval parish church (DU014-002002-). It is rectangular in plan (L 9m, WNW-ESE, With 4.9m, wall T 0.9m) and is entered through an elaborately decorated, pointed arched doorway which incorporates roll and hood moulding that terminates in a carved head. All the windows are blocked. There is a widely splayed window with chamfered, limestone jambs, and a square-headed window in the south wall. There is an aumbry on the same side. An L-shaped section of wall extends from the northeast angle of the chapel. An early 19th-century mausoleum is attached to the southeast corner. There are burials and big tree internally and there has been some rebuilding of the wall.	St. Margarets	Very High	712971	743889
CH051	Townland Boundary	TB17	Part of L3132 roadway. Sandyhill/Millhead townland boundary	Sandyhill/Millhead	Medium/High	713275	743997

CH052	Windmill (in ruins)	PS03	Windmill (in ruins) - Now a circular tower ruin in field, northeast of St. Margaret's	Millhead	Very High	713400	743956
CH053	Well	UCH20	Well marked on 1st Edition Ordnance Survey sheet as 'Moss Well [Mass Well]' - located to the north of roadway	Millhead	Medium/High	713383	744159
CH054	Buildings	UCH21	A group of three buildings marked on the 1st Edition Ordnance Survey sheet to the south of the roadway - No visible trace of these buildings at their marked location	Millhead	Medium/Low	713413	744147
CH055	Townland Boundary	TB18	Part of R108 roadway, but still extant to the northwest of roadway. Millhead/Kingstown townland Boundary	Millhead/Kingstown	Medium/High	713501	744322
CH056	Roadway	UCH22	Kingstown Crossroads Junction - marked on the 1st Edition Ordnance Survey sheet - a distinctive junction of possible antiquity	Millhead/Kingstown	Medium/Low	713529	744291
CH057	Laneway	UCH23	Laneway marked on the 1st Edition Ordnance Survey sheet	Kingstown	Medium/High	713889	744639
CH058	Townland Boundary	TB19	Part of R108 roadway, but still extant to the northwest of roadway. Kingstown/Barberstown townland Boundary	Kingstown/Barberstown	Medium/High	714084	744622
CH059	Archaeological Excavation	17 E0091	No Archaeological Significance	Barberstown	Very High	714059	744538
CH060	Archaeological Excavation	17 E0282	A total of 38,419.6 linear metres of test trench was excavated in the greenfield areas of the scheme which made up a total of 31 fields. Eleven possible sites (Sites 1-11) were identified during the assessment phases of works consisting of isolated possible pits, post-holes and ditches. The excavation of these sites was undertaken under an extension to Licence No: 17E0282 beginning on 22 July 2017 until 2 November 2017. Of the eleven sites that were identified during the testing phase seven proved to be of archaeological significance upon further investigation.	Barberstown	Very High	714655	743800
CH061	Building	UCH24	Building with adjacent laneway marked on the 1st Edition Ordnance Survey Sheet	Barberstown	Medium/Low	714455	744596
CH062	Archaeological Excavation	17E 0090	Site D is located within the proposed development area of the North Runway Project at Dublin Airport in the townland of Barberstown. The site was identified during advance archaeological investigations which included non-invasive geophysical survey by Target Geophysics (16R0097) and archaeological test-trenching (16E0335) by Courtney Deery Heritage Consultancy.	Barberstown	Very High	714662	744466
CH063	Building	UCH25	Long E-W aligned Building with adjacent laneway marked on the 1st Edition Ordnance Survey Sheet	Barberstown	Medium/Low	714659	744570
CH064	Townland Boundary	TB20	Part of R108 roadway. Barberstown/Pickardstown townland Boundary	Barberstown/Pickardstown	Medium/Low	714817	744560
CH065	Townland Boundary	TB21	Part of R108 roadway but survives to the north of roadway. Pickardstown/Forrest Great townland Boundary	Pickardstown/Forrest Great	Medium/High	714970	744559
CH066	Ringfort	DU00427/PS04	Situated on level grassland. This site was formerly a platform type ringfort (diam. c. 50m) with a waterlogged external fosse (Healy 1975, 23). It's south-eastern	Forrest Great	Very High	715314	744668

			quadrant has been truncated by works associated with Dublin airport but the majority of the ringfort is visible as a crop mark on the Bird's-eye viewer of Bing.				
CH067	Building	UCH26	Small roadside building located to the north of roadway and marked on the 1st Edition Ordnance Survey Sheet	Forrest Great	Medium/Low	715542	744775
CH068	Lime Kiln	UCH27	A lime Kiln marked on the 1st Edition Ordnance Survey sheet located to the south of roadway- freestanding in a field	Forrest Great	Medium/Low	715591	744731
CH069	Dwelling/Building	PS05	Dwelling-Earthwork on Cooks Road	Forrest Great	Very High	715715	744792
CH070	House - 16th/17th century	DU00428	The Civil survey (1654-6) mentions a fair stone house at the Great Forrest held by Lord Ranelagh (Simington 1945, 113). This is probably the building shown on the 1840 OS 6-inch map. as 'Forrest House in ruins'. In the 1992 report there were foundations of this building present at the rear of a large farmhouse. Now a yard. No visible remains.	Forrest Great	Very High	715745	744780
CH071	Building complex	UCH28	A complex of four buildings marked on the 1st Edition Ordnance Survey to the south of 'Forrest Ho.' - possibly associated the aforementioned 16th-17th century settlement	Forrest Great	Medium/Low	715723	744713
CH072	Drain/Leat	UCH29	A leat/drain marked on the 1st Edition Ordnance Survey Sheet	Forrest Great	Medium/High	716001	744588
CH073	Townland Boundary	TB22	Part of Naul Road but may survive to the north of the roadway. Forrest Great/Forrest Little townland Boundary	Forrest Great/Forrest Little	Medium/High	716205	744468
CH074	Buildings	UCH30	A building complex marked on the 1st Edition Ordnance Survey Sheet to the south of roadway	Forrest Little	Medium/Low	716334	744415
CH075	Laneway	UCH31	A laneway marked on the 1st Edition Ordnance Survey Sheet leading to 'Old Quarry'	Forrest Little	Medium/Low	716932	744456
CH076	Townland Boundary	TB23	Part of Naul Road but may survive to the north of the roadway. Forrest Little/Cloghran townland Boundary	Forrest Little/Cloghran	Medium/High	717190	744357
CH077	Building	UCH32	Small roadside building located to the west of roadway and marked on the 1st Edition Ordnance Survey Sheet	Forrest Little	Medium/Low	716261	744493
CH078	Building	UCH33	Long, L-plan roadside building with gable to the road, located to the north of roadway	Forrest Little	Medium/Low	717176	744327
CH079	Ringfort	DU00430/PS06	Named 'fort' on the 1837 OS 6-inch map. It was partly demolished in 1822 and cleared away in 1873 (Healy 1975, 24). The area has been incorporated into an extension to the recently constructed runway at Dublin Airport. Not visible at ground level. - DU011-046----	Cloghran	Very High	717244	744290
CH080	Enclosure	DU04364	A sub-rectangular enclosure visible as a crop mark on an aerial photograph together with other possible features (SMR file; pers. comm. T. Condit). The site is located on low-lying land that rises steeply to the south. No visible remains at ground level.	Forrestown South	Very High	717360	744526
CH081	Archaeological Excavation	09E 0467	Testing of Area 9 was carried out on 1 October 2009. A total of 24 test-trenches were excavated in one field and no features of archaeological significance were identified.	Forrestown South/Cloghran	Very High	717726	744190

CH082	Archaeological Excavation	01E 0135	Testing took place at Navan Road, Dunboyne, in advance of construction of a mixed commercial and residential development, in March 2001. Eight test-trenches were excavated over the development area. No archaeological features or deposits were encountered in any of these. A 19th-century building stood on the site. This was surveyed prior to demolition. Further testing took place in May 2001. Eight more test-trenches were excavated over the development area. No archaeological features or deposits were encountered in any of these.	Harristown	Very High	714026	742327
CH083	AAP	AAP03	Stream marked on the 1st Edition 25 inch Ordnance Survey map	Harristown	Medium/High	713883	742378
CH084	Well	UCH34	Well marked on the 1st Edition 25-inch Ordnance Survey Sheet	Harristown	Medium/Low	713780	742381
CH085	Bridge	UCH35	Small bridge crossing stream marked on the First Edition 25-inch Ordnance Survey Sheet	Harristown	Medium/Low	713704	742404
CH086	Gravel Pit	UCH36	Gravel Pit marked on 1st edition 25-inch Ordnance Survey Sheet	Shanganhill	Medium/Low	712629	743012
CH087	Building	UCH37	Building marked on the 1st Edition 25-inch Ordnance Survey Sheet	Sandyhill	Medium/Low	712881	743396
CH088	Footpath	UCH38	Footpath marked on the 1st Edition 25-inch Ordnance Survey Sheet	Sandyhill	Medium/Low	713037	743604
CH089	Drain/Leat	UCH39	A leat/drain marked on the 1st Edition 25-inch Ordnance Survey Sheet	Kingstown	Medium/High	714011	744621
CH090	Drain/Leat	UCH40	A leat/drain marked on the 1st Edition 25-inch Ordnance Survey Sheet	Forrest Great	Medium/Low	715976	744605
CH091	AAP - Spring	AAP04	A Spring marked on the 1st Edition 25-inch Ordnance Survey Sheet	Forrest Little	Medium/High	716319	744483
CH092	Building	UCH41	A N-S aligned roadside building marked on the Ordnance Survey Cassini edition	Harristown	Medium/Low	713525	742567
CH093	Possible Lime Kin	UCH42	A possible lime kiln or other circular structure with adjacent rectangular structure (unroofed) marked on the Ordnance Survey Cassini Edition immediately to the north of the road	Harristown	Medium/Low	713247	742552
CH094	Building	UCH43	A small rooved building marked on the Ordnance Survey Cassini Edition	St. Margarets	Medium/High	712751	743361
CH095	Laneway	UCH44	A laneway marked on the Ordnance Survey Cassini Edition	Sandyhill	Medium/Low	713081	743694
CH096	Bridge and Leat/drain	UCH45	A drain/leat with an associated bridge marked on the Ordnance Survey Cassini Edition and 1st Edition 25-inch	Barberstown	Medium/High	714601	744595
CH097	Laneyway with adjacent drain	UCH46	A laneway with adjacent drain to the west - marked on all Ordnance Survey Editions	Barberstown	Medium/High	714832	744562
CH098	Possible Orchard	UCH47	A possible orchard or planned garden marked on the Ordnance Survey Cassini Edition	Forrest Great	Medium/Low	715531	744735
CH099	Possible Pond	UCH48	A possible pond marked on the Ordnance Survey Cassini Edition	Forrest Great	Medium/Low	715601	744732

CH100	Drain/Leat	UCH49	A leat/drain marked on the Ordnance Survey Cassini Edition	Forrest Little	Medium/Low	716328	744472
CH101	Building	PS07	Castlemoate House - Five-bay two-storey house, out-offices & gates	Cloghran (Swords)	Very High	717603	743997
CH102	Archaeological Excavation	09E0467	No archaeological significance	Forrestown South/Cloghran	Very High	717726	744190
CH103	Archaeological Excavation	08E0333	An assessment, including trenching, was carried out in advance of the construction of a house. Four test-trenches were excavated, in the south-west corner of a level field, with no visible anomalies. The RMP indicates a mound/site, DU015-001, in the adjacent field to the west of the site. No material of an archaeological nature was disclosed by the test-trenching.	Forrestown South/Cloghran	Very High	717748	744239
CH104	Graveyard	DU03915/PS08	A roughly rectangular graveyard built on a rock outcrop. This rock has been quarried along the exterior of the graveyard wall to create a steep precipice around the north and east side of the site. It encloses the remains of an 18th century church on the site of the medieval parish church (DU014-009001-). The graveyard contains 18th-20th century gravestones, undecorated markers and two vaults. Previously surveyed (Egan 1991)	Cloghran (Coolock By.)	Very High	717763	744003
CH105	Building	UCH50	A T-plan building located to the east of the roadway marked on the 1st Edition Ordnance Survey Sheet	Cloghran (Coolock By.)	Medium/Low	717763	744096
CH106	Buildings (Post Office)	UCH51	Two adjacent buildings marked as 'Post Office' shown on the 1st Edition Ordnance Survey Sheet to the east of the roadway - a more modern dwelling house appears to occupy this location now - it is unclear if any of the original post office building has been incorporated	Cloghran (Coolock By.)	Medium/High	717741	744066
CH107	Quarry/Lead Mine	UCH52	An area shown as a quarry with adjacent lead mine to the south, marked on the 1st Edition Ordnance Survey sheet - Area now traversed by modern roadway	Cloghran (Coolock By.)	Medium/Low	717819	744052
CH108	Building	UCH53	A building associated with 'Limepark' marked on the 1st Edition Ordnance Survey sheet	Cloghran (Coolock By.)	Medium/Low	717908	743982
CH109	Possible Well	UCH54	A circular feature marked on the 1st Edition Ordnance Survey sheet - possibly a well associated with 'Limepark'.	Cloghran (Coolock By.)	Medium/Low	717936	743995
CH110	Laneway	UCH55	A laneway marked on the 1st Edition Ordnance Survey Sheet associated with 'Limepark'	Cloghran (Coolock By.)	Medium/Low	717971	743979
CH111	Holy Well	PS08	Holy Well - Enclosed stone well at base of steps under tree in field off Stockhole Lane	Cloghran (Coolock By.)	Very High	718009	743999
CH112	Ritual site - holy well	DU00597/PS09	In 1958 the well had dried up and showed only as a hollow in a field where it was marked by a whitethorn bush. The site is no longer venerated (Ó Danachair 1958, 77). Within a level field of pasture.	Cloghran (Coolock By.)	Very High	718011	743787
CH113	Farm House	PS10	Former Cloghran Stud Farm - Main house (former Glebe House) & entrance gates, excluding stable complex	Cloghran (Coolock By.)	Very High	718194	743799

CH114	Laneway	UCH56	Laneway marked on 1st Edition Ordnance Survey Sheet, associated with Glebe House to the south. - Laneway remains extant	Cloghran (Coolock By.)	Medium/High	718266	743925
CH115	Archaeological Excavation	00E0951	This small site was identified in the course of monitoring of topsoil-stripping prior to the construction of Phase 1 of the Airport-Balbriggan bypass (see above No. 323). The site was identified as a small, oval area that contained charcoal-enriched soil and a small area of burnt topsoil to the east. It was 0.7m long, 0.62m wide and 0.05m deep. The charcoal-enriched soil lay directly on top of the subsoil. The site was probably a small pit that had been ploughed through. It is considered to be of no archaeological significance.	Cloghran (Coolock By.)	Very High	718516	743902
CH116	Archaeological Excavation	00E0950	This small site was identified in the course of monitoring of the topsoil-stripping prior to the construction of Phase 1 of the Airport-Balbriggan bypass (see above No. 323). The site was identified as a small, circular area that contained charcoal-enriched soil. It was 0.9m long, 0.81m wide and 0.13m deep. The charcoal-enriched soil lay directly on top of the subsoil. The site was probably a small pit that had been ploughed through. This site is considered to be of no archaeological significance.	Cloghran (Coolock By.)	Very High	718678	744053
CH117	Leat/Drain	UCH57	Small leat (partially canalised) located in farmland - marked on the 1st Edition Ordnance Survey Sheet	Cloghran (Coolock By.)	Medium/Low	718689	743798
CH118	Townland Boundary	TB24	Part of Stockhole Lane roadway, possibly still extant to the east of roadway. Cloghran (Coolock By.)/Glebe Part of Portmarnock) townland boundary	Cloghran (Coolock By.)/Glebe (Part of Portmarnock)	Medium/High	718748	743496
CH119	Building	UCH58	Small building marked at the 1st Edition Ordnance survey Sheet located to the south of roadway at the northern end of a laneway leading to Glebe House - No longer extant, area forms part of a modern driveway	Cloghran (Coolock By.)	Medium/Low	718742	743502
CH120	Mound	DU00702/PS11	In field of pasture N of farmhouse. An aerial photograph (FSI 453/2) taken in 1971 shows evidence for an earthen mound (diam. c. 15m). Not visible at ground level.	Cloghran (Coolock By.)	Very High	718868	743533
CH121	Building/Glebe House	UCH59	A building marked as Glebe House with associated curtilage marked on the 1st Edition Ordnance Survey Sheet - the building appears to have been entirely replaced, although the boundary wall has been retained	Glebe (Part of Portmarnock)	Medium/High	718776	743367
CH122	Townland Boundary	TB25	Stockhole/Glebe (Part of Portmarnock) townland Boundary- broken by modern roadway, but possibly maintained in the property boundary of adjacent property to the east	Stockhole/Glebe (Part of Portmarnock)	Medium/High	718767	743307
CH123	Townland Boundary	TB26	Cloghran (Coolock By.)/Stockhole townland Boundary - broken by modern roadway, but possibly maintained in the property boundary of adjacent property to the west	Cloghran (Coolock By.)/Stockhole	Medium/High	718731	743278
CH124	Enclosure	DU04505	An irregular shaped enclosure visible as a crop mark on an aerial photograph together with other features that could indicate a possible field system (DU014-112----	Stockhole	Very High	718714	743074

			(SMR file; pers. comm. T. Condit). Located within flat open land. No visible remains.				
CH125	Field system	DU04506	A possible field system visible as a crop mark on an aerial photograph together with an irregular shaped enclosure in the same field (DU014-111----) (SMR file; pers. comm. T. Condit). Within flat land.	Stockhole	Very High	718668	743064
CH126	Buildings	UCH60	Two adjacent buildings (one L-plan) located to the west of roadway and marked on the 1st Edition Ordnance Survey Sheet - No Longer extant	Stockhole	Medium/Low	718754	743264
CH127	Building	UCH61	E-W aligned rectangular building located to the east of roadway and marked on the 1st Edition Ordnance Survey sheet - No longer extant	Stockhole	Medium/Low	718784	743188
CH128	Building	UCH62	E-W aligned rectangular building located to the north of roadway and marked on the 1st Edition Ordnance Survey sheet -Appears to be no longer extant and replaced by more modern dwelling	Stockhole	Medium/Low	718856	743189
CH129	Building	UCH63	E-W aligned rectangular building located to the north of roadway and marked on the 1st Edition Ordnance Survey sheet - Still extant with galvanise roof	Stockhole	Medium/High	718894	743186
CH130	Townland Boundary	TB27	Part of Baskin Lane roadway, possibly surviving to the north and south of roadway. Stockhole/Baskin townland boundary	Stockhole/Baskin	Medium/High	718897	743174
CH131	Buildings	UCH64	Two adjacent buildings stepped back from the southern side of the roadway and marked on the 1st Edition Ordnance Survey Sheet - Still Extant	Baskin	Medium/High	719148	743165
CH132	Building	UCH65	An E-W aligned roadside building on the southern side of the roadway and marked on the 1st Edition Ordnance Survey Sheet -Still Extant	Baskin	Medium/High	719156	743167
CH133	Building	UCH66	An E-W aligned building stepped back from the northern side of the roadway and marked on the 1st Edition Ordnance Survey Sheet - A modern shed occupies this location now	Baskin	Medium/Low	719165	743196
CH134	Building	UCH67	A small building stepped back from the northern side of the roadway and marked on the 1st Edition Ordnance Survey Sheet - Now called 'The Bungalow', there appears to be no remains of this building at its marked location	Baskin	Medium/Low	719408	743131
CH135	Building	UCH68	A small building marked as Gate Lodge located to the south of the roadway and associated with Baskin Hill House and marked on the 1st Edition Ordnance Survey Map - No visible remains of this structure	Baskin	Medium/Low	719508	743089
CH136	Building	UCH69	A small building located on northern side of the roadway and stepped back from the road - marked on the 1st Edition Ordnance Survey Map - No visible remains of this building although the area is hidden by vegetation	Baskin	Medium/Low	719544	743109
CH137	Pigeon House	UCH70	Located on the northern side of the roadway, a circular structure shown on the 1st Edition Ordnance Survey sheet	Baskin	Medium/Low	719546	743130

			and marked as Pigeon House - No visible remains of this structure, although the area is hidden by vegetation					
CH138	Building	UCH71	Located on the northern site of the roadway and marked on the 1st Edition Ordnance Survey sheet as 'Site of Baskin House' - No extant remains of this building	Baskin	Medium/Low	719583	743134	
CH139	Building	UCH72	Located on the northern side of the roadway, a U-plan with eastern projection building marked on the 1st Edition Ordnance Survey sheet - No longer extant	Baskin	Medium/Low	719622	743097	
CH140	Building	UCH73	Located on the southern side of the roadway, an L-plan building marked on the 1st Edition Ordnance Survey sheet - No longer extant	Baskin	Medium/Low	719676	743061	
CH141	Building	UCH74	Located on the southern side of the roadway, a N-S aligned building with adjacent laneway to the west - marked on the 1st Edition Ordnance Survey sheet - No longer extant	Baskin	Medium/Low	719849	743063	
CH142	Townland Boundary	TB28	Baskin/Ballymacartle townland Boundary - Now a street following the line of the townland boundary at this location	Baskin/Ballymacartle	Medium/Low	719893	743079	
CH143	Building	UCH75	N-S aligned rectangular building away from the southern side of the roadway and marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Baskin	Medium/Low	719895	743038	
CH144	Townland Boundary	TB30	Baskin/Bohammer townland Boundary - No longer extant at this location	Baskin/Bohammer	Medium/Low	720038	743028	
CH145	Bridge	UCH80	Bridge shown crossing a small stream on the 1st Edition Ordnance Survey Sheet - Modern bridge railings are now at this location, though some elements of the bridge may survive under the roadway	Ballymacartle/Bohammer	Medium/High	720223	742983	
CH146	Buildings	UCH81	A complex of 3 buildings surrounding a courtyard marked on the 1st Edition of the Ordnance Survey Sheet on the southern side of the roadway - Now Kinsealy Riding Centre	Bohammer	Medium/High	720573	742972	
CH147	Building	UCH82	An E-W aligned building located within the Emsworth Demesne lands to the south of the roadway - marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Bohammer	Medium/Low	720755	742971	
CH148	Building	UCH83	An N-S aligned building located to the south of the roadway - marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Bohammer	Medium/Low	720778	743004	
CH149	Townland Boundary	TB31	Bohammer/Kinsaley townland Boundary - Survives in field boundary to the north of the roadway - Cut by roadway	Bohammer/Kinsaley	Medium/Low	720768	743031	
CH150	Building	11350010/PS12	Detached five-bay two-storey house, 1794, with pedimented three-bay two-storey central bay flanked by single-bay, single-storey, overlapping wings. Fan lighted doorway under porch of engaged Doric columns and entablature. Ground floor centre windows and- Five-bay two-storey house, designed by James Gandon & Out-offices	Bohammer	Very High	720821	742773	

CH151	Postbox	11350005	Wall-mounted cast-iron post box, c.1885, with 'VR' monogram, set into wall of Saint Nicholas' Boys National school. Manufacturer's name, 'T. Allen & Co., London'.	Kinsaley	High	721242	743224
CH152	Church	11350003	Detached gabled-fronted Roman Catholic church, c.1840, on a cruciform plan with two-bay side elevation to nave. Single-bay transepts which have gabled porches attached to west elevations, and single-bay sacristy with gabled porch attached to south elevation. Tower and spire to east. ROOF: Double-pitched; slate with granite ridge tiles and coping; pyramidal slate roof to tower crowned by wrought iron cross; some original cast-iron rainwater goods. WALLS: Nap rendered front wall with raised lettering within pediment and having statue of the Virgin contained within a niche; stone cross crowns gable; pebbledash side walls. OPENINGS: Square headed granite surround to main door; timber panelled door; round and square headed; rendered reveals; stone cill; timber sash windows with coloured glass margin panes.	Kinsaley	High	721223	743245
CH153	Buildings	UCH84	A complex of 3 buildings surrounding a courtyard located to the west of roadway - marked on the 1st Edition Ordnance Survey Sheet - One building remains, now a Café	Kinsaley	Medium/High	721191	742961
CH154	Townland Boundary	TB32	Kinsaley/Bohammer townland Boundary - Now cut by modern roadway	Kinsaley/Bohammer	Medium/Low	721203	742927
CH155	Building	UCH85	A N-S aligned rectangular building located to the west of the roadway and marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Bohammer	Medium/Low	721194	742900
CH156	Buildings	UCH86	Two adjacent buildings located on a laneway to the east of the roadway and marked on the 1st Edition Ordnance Sheet - No longer extant, now St. Nicholas of Myra National School Kinsealy, that is possibly a Basil Raymond Boyd-Barrett design	Kinsaley	Medium/High	721222	742707
CH157	Building	UCH87	An E-W aligned long rectangular building on the northern side of a laneway to the east of the roadway, marked on the 1st Edition Ordnance Survey Sheet - Elements may be retained in a more recent dwelling house located on the site	Kinsaley	Medium/High	721191	742650
CH158	Building	UCH88	A N-S aligned small rectangular roadside building located to the east of the roadway and marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Kinsaley	Medium/Low	721172	742631
CH159	Building (Gate Lodge)	UCH89	A small E-W aligned building located to the west of the roadway and marked as Gate Lodge on the 1st Edition Ordnance Survey Sheet associated with St. Doolaghs	Bohammer	Medium/Low	721137	742511
CH160	Building (Gate Lodge)	11350012	Detached three-bay single-storey gable-fronted gate lodge, c.1830. Single-bay extension and single-bay recessed entrance porch to west, c.1970. ROOF: Double pitched slate roof with a nap rendered chimney stack. WALLS: Nap rendered with a moulded string course.	Bohammer	High	721101	742282

			OPENINGS: Segmental headed; recessed panels to openings. Square headed diamond timber casement windows and a timber door.				
CH161	Building (Estate House)	11350011	Detached five-bay two-storey house, c.1830, with return to Bohammer rear. Central projecting Doric entrance porch to east elevation, c.1840. uPVC conservatory to south elevation, c.1990. ROOF: Hidden behind parapet wall with two nap rendered chimney stacks at gable ends. WALLS: Nap rendered with a nap rendered moulded cornice and quoins. uPVC conservatory, c.1990, to right hand side elevation. OPENINGS: Square headed windows with nap rendered moulded architraves, stone cills and 6/6 timber sash windows. Projecting entrance porch with timber flat panels and glazing to sides and quarter engaged, nap rendered Doric columns	Bohammer/Saint Doolaghs	High	721000	742390
CH162	Townland Boundary	TB33	Part of R107 roadway. Bohammer/Saint Doolaghs Townland Boundary	Bohammer/Saint Doolaghs	Medium/Low	721103	742234
CH163	Townland Boundary	TB34	Kinsaley/Saint Doolaghs Townland Boundary - Possible remains of walling located adjacent and to east of modern roadway	Kinsaley/Saint Doolaghs	Medium/High	721123	742206
CH164	Building (Gate Lodge)	11350018/PS13	Detached three-bay single-storey gate lodge, c.1850. Extensions c.1980 to north and east. Set behind entrance gates, comprising cast-iron double entrance gates and single pedestrian gates set in ashlar piers. Flanked by curved ashlar plinth walls with cast-iron railings, terminated by ashlar piers. ROOF: Double-pitched and hipped; slate with terracotta ridge tiles; single rendered chimney stack. WALLS: Nap rendered. OPENINGS: Segmental headed windows; rendered reveals; granite cills; replacement uPVC windows; segmental headed door; recessed opening; timber and glazed door.	Saint Doolaghs	Very High	721134	742148
CH165	NMI Topographical File	IA/189/86	Bronze (?) Ring Brooch; Bronze Buckle; 2 Pieces of Lead	Saint Doolaghs	Very High	721240	742042
CH166	Building (House)	11350019/PS14	Detached five-bay two-storey over basement house, c.1850, with advanced central bay having projecting entrance porch. Pierced balustrade conceals the basement and continues to the walled garden. Curved corridor to rear right-hand side leading to former conservatory, c.1890, now demolished. Former home of the painter Nathaniel Hone the Younger. ROOF: Hidden behind parapet wall with two nap rendered corniced chimney stacks. WALLS: Nap rendered with quoins and granite entrance porch; cornice and string course; central three bays to rear in a shallow bow. OPENINGS: Square headed openings with nap rendered architrave and bracket cornice; granite cills; timber sash windows.	Saint Doolaghs	Very High	721285	742013
CH167	Ringditch	DU00725	In low-lying terrain under tillage east of St Doolagh's church (DU015-009001-). An aerial photograph taken in	Saint Doolaghs	Very High	721445	742013

			1971 (FSI 450/449) shows a cropmark of a ring feature (diam. c. 20m). Visible on Bing (viewed 25/01/2015). Not visible at ground level.				
CH168	NMI Topographical File	IA/241/1988 (6	"	Saint Doolaghs	Very High	721112	742096
CH169	Cross	DU00719	A stone cross marks the entrance to St. Doolaghs church and graveyard (DU015-009002-). In the late 18th century, when Austin Cooper visited the site, it was located in the graveyard (Price 1942, 70). It has very short arms and a triangular-shaped head (H 1.6m). It is set on a double-stepped pedestal immediately next to the Malahide road.	Saint Doolaghs	Very High	721102	742082
CH170	Archaeological Excavation	99E 0470	An archaeological assessment in advance of the North Fringe Sewer Project was required owing to the proximity of the pipeline to St Doolagh's Church. Two trenches 9m long were excavated in the grass verge in front of the main entrance to St Doolagh's. In no trench were finds, features or structures of any archaeological significance uncovered.	Saint Doolaghs	Very High	721046	742104
CH171	Ritual site - holy well	DU00721/11350017	St Doolaghs well lies downslope and N of St. Doolagh's Church. It is a circular stone-lined well below ground level which is enclosed by an octagonal building with a cone-shaped roof similar to that at St. Sylvester's in Malahide Village (DU012-023001-). The entrance is in the south of a sunken court. Interior is lit by cross-shaped windows. Above a string course is the cone-shaped roof which is marked by projecting gables on the N, E, S, and W with narrow pointed windows. Built of coursed masonry with well shaped blocks (Anon , 1914, 268). Frescoes in the interior painted in 1609 by a Mr. Fagan, of Feltrim were still visible in the last century (Walsh, 1888, 233).-Holy well surrounded by random rubble limestone octagonal structure, c.1300, restored c.1990. WALLS: Random rubble limestone. OPENINGS: Square-headed openings to gable end; pointed opening with cast-iron gate within.	Saint Doolaghs	Very High	721074	742148
CH172	Archaeological Excavation	15E0329	A targeted test excavation was carried out within the grounds of St Doolagh's church (DU015-009001) on the Malahide Road by the Resurrecting Monuments community archaeology group from 25 July to 1 August 2015. The excavation was funded under the Irish Research Council's 'New Foundations Grant Scheme' and the project was coordinated by Grassroots Archaeology in partnership with Professor Gabriel Cooney of UCD, supported by Fingal County Council. The site is located in the townland of St Doolagh's situated approximately 4.8km south of Malahide. Whilst the current St Doolagh's Church dates from the 19th century, the attached buildings (DU015-009001) and graveyard (DU015-009006) are of medieval date.	Saint Doolaghs	Very High	721048	742156

CH173	Enclosure	DU04758	Geophysical survey (Licence 09R 165) undertaken at St Doolagh's church and graveyard detected the fragmented remains of a possible sub-circular enclosure (60m diam.) centred to the W of the church and graveyard. The remains were poorly defined due to interference from modern ferrous deposits. However, it does suggest the presence of an enclosure which is not contemporary with the present location of St. Doolagh's church and graveyard (Nicholls 2009, 7)	Saint Doolaghs	Very High	721008	742125
CH174	Graveyard	DU00723	A sub rectangular area defined by a masonry wall which encloses the remains of St. Doolagh's Church (DU015-009001-). It is raised on the N side. There are late medieval mouldings used as coping stones for the wall S of the church. There are also two more mouldings at the foot of the stone steps in the SW (DU015-009007-). Excavations in 1989 showed that the ground level around the church had been truncated and most of the burials removed. This activity was associated with extensive reconstruction works which took place during the 19th century (Swan, 1990, 18-19). The graveyard contains a mixture of 18th, 19th and 20th century headstones (Fingal Historic Graveyards Project, 2008).	Saint Doolaghs	Very High	721045	742117
CH175	Archaeological Excavation	E000508	"	Saint Doolaghs	Very High	721050	742111
CH176	Archaeological Excavation	99E0470	An archaeological assessment in advance of the North Fringe Sewer Project was required owing to the proximity of the pipeline to St Doolagh's Church. Two trenches 9m long were excavated in the grass verge in front of the main entrance to St Doolagh's. In no trench were finds, features or structures of any archaeological significance uncovered.	Saint Doolaghs	Very High	721046	742104
CH177	Church	DU00718	The earliest reference to St. Doolagh is found in the 9th century Martyrology of Oengus where he is referred to as 'Duilech of Clochar' (Stokes 1905, 235). The present building is multi-period. It is rectangular in plan with a central residential tower that projects above the roofline and has stepped battlements. The masonry is well coursed in the central section, but the blocks are more irregular in the E end. It is entered through a later addition to the building, which dates from 1864.	Saint Doolaghs	Very High	721054	742100
CH178	Architectural fragment	DU04182	There are late medieval mouldings used as coping stones for the wall S of the church (DU015-009001-). There are also two more mouldings at the foot of the stone steps in the SW.	Saint Doolaghs	Very High	721048	742098
CH179	Ecclesiastical enclosure	DU00722	The enclosing graveyard wall around St. Doolagh's Church (DU015-009001-) has a distinct curve in the SE quadrant. In 1977 there were traces of bank visible to N of the graveyard (OPW Report). This may indicate a former	Saint Doolaghs	Very High	721043	742091

			ecclesiastical enclosure in the environs of St. Doulagh's Church. Excavation undertaken at this site during 1990 revealed a well-defined ditch which was interpreted as part of the ecclesiastical enclosure revealed to the south of the site (Swan 1991, 24).				
CH180	Field system	DU04757	Geophysical survey (Licence 09R 165) undertaken at St Doulagh's demonstrated that the ecclesiastical enclosure (c. 162m diam.) (DU015:009005) extends into the fields to the N, S and W of the church and graveyard. A sub-rectangular network of ditches was identified to the S of the church extending further to the S as far as the ecclesiastical enclosure. These are likely to represent a network of enclosure remains contemporary with early settlement at St. Doulagh's, which later evolved according to changing patterns of landuse at the site through to the 19th century as there is a partial correlation with former boundary alignments indicated on 1st edition Ordnance Survey 6-inch map. The results of the survey further suggest that interspersed with the ditches are pits and other features (1.5m-4m diam.) that could be interpreted as kiln remains or similar industrial deposits. (Nicholls 2009, 7)	Saint Doolaghs	Very High	721026	742043
CH181	Building	UCH90	N-S aligned rectangular building located to the west of roadway and south of St. Doolaghs ecclesiastical complex - marked on the 1st Edition Ordnance Survey sheet - No longer extant	Saint Doolaghs	Medium/Low	721078	742067
CH182	Buildings (Terrace)	UCH91	A N-S aligned possible roadside terrace of buildings located to the west of roadway and south of St. Doolaghs ecclesiastical complex - marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Saint Doolaghs	Medium/Low	721089	742044
CH183	Buildings (School)	UCH92	Two small E-W aligned building located to the east of the roadway and marked as 'School Ho.' on the 1st Edition Ordnance Survey Sheet - Possibly now a gate house and still extant	Saint Doolaghs	Medium/High	721125	742135
CH184	Building	UCH93	A rectangular N-S aligned roadside building located to the east of roadway and north of laneway associated with St. Doolaghs Lodge marked on the First Edition Ordnance Survey Sheet. Still longer extant.	Saint Doolaghs	Medium/High	721072	741939
CH185	Building (Gate Lodge)	11350027	Three-bay single-storey gate lodge, c.1895. ROOF: Hipped slate roof; single chimney stack with terracotta ridge tiles. WALLS: Pebble dash; rendered. OPENINGS: Square headed; rendered reveals; early 20th century timber casement windows; simple timber pan	Saint Doolaghs	High	721047	741939
CH186	Milestone	11350029/PS15	Cast-iron milestone in entrance wall to Lime Hill House	Saint Doolaghs	Very High	721058	741952
CH187	Building (Estate House)	11350021/PS16	Detached five-bay two-storey house, c.1790, with portico entrance, bowed end bays. Return and belvedere to rear. ROOF: Double-pitched slate roof to front with	Saint Doolaghs	Very High	721075	741836

			perpendicular M-profile hipped roof to rear; nap rendered chimney stacks with clay pots; T-shaped plan. WALLS: Pebbledash to front; nap rendered elsewhere. OPENINGS: Square-headed; rendered reveals; granite cills; replacement 6/6 timber sash windows; fluted doric granite portico; moulded door surround; timber panelled door; centrally opening doors to side				
CH188	Building	UCH94	A small E-W aligned roadside building located to the east of the roadway and on the 1st Edition Ordnance Survey Sheet associated with St. Doolaghs Lodge - No longer extant	Saint Doolaghs	Medium/Low	721033	741821
CH189	Townland Boundary	TB35	Part of Limekiln Lane. Saint Doolaghs/Burgage townland Boundary - formed by roadway/Limekiln lane	Saint Doolaghs/Burgage	Medium/High	721002	741758
CH190	Townland Boundary	TB36	Saint Doolaghs/Balgriffin townland boundary. Formed by stream	Saint Doolaghs/Balgriffin	Medium/High	721012	741733
CH191	Bridge	UCH95	St. Doolaghs Bridge marked on the 1st Edition Ordnance Survey Sheet. Elements may survive under the modern road way	Saint Doolaghs/Burgage/Balgriffin	Medium/High	721009	741732
CH192	Weir	UCH96	Weir marked on the 1st Edition Ordnance Survey Sheet associated with St. Doolaghs Lodge - portions may survive in stream	Saint Doolaghs	Medium/High	721055	741724
CH193	Building	UCH97	Small L-plan building located to the west of roadway at St. Burgage Doolaghs Bridge junction - marked on the 1st Edition Ordnance Survey - No longer extant		Medium/Low	720999	741728
CH194	Townland Boundary	TB37	Part of modern property boundary. Burgage/Balgriffin townland Boundary - Formed partially by property boundary/Car's Lane	Burgage/Balgriffin	Medium/High	721047	741629
CH195	Archaeological Excavation	1990:031	Archaeological excavations were undertaken at St Doolagh's Church last September as part of a continuing conservation and restoration project. This work was concentrated on three areas: 1. The area surrounding and in the immediate vicinity of the baptistery and the vault containing the holy well; 2. the line of a long trench, opened mechanically and without archaeological supervision, which intersected the site more or less diagonally; 3. the area within the present church yard. 1. Showed signs of considerable disturbance in all cuttings and yielded only one significant feature. This consisted of a carefully constructed bath or trough, measuring 1.8m x 0.75m with a depth of 0.6m. It was fed through a channel with the overflow of water from the spring inside the baptistry, and this flow in turn could be controlled to feed through a sluice into the underground vault which also contained the holy well. From this area a number of coins and tokens were recovered, including some from the spring of the baptistry, of which the oldest was a posthumously minted silver penny of Henry VIII. Small quantities of pottery fragments of all dates from the	Balgriffin	Very High	721231	741500

			<p>13th/14th centuries onwards were recovered from many cuttings here, as well as small quantities of slag.<sup>2</sup> The line of trenching which had been opened mechanically revealed archaeologically significant deposits in a number of areas, including stratified occupation debris, indications of both inner and outer enclosing ditches, and an area of burial. This latter contained at least six extended human burials in very shallow grave pits, directly beneath the plough-soil. These were adult burials. No artefacts were recovered, nor was any pottery noted in this area. Some slag was, however, identified as associated with the occupation area.<sup>3</sup> Trenching within the modern churchyard showed evidence that part, at least, of the accumulated deposits of burials here had been almost completely removed, thus lowering the ground level considerably. Only the bases of the grave trenches survived, and in most cases any human remains recovered were disarticulated and extremely disturbed. It is likely that this activity was associated with the extensive reconstruction works which took place during the latter part of the last century. Supervision of operations still continues, but since the site is to be taken in charge by the Parks Department of Dublin Co. Council, further major excavations of the site are not at present envisaged.</p>				
CH196	Cemetery	UCH98/1990:031	Cemetery with various cut stone grave markers from c.1990 to present - In use as a modern cemetery	Balgriffin	High	721144	741453
CH197	Building	UCH99	Small N-S aligned rectangular building marked on the 1st Edition Ordnance Survey Sheet - Still extant	Belcamp	Medium/High	721096	741416
CH198	Townland Boundary	TB38	Part of roundabout at junction of R107 and R139 roadway Belcamp/Balgriffin townland Boundary	Belcamp/Balgriffin	Medium/Low	721108	741482
CH199	Building	UCH100	N-S aligned rectangular building located to the east of roadway, marked on the 1st Edition Ordnance Survey Sheet - No longer extant	Balgriffin	Medium/Low	721147	741372
CH200	Building (Gate Lodge)	UCH101	Roadside L-plan building located to the west of roadway and associated with Belcamp Estate - marked as Gate Lodge on the 1st Edition Ordnance Survey Sheet - Two modern bungalows no occupy this site.	Belcamp	Medium/Low	721144	741257
CH201	Bridge/Culvert	UCH102	Bridge/Culvert marked Br.68 on the 1st Edition Ordnance Survey Sheet - Elements of this may survive under the modern roadway	Belcamp	Medium/High	721157	741198
CH202	Building	UCH103	Small structure/building located to east of roadway marked on 1st Edition Ordnance Survey Sheet with possible adjacent well to the SW - No longer extant	Balgriffin	Medium/Low	721190	741158
CH203	Archaeological Excavation	06E0343	There was no evidence for any archaeological features or deposits revealed during the bulk excavations for Blocks 9 and E. The historical background of the area suggested there was a low risk for the presence of archaeological deposits or features.	Balgriffin	Very High	721026	741708

CH204	Building	UCH104	Small roadside NW-SW aligned building adjacent to Airfield Lodge and walled garden - marked on the 1st Edition Ordnance Survey Sheet - No Longer extant	Balgriffin	Medium/Low	721039	740721
CH205	Walled Garden	UCH105	Walled garden associated with Airfield Lodge - No Longer extant	Balgriffin	Medium/Low	721069	740720
CH206	Townland Boundary	TB39	Part of R139 roadway. Balgriffin/Newtown townland Boundary - No Longer extant	Balgriffin/Newtown	Medium/Low	721028	740735
CH207	Townland Boundary	TB40	Part of R139 roadway and no longer extant within - cut by modern roadway. May survive to the north and south of roadway. Belcamp/Balgriffin townland Boundary	Belcamp/Balgriffin	Medium/Low	720604	740885
CH208	Building	UCH106	E-W aligned building to the north of roadway marked on 1st Edition Ordnance Survey Sheet - No Longer Extant.	Belcamp	Medium/Low	720038	741006
CH209	Building (Gate Lodge)	UCH107	NW-SE aligned building to N of roadway associated with Belcamp Park- marked as Gate Lodge on 1st Edition Ordnance Survey Map- No longer Extant	Belcamp	Medium/Low	719532	741200
CH210	AAP	AAP05	Small stream marked on 1st Edition Ordnance Survey Sheet	Belcamp	Medium/High	719591	741259
CH211	Building (Estate House)	11349005	Detached three-bay two-storey house, c.1840, with central portico. ROOF: M-profile double pitched slate roof; rendered chimney stacks; terracotta pots. WALLS: Pebble dashed; nap rendered plinth course. OPENINGS: Ionic columns to portico; square headed openings; stone cills; uPVC casements.	Belcamp	High	719393	741395
CH212	AAP	AAP06	Small stream marked on 1st Edition Ordnance Survey Sheet	Belcamp/Balgriffin	Medium/High	721159	741205
CH213	AAP	AAP07	Small stream marked on 1st Edition Ordnance Survey Sheet	Belcamp/Saint Doolaghs	Medium/High	721029	741736
CH214	AAP	AAP08	Small stream marked on 1st Edition Ordnance Survey Sheet	Ballymacartle/Bohammer	Medium/High	720230	742992
CH215	AAP	AAP09	Small stream marked on 1st Edition Ordnance Survey Sheet	Cloghran	Medium/High	718685	743796
CH216	Well	UCH108	Well marked on 1st Edition 25-inch Ordnance Survey map	Cloghran	Medium/Low	718179	743913
CH217	Building (structure)	UCH109	Small rectangular structure marked as unroofed on the 1st Edition 25-inch Ordnance Survey Sheet	Cloghran	Medium/Low	718217	743926
CH218	Building	UCH110	Small N-S aligned two-roomed rectangular building marked on the 1st Edition 25-inch Ordnance Survey Sheet - This area now forms part of a modern driveway to a dwelling house	Cloghran	Medium/Low	718745	743501
CH219	Building	UCH111	Small rectangular building on the north side of roadway marked on the 1st Edition 25-inch Ordnance Survey Sheet	Cloghran	Medium/Low	718715	743536
CH220	Building	UCH112	Small N-S aligned rectangular roadside building on the east side of roadway marked on the 1st Edition 25-inch Ordnance Survey Sheet - Appears to be no longer extant	Glebe (Part of Portmarnock)	Medium/Low	718755	743361

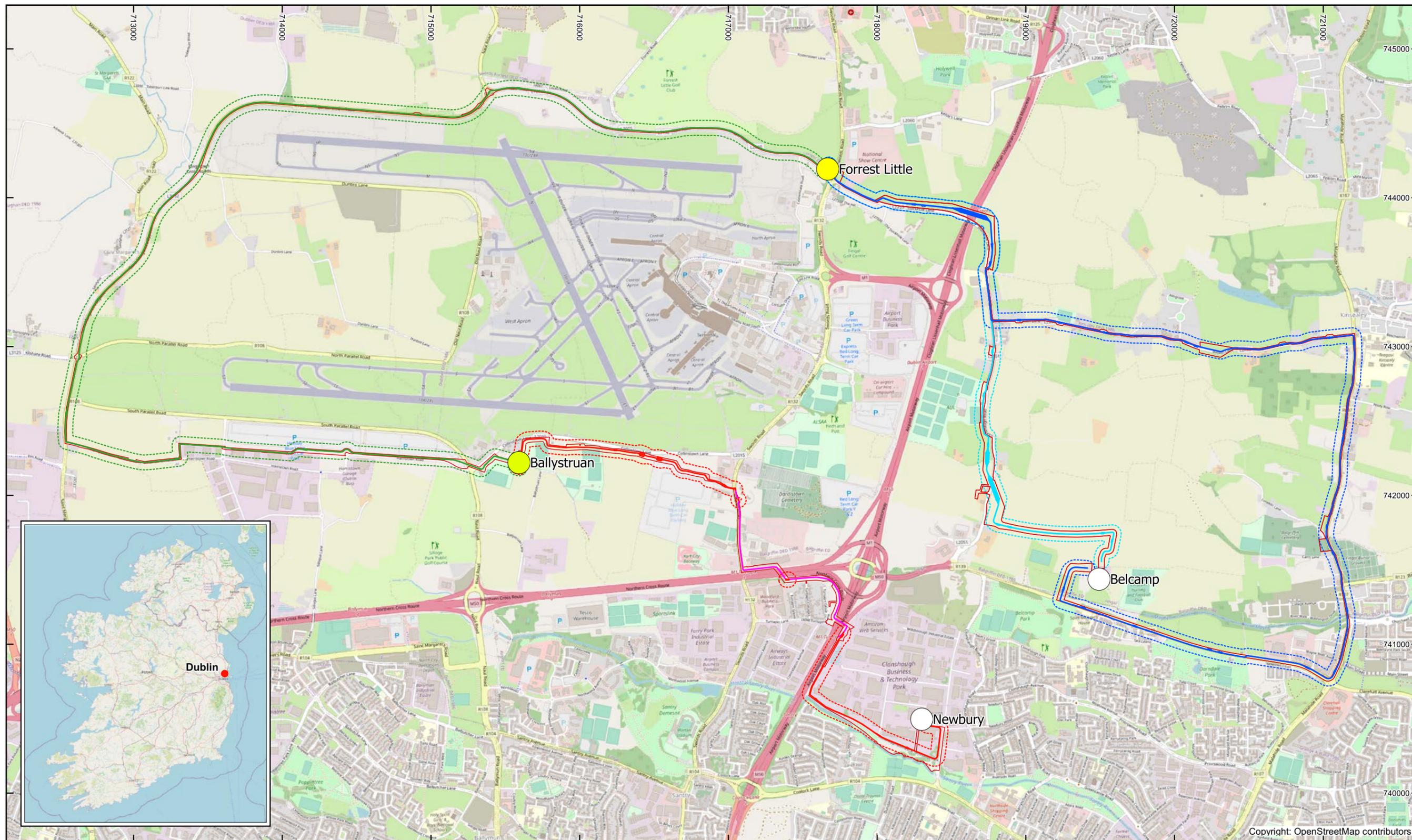
CH221	Building	UCH113	Small E-W aligned rectangular roadside building on the west side of roadway marked on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Cloghran	Medium/Low	718747	743292
CH222	Buildings	UCH114	E-W aligned rectangular building located to the south of roadway with possible toilet block located to the south - marked in the 1st Edition 25-inch Ordnance Survey Sheet - This building appears to be extant	Stockhole	Medium/High	718832	743162
CH223	Buildings	UCH115	Two buildings located to the south of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet - A modern dwelling now stands at this location	Baskin	Medium/Low	719130	743154
CH224	Building	UCH116	Small square building located to the south of roadway, marked on the 1st Edition 25-inch Ordnance Survey Sheet - this building appears to be still extant	Baskin	Medium/High	719362	743120
CH225	Well	UCH117	Circular well located on the northern side of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Baskin	Medium/Low	719386	743131
CH226	Well	UCH118	Circular well located on the southern side of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Baskin	Medium/Low	719660	743066
CH227	Building	UCH119	Small NW-SE aligned rectangular roadside building located to the north of roadway and marked on both Editions of the Ordnance Survey Sheet - No longer extant	Ballymacartle	Medium/Low	720161	743004
CH228	Bridge/Culvert	UCH120	Small Bridge/Culvert crossing stream marked on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Bohammer	Medium/Low	720213	742958
CH229	Building	UCH121	N-S aligned roadside building marked to the east of roadway at T-junction on the 1st Edition 25-inch Ordnance Survey Sheet - Elements of this building may survive in a more modern dwelling	Kinsaley	Medium/High	721218	743078
CH230	Buildings	UCH122	E-W aligned rectangular building marked as 'Kinsaley' with possible toilet block to the south marked on the 1st Edition 25-inch Ordnance Survey Sheet - Elements of this building may survive in a more modern dwelling	Kinsaley	Medium/High	721230	743104
CH231	Pump	UCH123	Roadside Pump marked on 1st Edition 25-inch Ordnance Survey Sheet - It remains in situ	Bohammer	Medium/High	721199	742729
CH232	Pump	UCH124	Pump marked on 1st Edition 25-inch Ordnance Survey Sheet - no longer at its marked location	Baskin	Medium/Low	719547	743125
CH233	Pump	UCH125	Pump marked on 1st Edition 25-inch Ordnance Survey Sheet - No longer at its marked location	Stockhole	Medium/Low	718778	743165
CH234	Smithy/Dispensary	UCH126	Building marked as 'Smithy' on the 1st Edition 25-inch Ordnance Survey Sheet - Marked as Disp. On Cassini Ordnance Survey Edition	Cloghran	Medium/Low	717757	744110
CH235	Buildings (Terrace)	UCH127	A terrace of 3 buildings (N-S) with a possible toilet block to the west, located to the west of roadway and stepped back from the road - marked on the 1st Edition 25-inch Ordnance Survey sheet -No longer extant	Bohammer	Medium/Low	721160	742658

CH236	Building	UCH128	Small square building marked at junction on the western side of roadway on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Bohammer	Medium/Low	721169	742673
CH237	Building complex	UCH129	Located to the east of roadway, L-plan building with adjacent rectangular E-W aligned building and Pump marked on 1st Edition 25-inch Ordnance Survey Sheet - Still extant	Bohammer	Medium/High	721171	742507
CH238	Building	UCH130	SW-NE aligned building located to the west of roadway and marked on the 1st Edition 25-inch Ordnance Survey sheet - Still extant	Saint Doolaghs	Medium/High	721037	741894
CH239	Building (Gate Lodge)	UCH131	Square plan building marked as Gate Lodge located to the east of roadway and associated with St. Doolaghs Park - marked on both Editions of Ordnance Survey Sheet - May partially survive at the western boundary of modern cemetery.	Balgriffin	Medium/High	721099	741575
CH240	Buildings (Terrace)	UCH132	Terrace of 7 buildings located to the west of roadway and marked on the 1st Edition 25-inch map - Still Extant	Belcamp	Medium/High	721113	741436
CH241	Buildings (Terrace)	UCH133	Terrace of 7 buildings located to the west of roadway and marked on the 1st Edition 25-inch map - Still Extant	Balgriffin	Medium/High	721157	741392
CH242	Roadside Structures	UCH134	A pair of small adjacent square-plan structures of unknown function located immediately to the east of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet - No longer extant	Balgriffin	Medium/Low	721177	741167
CH243	Buildings	UCH135	A building complex (3) with associated pump located to the west of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet - Elements of these buildings appear to be still extant to the west of the Malahide road	Balgriffin	Medium/High	721108	740957
CH244	Building (Lodge)	UCH136	A building marked as 'Lodge' associated with the Belcamp Estate. Located to the north of roadway and marked on the 1st Edition 25-inch Ordnance Survey Sheet. - Possible remains located to the north side of modern roadway	Belcamp	Medium/High	720465	740927
CH245	Building (Hall)	UCH137	A building marked as 'Hall' - E-W aligned and set back from eastern side of Roadway. Marked as Hillview on Cassini Edition - Still Extant	Belcamp	Medium/High	721179	741318
CH246	Building	UCH138	Long, N-S aligned building with gable to roadway, located on south side of roadway and marked on Cassini Ordnance Survey Edition	Bohammer	Medium/Low	720646	742986
CH247	Buildings	UCH139	10 Semi-detached buildings (Baskin Cottages) with associated plots located on the north side of roadway and marked on the Cassini Ordnance Survey Edition	Baskin/Ballymacartle	Medium/High	720045	743068
CH248	Archaeological Excavation	04E0381	Monitoring took place of the laying of a gas pipe and water main along parts of Brackenstown and Naul roads by Bord Gais Aireann. The route of the pipe passed through the constraint circles of a motte-and bailey site, a possible bridge site and a mound. The trenches to accommodate the pipes were cut into the road. No archaeological	Brackenstown	Very High	716564	744407

			structures or deposits were encountered during the monitoring of the laying of the pipeline. For the majority of the length of the trench this can be attributed to the fact that the trench stayed within the fabric of the road and did not reach undisturbed natural strata.				
CH249	NMI Topographical File	1962:259	Bronze Axehead (w/side-flanges and stop-ridge)	Newtown	Very High	712011	743076
CH250	Buildings (Housing Estate)	UCH140	An estate of 32 semi-detached houses with associated plots in the townland of Turnapin Little - marked on the Cassini Ordnance Survey Edition	Turnapin Little	Medium/High	717526	741405
CH251	Archaeological Excavation	13E0464	Nothing of archaeological significance was uncovered during the pre-development testing.	Stockhole	Low	718903	742570
CH252	Archaeological Excavation	04E0557	Nothing of archaeological significance was uncovered during the pre-development testing.	Stockhole	Low	718935	741777
CH253	Buildings	UCH140	Two roadside buildings located to the west of roadway, the northernmost one being U-shaped. Marked on the 1st Edition Ordnance Survey Sheet. No longer extant - Possible gate post still extant - identified during site visit.	Stockhole	Medium/High	718775	743073
CH254	Building	UCH141	Rectangular building to the east of roadway marked on the 1st Edition Ordnance Survey Sheet	Stockhole	Medium/Low	718807	742992
CH255	Building	UCH142	L-plan building located to the east of the roadway marked on the 1st Edition Ordnance Survey Sheet	Stockhole	Medium/Low	718808	742961
CH256	Buildings	UCH143	Two adjacent east-west aligned buildings located to the west of roadway marked on the 1st Edition Ordnance Survey Sheet	Stockhole	Medium/Low	718778	742940
CH257	Building	UCH144	L-plan building located to the east of the roadway marked on the 1st Edition Ordnance Survey Sheet	Stockhole	Medium/Low	718790	742852
CH258	AAP	AAP010	A spring or pool marked as 'Shanes Ford' on the First Edition Ordnance Survey Sheet located to the east of roadway	Stockhole	Medium/High	718780	742777
CH259	Buildings	UCH145	A group of buildings arranged around a yard marked on the First edition Ordnance Survey Sheet to the west of roadway	Stockhole	Medium/Low	718730	742697
CH260	Building	UCH146	An L-plan building located adjacent and to the west of the road junction at Stockhole House and marked on the First Edition Ordnance Survey Sheet	Stockhole	Medium/Low	718726	742428
CH261	Townland Boundary	TB40	Stockhole/Clonshagh townland boundary formed by roadway	Stockhole/Clonshagh	Medium/Low	718747	742408
CH262	Townland Boundary	TB41	Stockhole/Middletown townland boundary formed by roadway	Stockhole/Middletown	Medium/Low	718809	742406
CH263	Townland Boundary	TB42	Clonshagh/Middletown townland boundary formed by roadway	Clonshagh/Middletown	Medium/Low	718785	742319
CH264	Gate Lodge	UCH147	Gate Lodge associated with Edendale and located to the west of roadway and marked on the First Edition Ordnance Survey Sheet - Possible walling still extant - identified during site visit.	Clonshagh	Medium/High	718782	742256

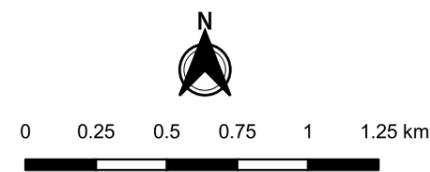
CH265	Gate Lodge	UCH148	Gate Lodge associated with Upper Middletown and located to the east of roadway and marked on the First Edition Ordnance Survey Sheet	Upper Middletown	Medium/Low	718808	742256
CH266	Buildings	UCH149	A pair of parallel rectangular east-west aligned buildings marked on the First Edition Ordnance Survey Sheet to the east of the roadway.	Clonshagh	Medium/Low	718823	742216
CH267	Building	UCH150	A T-plan building marked to the west of roadway on the First edition Ordnance Survey sheet	Clonshagh	Medium/Low	718757	742060
CH268	Buildings	UCH151	A group of buildings with intervening laneway marked on the First edition Ordnance Survey Sheet to the west of roadway	Clonshagh	Medium/High	718726	741975
CH269	Building	UCH152	A single rectangular north-south aligned building located to the west of roadway and marked on the First Edition Ordnance Survey Sheet	Clonshagh	Medium/Low	718701	741819
CH270	Building	UCH153	An east-west aligned rectangular building marked to the east of the roadway on the First Edition Ordnance Survey Sheet	Clonshagh	Medium/Low	718743	741836
CH271	Building	UCH154	An L-plan building located adjacent and to the east of the road and marked on the First Edition Ordnance Survey Sheet	Clonshagh	Medium/Low	718728	741812
CH272	Well	UCH155	A roadside well marked on the First Edition 25-inch Ordnance Survey Sheet	Clonshagh	Medium/Low	718773	742328

**Appendix I2. – Chapter 15 - Scheme Location: MetroLink underground  
cable route options and study area (100m radius)**



**KEY**

- Existing Station
- Proposed Station
- Forest Little to Belcamp
- Forest Little to Belcamp Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Redline Boundary
- Study Area\_Forest Little To Ballystruan
- Study Area\_Forest Little To Belcamp Option 1
- Study Area\_Ballystruan To Newbury

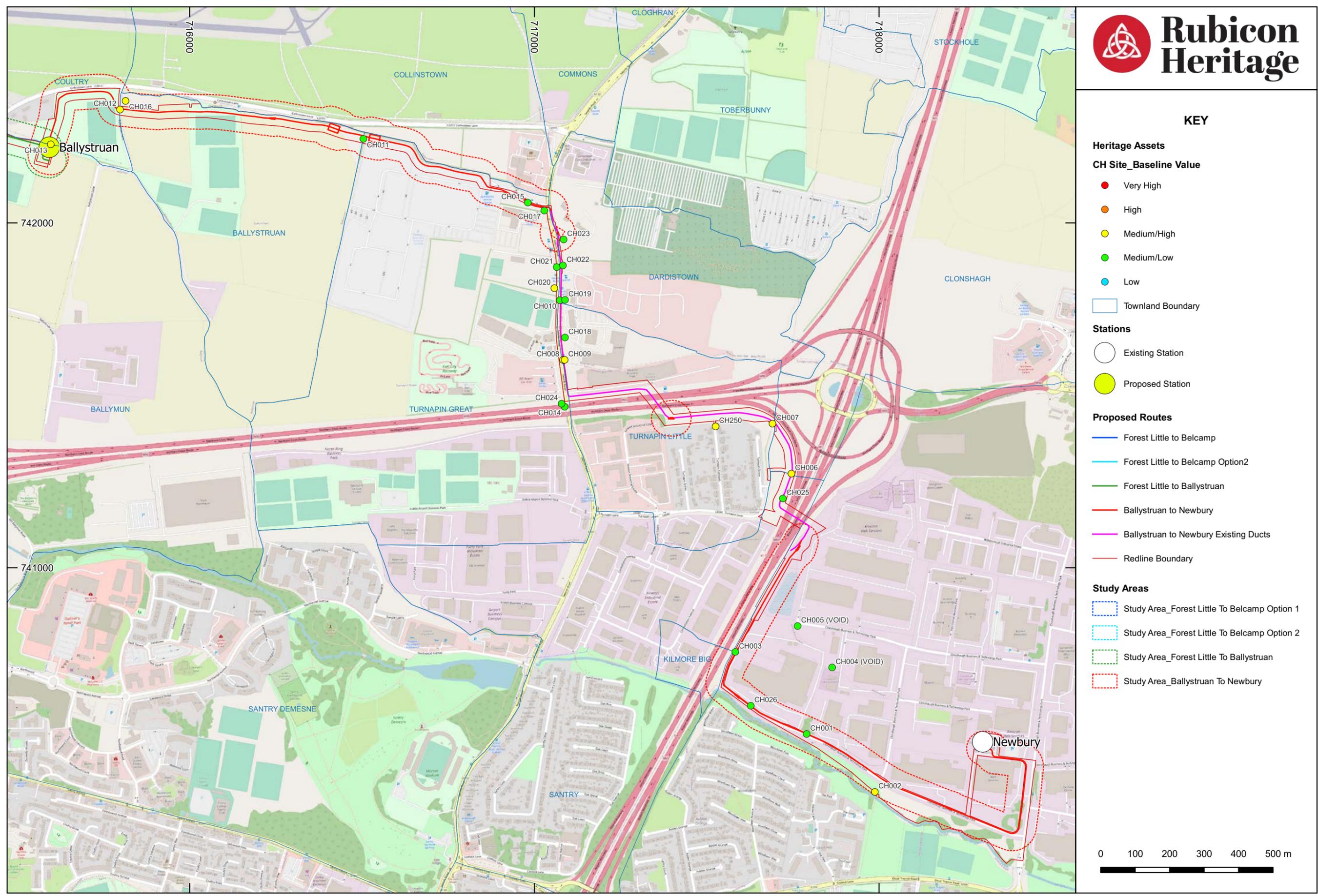


Project Code: RH0485 - MetroLink UG Cable Route

Date: 18/05/2023      Prepared by: H.Sims  
 Scale: 1:25,000 @ A3      Approved by: E.O'Flaherty  
 Status: Final      Revision Number: 1.4

Figure 1 - Scheme location: MetroLink underground cable route options and study area (100m radius).

**Appendix I3. – Chapter 15 - Cultural Heritage (CH) sites within the study area (100m radius) Drawings**

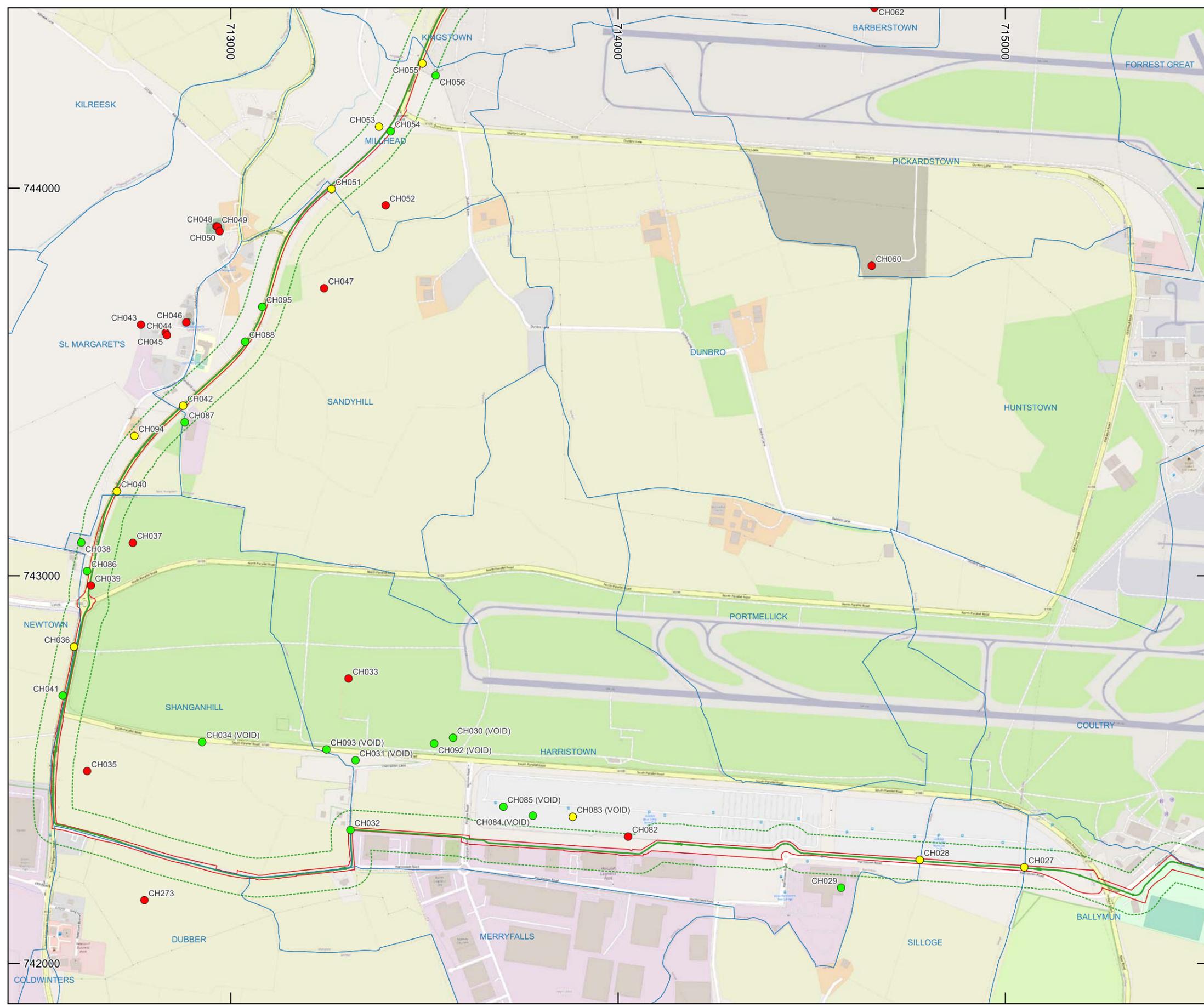


### KEY

- Heritage Assets**
- CH Site\_Baseline Value**
- Very High
  - High
  - Medium/High
  - Medium/Low
  - Low
- Townland Boundary
- Stations**
- Existing Station
  - Proposed Station
- Proposed Routes**
- Forest Little to Belcamp
  - Forest Little to Belcamp Option2
  - Forest Little to Ballystruan
  - Ballystruan to Newbury
  - Ballystruan to Newbury Existing Ducts
  - Redline Boundary
- Study Areas**
- Study Area\_Forest Little To Belcamp Option 1
  - Study Area\_Forest Little To Belcamp Option 2
  - Study Area\_Forest Little To Ballystruan
  - Study Area\_Ballystruan To Newbury



Figure 2.1 - Cultural Heritage (CH) sites within the study area (100m radius).



### KEY

**Heritage Assets**

**CH Site\_Baseline Value**

- Very High
- High
- Medium/High
- Medium/Low
- Low

□ Townland Boundary

**Stations**

- Existing Station
- Proposed Station

**Proposed Routes**

- Forest Little to Belcamp
- Forest Little to Belcamp Option 2
- Forest Little to Ballystruan
- Ballystruan to Newbury
- Ballystruan to Newbury Existing Ducts
- Redline Boundary

**Study Areas**

- Study Area\_Forest Little To Belcamp Option 1
- Study Area\_Forest Little To Belcamp Option 2
- Study Area\_Forest Little To Ballystruan
- Study Area\_Ballystruan To Newbury

Figure 2.2 - Cultural Heritage (CH) sites within the study area (100m radius).

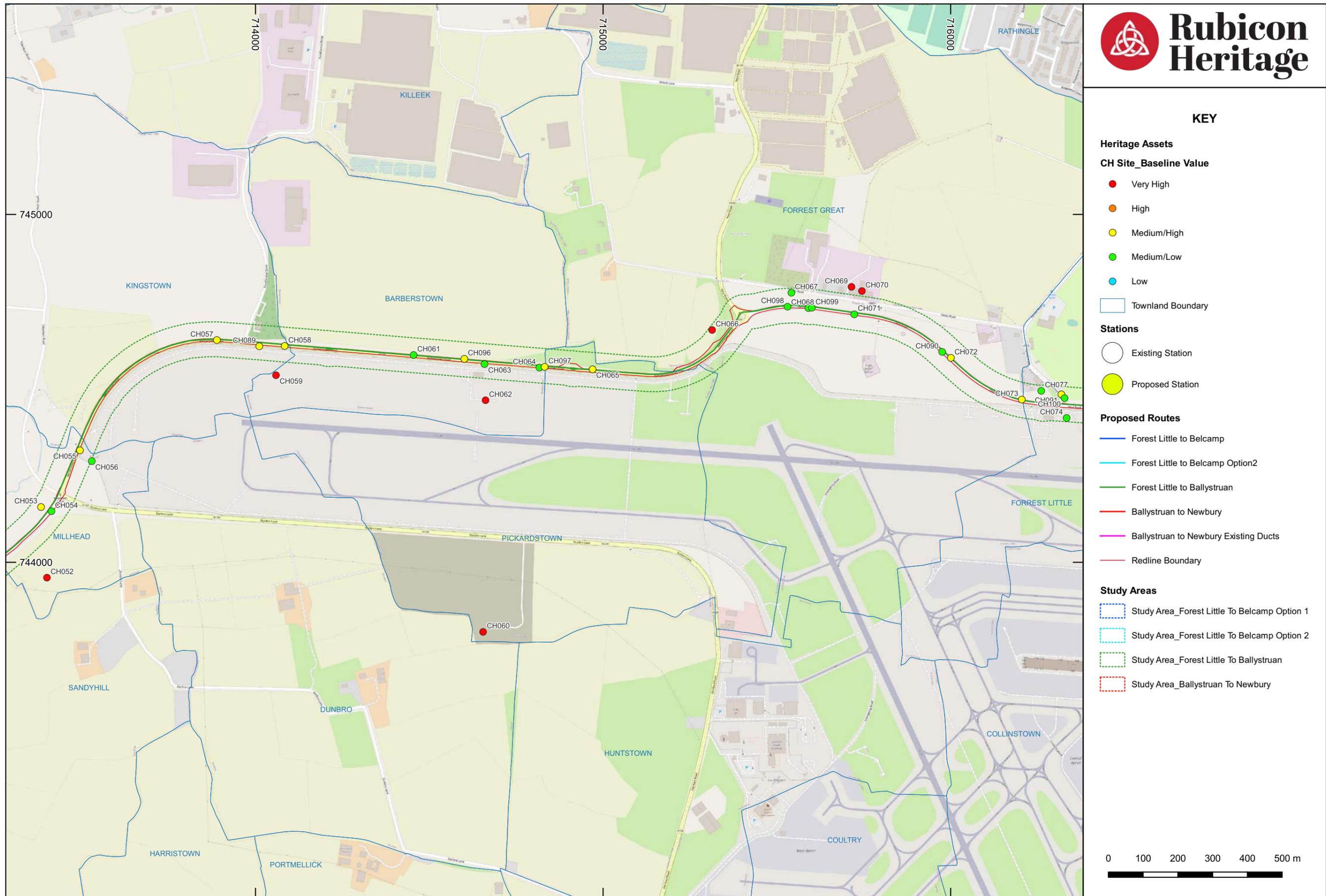


Figure 2.3 - Cultural Heritage (CH) sites within the study area (100m radius).

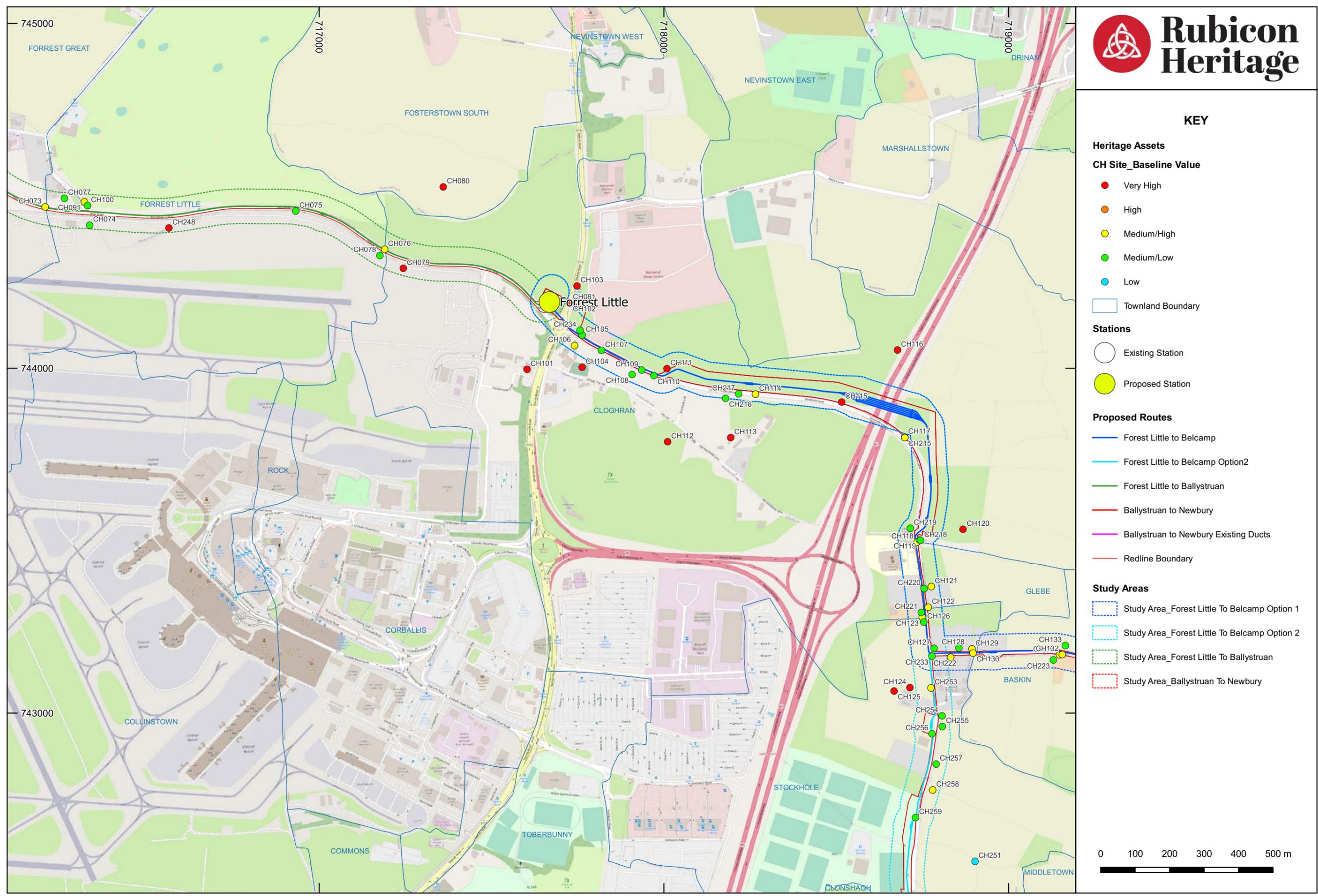


Figure 2.4 - Cultural Heritage (CH) sites within the study area (100m radius).

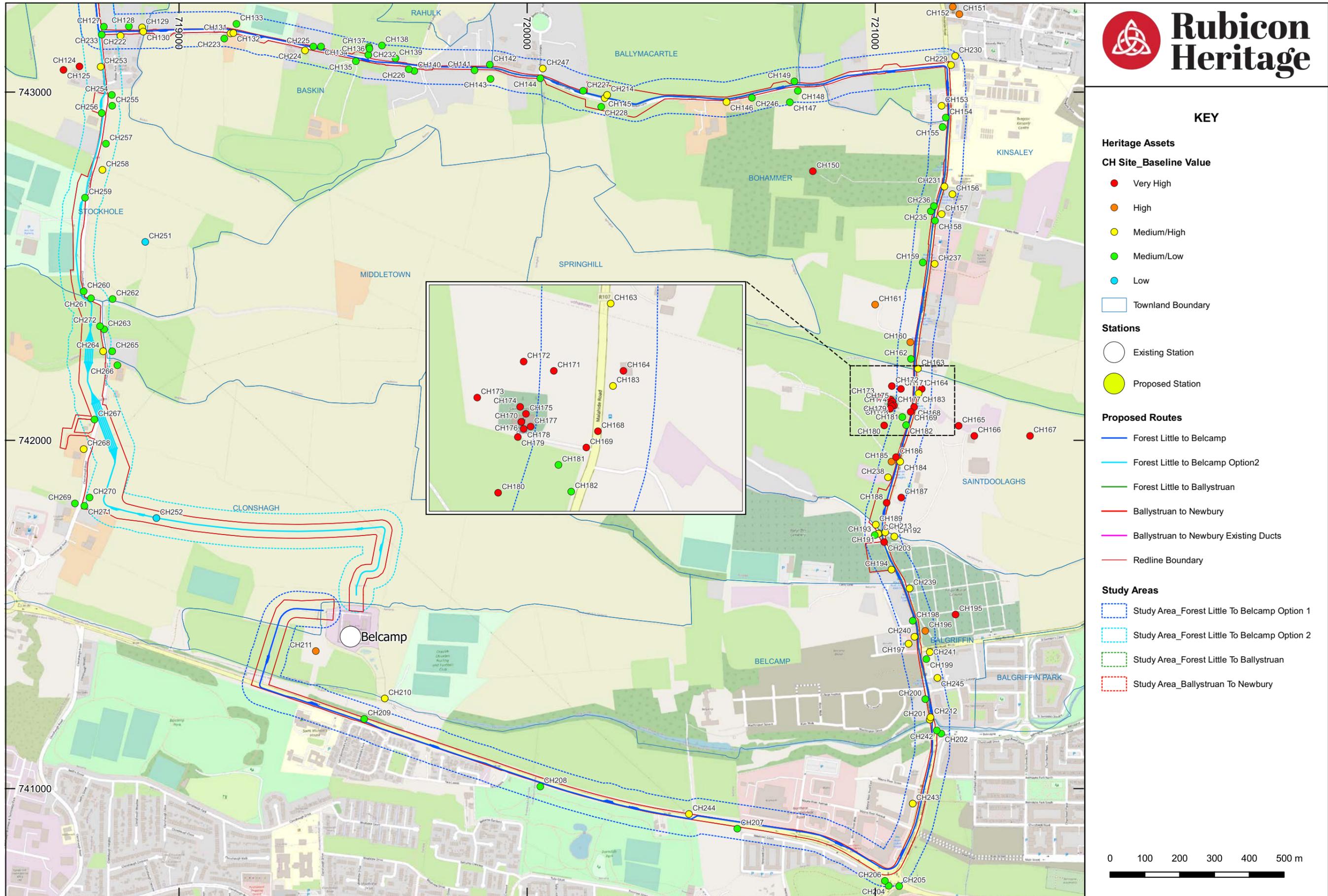


Figure 2.5 - Cultural Heritage (CH) sites within the study area (100m radius).



## Appendix J – Roads & Traffic

# Appendix J1 - Drawings

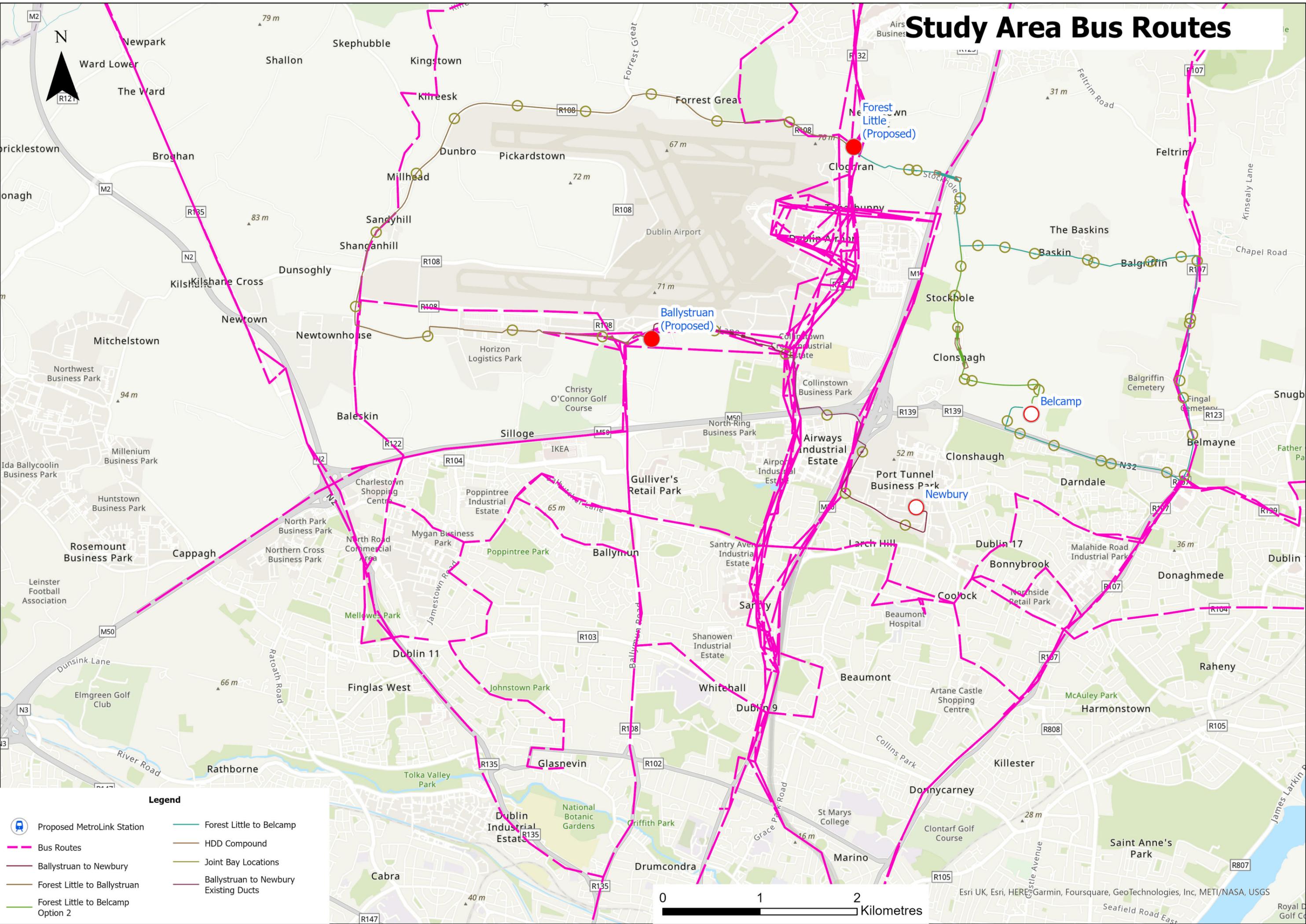
**J1.1 – Roads and Traffic – Bus Routes**

**J1.2 – Roads and Traffic – Study Area Road Sections**

**J1.3 – Roads and Traffic – Survey Sites**

## J1.1 – Roads and Traffic – Bus Routes

# Study Area Bus Routes

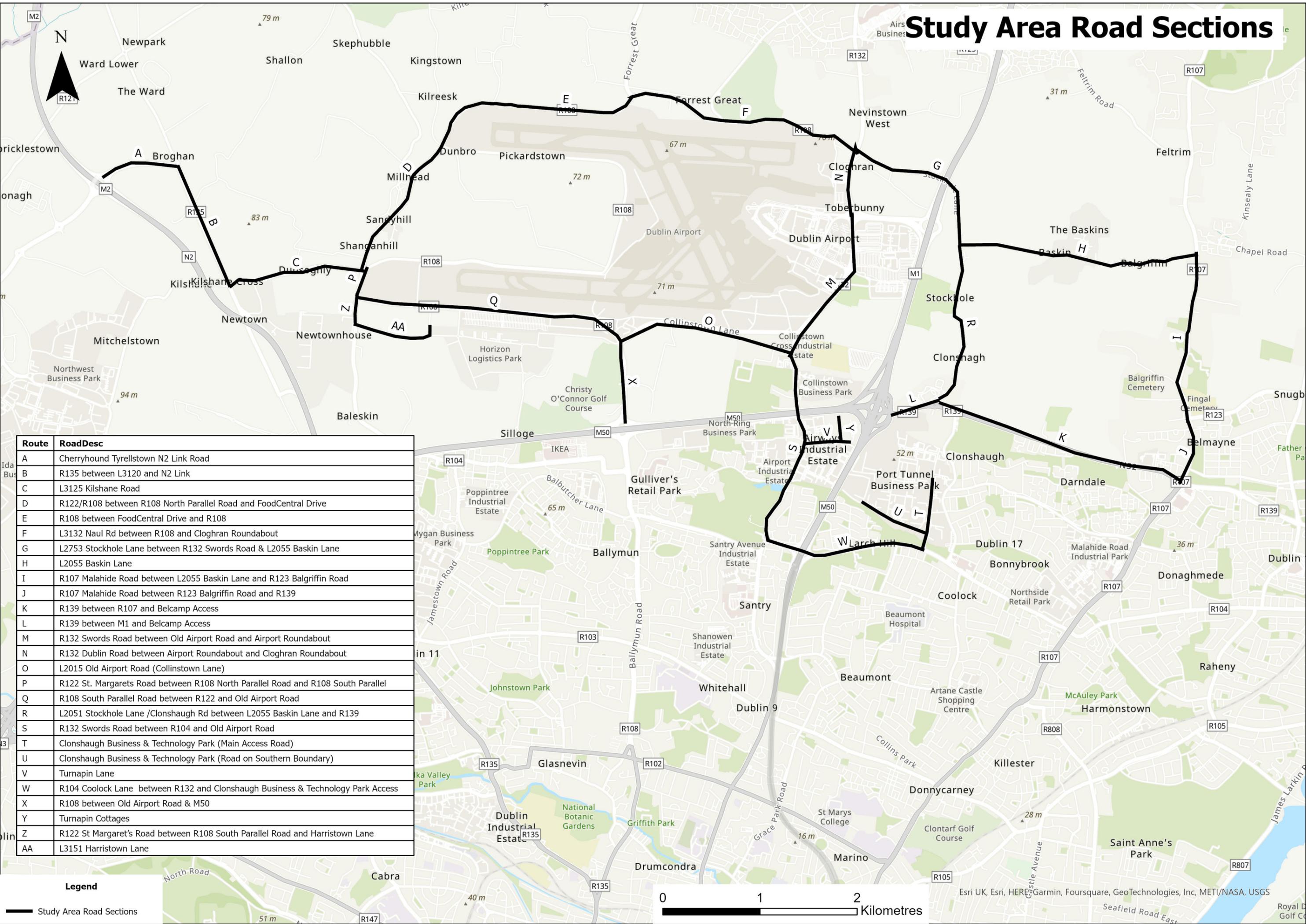


**Legend**

- Proposed MetroLink Station
- Bus Routes
- Ballystruan to Newbury
- Forest Little to Ballystruan
- Forest Little to Belcamp Option 2
- HDD Compound
- Joint Bay Locations
- Ballystruan to Newbury Existing Ducts

## J1.2 – Roads and Traffic – Study Area Road Sections

# Study Area Road Sections



Route	RoadDesc
A	Cherryhound Tyrellstown N2 Link Road
B	R135 between L3120 and N2 Link
C	L3125 Kilshane Road
D	R122/R108 between R108 North Parallel Road and FoodCentral Drive
E	R108 between FoodCentral Drive and R108
F	L3132 Naul Rd between R108 and Cloghran Roundabout
G	L2753 Stockhole Lane between R132 Swords Road & L2055 Baskin Lane
H	L2055 Baskin Lane
I	R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road
J	R107 Malahide Road between R123 Balgriffin Road and R139
K	R139 between R107 and Belcamp Access
L	R139 between M1 and Belcamp Access
M	R132 Swords Road between Old Airport Road and Airport Roundabout
N	R132 Dublin Road between Airport Roundabout and Cloghran Roundabout
O	L2015 Old Airport Road (Collinstown Lane)
P	R122 St. Margarets Road between R108 North Parallel Road and R108 South Parallel
Q	R108 South Parallel Road between R122 and Old Airport Road
R	L2051 Stockhole Lane /Clonshaugh Rd between L2055 Baskin Lane and R139
S	R132 Swords Road between R104 and Old Airport Road
T	Clonshaugh Business & Technology Park (Main Access Road)
U	Clonshaugh Business & Technology Park (Road on Southern Boundary)
V	Turnapin Lane
W	R104 Coolock Lane between R132 and Clonshaugh Business & Technology Park Access
X	R108 between Old Airport Road & M50
Y	Turnapin Cottages
Z	R122 St Margaret's Road between R108 South Parallel Road and Harristown Lane
AA	L3151 Harristown Lane

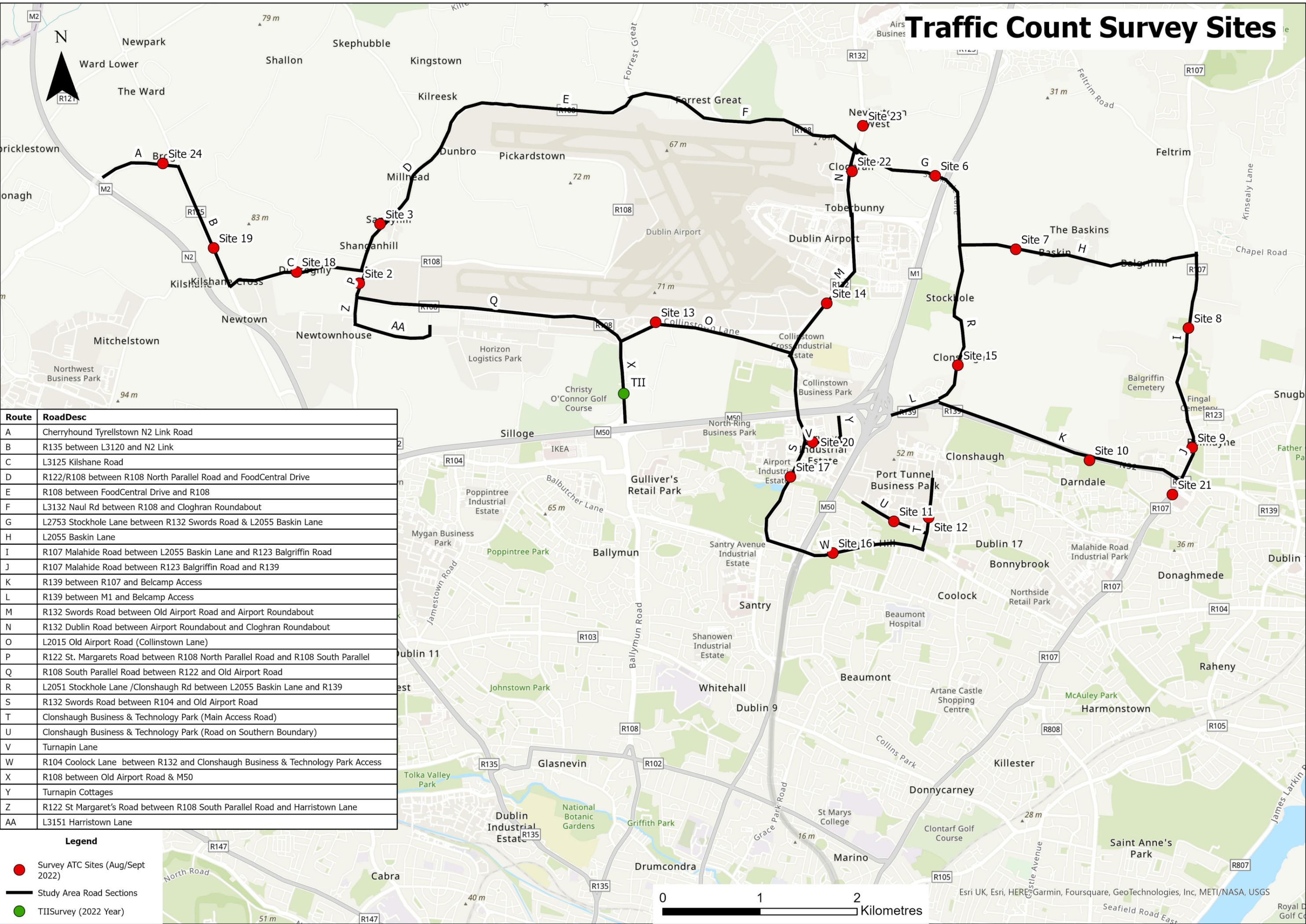
**Legend**  
 Study Area Road Sections

0 1 2 Kilometres

Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

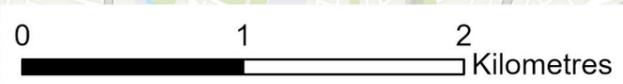
### **J1.3 – Roads and Traffic – Survey Sites**

# Traffic Count Survey Sites



Route	RoadDesc
A	Cherryhound Tyrellstown N2 Link Road
B	R135 between L3120 and N2 Link
C	L3125 Kilshane Road
D	R122/R108 between R108 North Parallel Road and FoodCentral Drive
E	R108 between FoodCentral Drive and R108
F	L3132 Naul Rd between R108 and Cloghran Roundabout
G	L2753 Stockhole Lane between R132 Swords Road & L2055 Baskin Lane
H	L2055 Baskin Lane
I	R107 Malahide Road between L2055 Baskin Lane and R123 Balgriffin Road
J	R107 Malahide Road between R123 Balgriffin Road and R139
K	R139 between R107 and Belcamp Access
L	R139 between M1 and Belcamp Access
M	R132 Swords Road between Old Airport Road and Airport Roundabout
N	R132 Dublin Road between Airport Roundabout and Cloghran Roundabout
O	L2015 Old Airport Road (Collinstown Lane)
P	R122 St. Margarets Road between R108 North Parallel Road and R108 South Parallel
Q	R108 South Parallel Road between R122 and Old Airport Road
R	L2051 Stockhole Lane /Clonshaugh Rd between L2055 Baskin Lane and R139
S	R132 Swords Road between R104 and Old Airport Road
T	Clonshaugh Business & Technology Park (Main Access Road)
U	Clonshaugh Business & Technology Park (Road on Southern Boundary)
V	Turnapin Lane
W	R104 Coolock Lane between R132 and Clonshaugh Business & Technology Park Access
X	R108 between Old Airport Road & M50
Y	Turnapin Cottages
Z	R122 St Margaret's Road between R108 South Parallel Road and Harristown Lane
AA	L3151 Harristown Lane

- Legend**
- Survey ATC Sites (Aug/Sept 2022)
  - Study Area Road Sections
  - TIISurvey (2022 Year)



Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS



## **Appendix K Route Selection Report**

# Appendix K – Route Selection Report

[K1 - PE424-F1159-R00-005-000 HV Cables Preferred Cable Route](#)

**K1 - PE424-F1159-R00-005-000 HV Cables Preferred Cable Route**



Energy for  
generations

## I\_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package



**NETWORKS**

## Preferred HV Cable Route Selection Report

Document No.: PE424-F1159-R00-005-000

Date: 11/10/2021

Engineering and Major Projects, One Dublin Airport Central, Dublin Airport, Cloghran, Co. Dublin,  
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**Phone** +353 (0)1 703 8000

**www.esb.ie**

I\_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package  
Preferred HV Cable Route Selection Report

<b>File Reference:</b>	PE424-F1159	
<b>Client Recipient:</b>	ESB NETWORKS	
<b>Project Title:</b>	I_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package	
<b>Report Title:</b>	Preferred HV Cable Route Selection Report	
<b>Report No.:</b>	PE424-F1159-R00-005-000	
<b>Revision No.:</b>	000	
<b>Prepared by:</b>	S.Sestanovi	Date: 11/10/2021
<b>Title:</b>	Engineer	
<b>Verified by:</b>	McGuirk_Ron	Date: 11/10/2021
<b>Title:</b>	Team Leader	
<b>Approved by:</b>	M.Byrne	Date: 11/10/2021
<b>Title:</b>	Team Leader	

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## Change History of Report

<b>Date</b>	<b>New Revision</b>	<b>Author</b>	<b>Summary of Change</b>
11/10/2021	00	S. Sestanovic	Initial Report

## Executive Summary

The MetroLink is a proposed high-capacity, high-frequency rail line running from Swords to Charlemont, linking various transportation hubs, such as Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services, thus creating fully integrated public transport in the Greater Dublin Area. MetroLink will connect various key destinations including Ballymun, the Mater Hospital, the Rotunda Hospital, Dublin City University and Trinity College Dublin. Much of the 19-kilometre route will run underground.

This report outlines the three preferred HV cable routes associated with the Metrolink development. From the HV cabling perspective, the main driver for this project is integration of the two new MetroLink 110 kV stations in the transmission network. The two new 110 kV GIS stations in north Dublin will be constructed at the locations identified and secured by the Customer, Transport Infrastructure Ireland (TII). Following the Customer's specific request, the new stations will be supplied by way of three new underground HV cables from existing HV stations in the area, namely Belcamp 220 kV station and Newbury 110 kV station.

This report is based on, and should be read as a progressive elaboration on the HV Cables – Route Selection Report, document no. PE424-F1159-R00-004-000, with the particular aim to review various options for each of the three MetroLink HV cable routes, as outlined in the aforementioned report, propose comparison criteria to create the HV cable route comparison matrix and finally, to select the preferred three HV cable routes.

The intervening period between the two reports was dedicated to the study of the identified HV cable route options, existing and future utility services and HV cables and general familiarization with the project requirements. By far the most time-consuming task was a walk-along (i.e., survey) the potential HV cable routes, with the combined overall length of 30+ kilometres. This was the most gratifying part of the effort as well, for it really brought all the project complexities to the fore.

The HV cables will be installed along a mixture of public road and private land, with a strong preference to the former, where possible. The two new 110 kV GIS stations will be named Forest Little 110 kV station, located at Metrolink North Portal in the Cloghran area, and Ballystruan 110 kV station located at Metrolink Dardistown in the Ballystruan area.

This HV cable route selection report offers more detailed overview of the potential HV cable routes within the study area, as outlined in HV Cables – Study Area Report, report PE424-F1159-R00-002-000, and the aforementioned PE424-F1159-R00-004-000 report and selects the three preferred HV cable routes.

This report also details some of the key stakeholders and a non-exhaustive list of potential constraints/obstacles along these HV cable routes. The final HV cable route designs will require substantial site investigation, and engagement with local authorities, other utilities, stakeholders and private landowners. The three new HV cables will be:

- 110 kV Forest Little – Belcamp
- 110 kV Newbury – Ballystruan
- 110 kV Ballystruan – Forest Little

The 110 kV Forest Little – Belcamp cable is somewhat more complex than other two. It will be designed and constructed to 220 kV standard for future operations but will initially operate at 110 kV. A parallel ducting installation will be constructed to 110 kV standards for the future Forest Little – Belcamp cable, which will initially be kept empty as a spare 110 kV installation.

The three HV cable routes will be described in greater detail under Sections 3, 4 and 5.

I\_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package  
Preferred HV Cable Route Selection Report

This report should be read in conjunction with the Construction Methodology for HV Cable Routes report, document PE424-F1159-R00-003-000, submitted as part of the Advanced Works Package for DN0566 MetroLink project.

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# 1 General Notes

## 1.1 Existing Utilities

For the purposes of this report service records were obtained from the following utility providers:

- Gas Networks Ireland
- Irish Water
- Eir
- Virgin Media
- BT
- Enet
- T50 Network (from Zayo)
- DAA Aviation Fuel Line (planning drawings only)
- HV cable route records were obtained from ESB Central Network Mapping site via GNet Viewer application
- Proposed/future HV cable routes, such as 110 kV Finglas – Dardistown and 220 kV Shellybanks – Belcamp, were obtained from design drawings

Existing utility services constraints elaborated in this report are based on the above records, but it should be acknowledged that these records are indicative only and subject to verification on site. It was also apparent during the recent site visits that additional services were present in the ground for which no records were obtained. The HV cable route alignments cannot be finalised until detailed surveys and site investigations are completed to prove suitable space in the ground is available for the HV cable trenching and ducting works, and that the required separation distances can be maintained from adjacent services.

Where the HV cable routes are required to cross, or run adjacent to existing utility services, consultation should take place with the relevant utility providers. Clarification of the existing utility service location and required separation distances will need to be determined before the HV cable route design can be finalised. In some instances, diversions of minor services may be necessary, but these will be subject to agreement with the relevant utility owner.

Any proposed HV cable routes described in this report, which may come in the close proximity or cross existing HV cables, will be subject to a series of HV cable rating calculations, with the aim to avoid any de-rating of either HV cables. These HV cable rating calculations will be undertaken at the detailed design stage of the project.

## 1.2 Private Property

It may be expected that certain sections of road carriageways along the HV cable routes outlined in this report, will not be suitable for the trenching and ducting works. This may require a section of the HV cable routes to be constructed in private lands adjacent to the roadway.

When preferred HV cable routes are selected, site investigation shall be undertaken at the earliest opportunity to identify areas which may require the HV cable route to be diverted off public lands. These areas may include, but are not limited to, bridge crossings, areas heavily congested with utility services, or areas with road/lane closure limitations.

A full legal easement will be required for access to any third-party lands as well as the standard ESB wayleave/easement. Temporary access to private lands may also be required to facilitate construction activities, HV cable fault repairs, or scheduled HV cable maintenance activities. These may require a working wayleave/easement to be agreed with the relevant landowner. No consultation has taken place with any private landowners as part of this report.

## 1.3 Bridges & Water crossings

Several water crossings have been identified along HV cable routes, ranging in size from river streams to small land drains. Every potential water crossing will need to be assessed on a case-by-case basis, with options for water crossings being:

- Installation within the existing bridge deck
- Open trench method
- Trenchless method, either Horizontal Directional Drilling (HDD) or Microbore tunnelling (MBT)

Detailed investigation will be required at every bridge or culvert to determine whether there is suitable space for the HV cable to be installed there, and permission from the relevant asset owner shall be sought.

If ducting is to be installed through or under the watercourse, Inland Fisheries Ireland should be contacted at the earliest opportunity for clarification of requirements or limitations relating to potential disturbance of the watercourse. An environmental assessment will need to be carried out for any impact to the watercourse or adjoining lands and will be done as part of any planning application.

HV cable routes through water courses will also likely require access to adjoining lands. Engagement with adjoining landowners should be sought at the earliest opportunity and are subject to a wayleave/easement agreement with the landowner. It's possible that additional water crossings are present which have not been identified in this report. A detailed site assessment should be carried out prior to any HV cable routes being finalised.

## 1.4 Traffic and Roads

The construction works associated with the proposed HV cable routes have the potential to lead to significant traffic disruption in some areas. Consultation with the relevant local authorities and road managers should take place to determine any restrictions or limitations on construction works along these routes. The proposed cable route options in this report interact with roads managed by Fingal County Council, Dublin City Council, TII, DAA, IDA and other parties.

Reinstatement requirements and working hours will also need to be agreed with the relevant road operators/management. Several bus routes were identified along these cable route options which may be disrupted by construction activities and may require temporary relocation of bus stops. Consultation should be undertaken with the relevant bus operators in the area.

It should be noted that at HV cable joint bay locations 24-hour single lane closures for approximately 12 days will be required during the HV cable jointing works, see Construction Methodology for HV Cables Routes, PE424-F1159-R00-003-000. The locations of the HV cable joint bays have not been considered as part of this report but where possible should be installed in locations to minimise traffic disruption and access/egress to residents or businesses during construction and HV cable jointing works. No consultation has taken place with local authorities or road operators/management as part of this report.

## 1.5 Ecology & Archaeology

This report gives a general overview of ecological and archaeological constraints along potential route corridors. The constraints listed in this report are non-exhaustive and it is recommended that detailed site investigations are conducted to identify all potential constraints along the preferred HV cable routes.

Potential constraints may include, but are not limited to, watercourse crossings, special areas of conservation (SAC), special protection areas (SPA), invasive plant species, works in green field sites, hedgerow or tree removal, disturbance of flora and fauna and works on, or close to archaeological sites. Further discussions with Inland Fisheries Ireland, National Monuments Service, NPWS, EPA and other relevant third parties are recommended as part of the design process. These will be considered in detail as part of the planning application process to be undertaken at a later date.

The presence of Japanese Knotweed has been identified within the study area and care should be taken where the HV cable routes are within or close to these locations, to prevent its spreading onto the adjoining areas.

## 1.6 Existing and Proposed HV Cables

### 1.6.1 Existing HV Cables

For the new 110 kV cables which are to be constructed as part of the DN0566 Metrolink Project, particular attention shall be given to existing HV cables, or proposed HV cables that may be installed in the close proximity.

Any potential HV cable derating, which may result from the newly constructed HV cables being installed in close proximity to, or crossing the existing HV cables shall be reviewed, calculated and communicated to the HV cable asset owner and transmission or distribution system operators.

The HV cable rating calculations will be undertaken at the detailed design stage of the project.

### 1.6.2 Proposed HV Cables

There are some ongoing HV cabling projects within the study area which are due for completion in the year 2022 – 2024, as follows.

A new HV cable route will be constructed to replace the existing 110 kV Finglas - Dardistown cable. Completion of this project may be expected in 2022.

When the above HV cable is energized, most of the existing 110 kV Finglas - Dardistown cable, built to the 220 kV standard, will be reused for the 220 kV Belcamp - Shellybanks cable, which will be part of the Belcamp Phase 2 development. A new section of the 220 kV cable ducting will be installed between the junction of the Old Airport Road with the Swords Road R132, and Belcamp 220 kV station. Completion of this project may be expected in the year 2023, or later.

These HV cables are expected to be completed well before the Metrolink project execution commences on site. For clarity, in the report the aforementioned HV cables are referred to as the replacement 110 kV Finglas - Dardistown cable (new) and the proposed 220 kV Belcamp - Shellybanks cable (presently, 110 kV Finglas – Dardistown cable).

Following the completion of Belcamp Phase 2 development, which will include the Belcamp station's second 220 kV cable connection (i.e., Belcamp – Shellybanks, see above), a 220 kV busbar extension and addition of the second 250 MVA transformer at Belcamp HV station, two new 110 kV cables will be terminated at Belcamp 110 kV GIS station as part of the I\_DN0556 Newbury transfer to Belcamp project. These will be 110 kV Belcamp – Newbury 1 and 2 cables.

Presently, the Belcamp Phase 2 development is expected for competition in Q2 2023, or possibly later. Thus, the aforementioned I\_DN0556 Newbury transfer to Belcamp HV cabling works may be expected in the year 2024, at the earliest. After the I\_DN0556 project completion, the existing 110 kV Grange – Newbury and 110 kV Kilmore - Newbury cables will become 110 kV Belcamp – Newbury 1 and 2 cables.

At a later date, as part of the MetroLink project, the 110 kV Newbury – Ballystruan cable will replace one of the 110 kV Belcamp – Newbury cables. Considering the relative position of the Newbury 110 kV station, almost equidistant between Belcamp 220 kV station and Ballystruan 110 kV station, no section of the future Belcamp – Newbury 1 or 2 cable is expected to be reused for the MetroLink project.

### 1.6.3 Statkraft NISA Project

There is a proposed development of an array of offshore wind farms in an area of the Irish sea, located off the coast of north County Dublin, Meath and Louth. This proposal is known as the Statkraft North Irish Sea Array or NISA.

The information available on this project is limited. From what was understood, the NISA project proposes/envisages the use of the Stockhole Lane and Baskin road to install a 2500 mm<sup>2</sup> Cu XLPE cable in a 1.7 m-wide trench on the route to Belcamp 220 kV station. Considering that both roads are single-lane primary local roads, 5 m wide each, it seems apparent that with the utility services already installed in these roads, there will be no space available there to accommodate both MetroLink and NISA HV cables. Consultation should take place with Statkraft at the earliest opportunity, to clarify their project brief and any potential future conflicts between the two projects.

## 1.7 Dublin Airport

Long sections of the proposed HV cable routes will be constructed in the roads surrounding the Dublin Airport perimeter, and additional consideration should be given to potential restrictions for conducting trenching and ducting works in this area. These considerations include, but are not limited to, works on the airport access roads and emergency exit roads, restrictions working under flight paths, excavations near airport landing lights or communications infrastructure, works on DAA lands, etc. Consultation should be undertaken with DAA at the earliest to discuss route options and potential restrictions.

The clay berm to the south of the Old Airport Road is considered as a potential route option in this report. To facilitate the installation of an HV cable route in this area the clay berm would need to be removed. It was observed that the clay berm is presently used by a group of the aircraft enthusiasts, the spotters, as the aircraft spotting location.

It is not known whether these enthusiasts have official DAA approval for their activities, and whether the said clay berm was assigned to them for the aircraft spotting. If this is a DAA assigned aircraft spotting location, a suitable alternative location would need to be discussed and agreed with the DAA, if the clay berm was to be removed. If the enthusiasts belong to an aircraft spotters club, the club representatives will be contacted as part of the stakeholders' engagement.

## 2 HV Cable Selection Criteria

### 2.1 Criteria when Selecting an HV Cable Route

In developing the HV cable route corridors for the MetroLink project, the following selection criteria was considered:

- HV cable routes were selected within the public domain e.g., roadways, public parks etc. to avoid private property where possible. The routes were investigated (i.e., surveyed) to maintain the required clearances from existing structures, or utility services as far as it was practically possible to do it. Any further HV cable route re-alignment which may follow, will be based on the outcome of the site investigation.
- HV cable route endeavoured to avoid unnecessary crossings of major roads, and water ways, where possible.
- HV cable routes were selected to minimise the need for the full road closure, and to generally minimise traffic disruption during trenching and ducting works.
- The HV cable routes were selected to minimise impact on the community.
- The HV cable routes were selected to avoid sudden changes in the alignment, both in horizontal and vertical plane.
- The HV cable routes should provide suitable locations for HV cable joint bays.
- Constructability of the HV cable routes was considered.
- The HV cable routes were selected to avoid water streams, where possible.
- HV cable routes were selected with aim to minimise the overall route length, to reduce the costs.
- The HV cable routes were selected to minimise conflict with future development, where these future developments were known, and where it was possible. In certain cases, it was considered not possible to have the two future developments concurrent along the same sections of the primarily local roads.
- Minimum design clearances between existing HV cables and major utility services, such as transmission gas pipelines, or water-mains, or the like, must be maintained at all times.
- The HV cable routes were selected to avoid areas of significant planting or forestry.
- Environmental constraints including designated areas such as NHA's, SPA's and areas of archaeological importance were avoided, where possible.
- Crossing points under the Special Areas of Conservation (SAC) act were avoided or minimised where no other viable alternative existed.
- The future maintenance access was critical when identifying the HV cable route.
- Compliance with the current county development plan was also taken into consideration.

## 2.2 HV Cable Installed in Road vs. Private Lands

The majority of HV cable routes are installed along existing roadways rather than across private land in accordance with long established practice for the HV cables in Ireland. This is for the following reasons:

- The HV Cables crossing private land require numerous legal easements with private landowners. One un-cooperative landowner can effectively halt the project.
- Long and uncertain timescales will be required to secure route agreement as there are numerous different landowners along the HV cable route. This would be an unacceptable risk from the project programming perspective.
- The logistics of getting heavy HV cable drums (up to 30 tonnes) to HV cable joint bays may require construction of haul roads across private land. In certain cases, the HV cable joint bays may be located several kilometres away from the nearest road.
- There is an additional negative environmental impact and cost associated with constructing such haul roads.
- The long-term disruption to farm practises as a result of the construction activities.
- The HV cable route will have to be patrolled regularly after installation to ensure it is not being put at risk due to other works taking place nearby. Private landowners would not look favourably on HV cable asset management personnel regularly accessing their property to inspect the HV cable. The access across the private land for HV cable repair works can also be problematic.
- There is increased risk of third-party damage and associated risks to public. Road works on public roads are generally carried out in a controlled manner compared to excavations in private land.
- The HV cable route will pass through an area with existing and potentially new archaeological sites. Archaeology is unlikely to be an issue at the excavation depths proposed under existing roads. However, it may become an issue crossing private land.
- It is the policy of both ESB and EirGrid that underground HV cables are installed in the publicly owned land, either roads, road verges, including footpaths, public parks, or the like.
- It may not be entirely possible to avoid HV cable routes crossing private lands because of either utility services congestion, or because the routes across the bridges/flyovers may not be allowed by the relevant authorities.

## 2.3 HV Cable Route Selection Matrix

An HV Cable Route Selection Matrix is a rectangular array of quantities arranged in rows (Evaluation Criteria) and columns (HV Cable Route Options, 1 to 3), which serves to numerically quantify each of the evaluated HV cable routes. The higher the overall score is, the less constrained the HV cable route option is. A sample of the matrix can be found below.

Evaluation Criteria	HV Cable Route Options		
	Opt. 1	Opt. 2	Opt.3
HV Cable Route Availability	1	2	3
HV Cable Route Constructability	1	2	3
HV Cable Route Length	1	2	3
HV Cable Maint. Wayleave/Easement Requirements	1	2	3
Other HV cables in Road Reserve	1	2	3
Utility Services in Road Reserve	1	2	3
Impact on Local Residents	1	2	3
Impact on Traffic Flow	1	2	3
Horizontal Directional Drilling for Road Crossings	1	2	3
Number of Water Crossings	1	2	3
Flooding History/Potential	1	2	3
Contaminated Land	1	2	3
Cultural Heritage Sites	1	2	3
Biodiversity (Flora and Fauna)	1	2	3
Landscaping Requirements	1	2	3
Sum of ranking	15	30	<b>45</b>
Overall Ranking – Least Constrained Route Option	<b>3</b>	2	<b>1</b>

7	6	5	4	3	2	1
Least Constrained				Most Constrained		

## HV Cable Routes

### 3 Forest Little to Belcamp

The Forest Little to Belcamp HV cable route will consist of two trenching and ducting installations, or alternatively, it may be executed as a double circuit. The first installation shall be constructed to 220 kV standards with a 220 kV cable installed in the ducts, but initially terminated at the two respective 110 kV GIS stations (i.e., Forest Little and Belcamp), and operated at 110 kV voltage level. At a later date this HV cable will be cut and diverted at both ends, terminated at the respective 220 kV GIS stations and operated on its designated 220 kV voltage level.

The second trenching and ducting installation shall be constructed to 110 kV standards and initially kept as a spare ducting installation. At a later date new 110 kV cable will be installed in the ducts, terminated at the respective 110 kV GIS stations, to serve as the replacement HV cable for the above, and maintain 110 kV connection between the Forest Little and Belcamp.

Considering the traffic flow constraints and other utilities already installed in the road, the two HV cable routes will likely be constructed side by side, or their construction will have to be phased/programmed differently if they are to follow different alignments. The third option would be a combination of both. The details of each installation shall be confirmed at design stage.

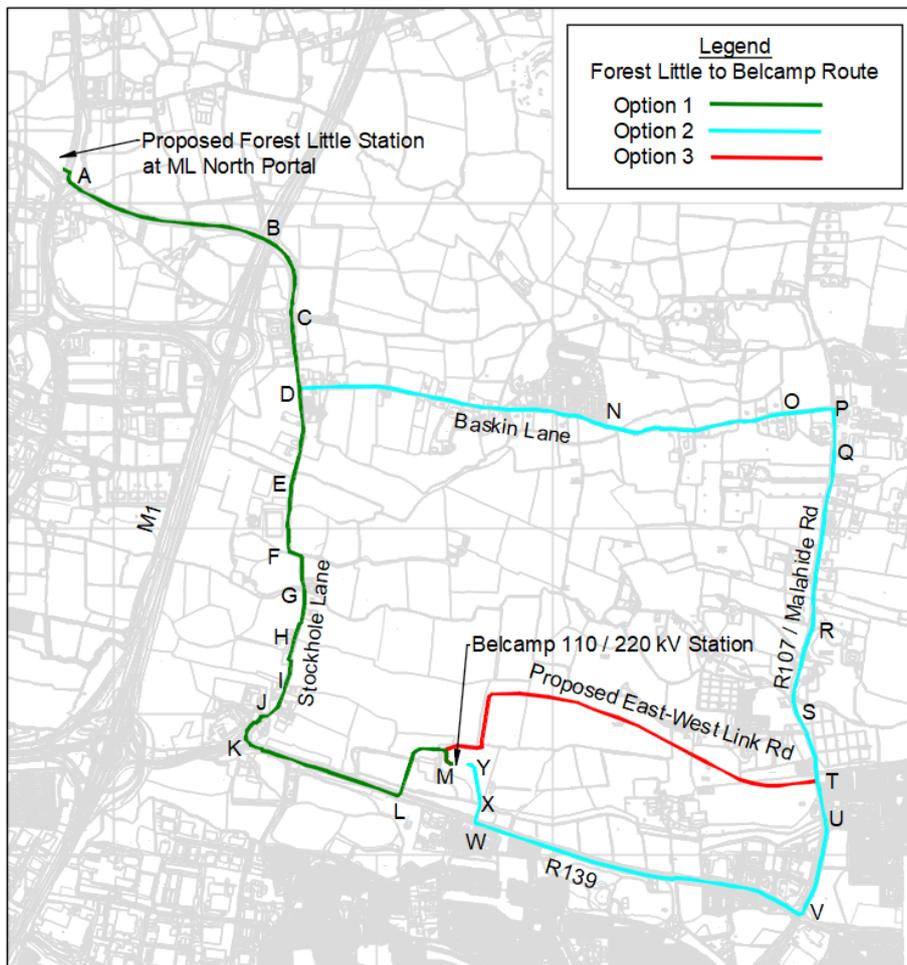


Figure 1 - Forest Little to Belcamp HV Cable Route, FL-B\_1 to 3

## 3.1 HV Cable Route Option 1 (FL-B\_1)

### 3.1.1 HV Cable Route Overview

Route option FL-B\_1 is approx. 4.7 km long, as shown in Figure 1. Starting at the proposed Forest Little HV station at Metrolink North Portal, the route crosses the R132 at the Cloghran Roundabout onto Stockhole Lane heading eastwards, crosses the M1 and continues along Stockhole Lane to the south before turning east onto the R139 and entering into Belcamp 220 kV station.

### 3.1.2 Existing Utilities

Please refer to Figure 1 for locations referenced below.

- A A number of existing utilities are present at the crossing of the R132 at the Cloghran roundabout including gas, water and telecoms, for illustration please refer to Figure 2.
- A-C A limited number of utilities are indicated on service records along this section of the HV cable route. The site survey conducted on both sides of the Stockhole Lane did not find visible evidence of any major utility leading to and crossing the bridge over M1. Please refer to Figure 3.

The storm water drainage system manholes, along with various telecoms chambers, which possibly served as pulling pits, were visible at regular intervals. There were no residential properties, but rather green fields on both sides of the road.

- C-K From location C southwards there is a significant number of additional services present, including a 600 mm watermain, 250 mm gas main and a DAA 200 mm continuously welded steel pipeline – the aviation fuel line. The status of the latter is unknown.

This section has a large number of residential properties on both sides of the road and is expected to have associated utility service connections for sewer, water, gas and telecoms. A line of manholes in the northbound lane between E-D may be the sewer main which is only partially shown on records. The gas main between E-G is shown crossing several times from the east to west side of the road. The gradual nature of some of these crossings may present difficulties maintaining separation distances.

The proposed Irish Water Greater Dublin Drainage (GDD) project will cross Stockhole Lane at location I. The presumed depth of GDD pipe burial, should not present issue for HV cable installation.

In view of the scarred asphalt surface on both sides of the road, there is a high likelihood of presence of other utilities not documented on the service records, as illustrated in Figure 4.

There are several unknown service trenches in this area which appear relatively recent. Further research is required to identify these asset owners and obtain as-builts for works in this area. This will be followed by the site investigation, with the slit trenches crossing the entire width of the Stockhole Lane.

- K-L The road R139 as shown in Figure 5, has several existing utilities located along the inner lanes on both sides of the road in this section. The DAA 200 mm aviation fuel line is/will be installed along the north side of the road R139, in this section, and beyond.

L-M this section follows the existing access road into Belcamp HV station and has a small number of existing services indicated on the available records.

Consultation with all relevant utilities will be required at detailed design stage to ensure that all services are captured on the service records and that these records are up to date.

### 3.1.3 Existing/Proposed HV Cables

#### **Existing HV Cables**

There are two HV cables installed between the Belcamp 220 kV station and Darndale 110 kV station, along the south side of the road R139, section K-L. These are 110 kV Belcamp - Darndale 1 & 3 cables.

#### **Proposed/Future HV Cables**

The proposed/future HV cables listed below were discussed in section 1.6.

A new 220 kV cable will cross Stockhole Lane at location I, parallel to the GDD pipe. This will be the 220 kV Belcamp – Shellybanks cable. Its execution will follow the 110 kV Finglas – Dardistown (Airport) cable diversion and commissioning and may not be expected before the year 2023 at the earliest.

Two new 110 kV cables will be terminated at Belcamp 110 kV GIS station as part of the DN0556 Newbury transfer to Belcamp project. These will be 110 kV Belcamp – Newbury 1 and 2 cables. The HV cable route is yet to be designed, but the impact on this HV cable route, if any, may be expected only along the section L-M.

The Statkraft North Irish Sea Array or NISA project related HV cabling works may have impact on the MetroLink project along this HV cable route. Little is known about this project at present, except that the offloading may be through a 220 kV cable, which may be installed along the section of the Stockhole Lane (A-D) and Baskin Lane, with the projected trench width of 1.7 m. If so, this width of trench would take one entire lane of the Stockhole Lane single carriageway. We do not see possibility for both MetroLink and NISA HV cables being installed along this section of the Stockhole Lane, especially considering all the other utility services already installed there.

The current rating impact that will result from the newly constructed HV cables being installed in the proximity or crossing existing HV cables will be reviewed at detailed design stage.

### 3.1.4 Traffic Impact

This HV cable route passes through a variety of areas with varying traffic levels.

- The Cloghran roundabout at location A, see Figure 2, is a heavily trafficked multilane roundabout, and the construction works in this area have the potential to cause significant traffic disruption, unless it is confined to night-time.
- The Stockhole Lane is a two-lane local primary road, see Figures 3 and 4. The width of individual lanes, section C-J, narrows down to ca. 2.5 m, and the overall road width is ca. 5 m. It has a low to moderate traffic level. Construction works will typically require a single lane closure, although it should be noted that it is unlikely for both HV cables to fit side by side, unless executed as a double circuit, due to congestion of existing utilities in the area. It is also likely that the HV cable(s) will have to cross the road multiple times to avoid existing utilities in this area. This may require construction works in both lanes at different times.

Installation of a 220 kV cable joint bay (ca. 10 m (L) x 2.5 m (W) x 2.5 m (D)) or 110 kV cable joint bay (ca. 6.5 m (L) x 2.5 m (W) x 2.5 m (D)) anywhere along this section of the Stockhole Lane will be a challenging task and may well result in need of encroaching in the private land.

- The two roundabouts on the southern end of Stockhole Lane, adjacent to the Clayton Hotel, and the section of the road R139 between locations K-L, see Figure 5, are heavily trafficked four-lane carriageways. In view of the location of existing utilities in the inner road R139 lanes, it is expected that the proposed HV cables would be installed either in the outer lanes or the 2 m wide road median.

The trenching and ducting works may have to be limited to night-time, with additional safety & health measures implemented to protect the working crews from the ongoing traffic.

### 3.1.5 Third Party Stakeholders

#### **Transport Infrastructure Ireland (TII)**

The bridge over the M1 at Stockhole Lane, see Figure 3, is under the control of the TII and permission should be sought for the HV cable route to cross the bridge, or use the existing HDPE ducts in the bridge deck, if such ducts exist, and are suitable for 220 kV cable installation standards.

In the event the bridge is not suitable for the HV cable crossing, an alternative route across the M1 motorway will have to be found. This crossing is expected to be via HDD, on either side of the bridge. This appears possible, because of the green fields aligned on both sides of M1. Again, permission will be required from TII for any crossings of their infrastructure.

#### **Private Landowners**

In the event the Stockhole Lane bridge over the M1 is not suitable, a significant route diversion of approximately 500 m would be required through private lands to allow for an HDD crossing under the motorway. A potential diversion into private lands may also be required at the Cuckoo Stream Bridge at location G, providing that the bridge deck cannot accommodate the HV cables. Comparatively, this will be a minor diversion, which will not affect the HV cable route alignment greatly.

### **Trinity Care AnovoCare Nursing Home**

This Trinity Care AnovoCare Nursing Home is found at location C on the Stockhole Lane. Clear access shall always be maintained during construction works, and consultation with the nursing home management should take place before the works can commence.

While HV cable joint bay locations have not been considered as part of this report, locations requiring priority or 24-hour access such as this should be avoided due to disruption caused during construction, HV cable jointing and future maintenance works.

### **Unknown Underground Fuel Storage Facility**

Just north of the nursing home, at location C, there is a facility surrounded by a palisade fence, which appears to serve as an underground fuel storage facility under construction. Due to the lack of identification signage, its function or purpose is not known, and will need to be confirmed during the site investigation. The facility itself is not in the way of HV cabling works, but the piping which may be associated with it may well be.

### **Irish Water**

The Greater Dublin Drainage project's Orbital Sewer Line will cross this potential HV cable route at Stockhole Lane, at location I. Although it is not anticipated that this may cause any major issues for the HV cabling works, consultations with Irish Water should be undertaken to clarify their planned works in this area.

## **3.1.6 Ecology**

A detailed ecological assessment will be required as part of the planning application.

### **Watercourses**

There were six watercourse crossings identified along this route, two streams/drains at location C, a drain/stream at location E, the Cuckoo Stream crossing location at G, the Mayne River crossing at Location L and the stream/drain crossing close to location M.

These crossings should be assessed on a case-by-case basis and where possible the HV cable(s) should remain in the bridge or roadway above the culvert to avoid crossing through the stream itself.

### **Japanese Knotweed**

Signage indicating Japanese Knotweed was found in the road verge at location C. While it is not anticipated that the HV cable route will be constructed in the verge in this area, care should be taken to avoid disturbance of these plants during construction activities to prevent its spreading to the adjacent areas.

### 3.1.7 HV Cable Route Option 1 (FL-B\_1) – Photos



Figure 2 - Cloghran Roundabout



Figure 3 - Stockhole Lane Bridge over M1



Figure 4 - Stockhole Lane after AnovoCare Nursing Home



Figure 5 - R139

## 3.2 HV Cable Route Option 2 (FL-B\_2)

### 3.2.1 HV Cable Route Overview

The HV cable route option FL-B\_2 is approx. 8.5 km long as shown in Figure 1. Starting at the proposed Forest Little Station at Metrolink North Portal, the route crosses the R132 at the Cloghran Roundabout onto the Stockhole Lane heading eastwards, crosses the M1 and continues along Stockhole before turning east onto the Baskin Lane. At Kinsealy the route turns south onto the R107/Malahide Rd towards the Clarehall Junction before turning west on the R139 and then enters Belcamp Station.

### 3.2.2 Existing Utilities

Please refer to Figure 1 for the locations below.

A-D As per Option FL-B\_1.

D-P A moderate number of services were identified along the Baskin Lane, which include gas mains along both sides for a large section of the road.

O A previous slit trench is visible on in the road at location O, which indicates the gas main in the centre of the eastbound lane and the watermain just north of the road centreline along the Baskin Lane. Both are shown on the road edge on the service records provided. This highlights the importance of the site investigation being carried out along the proposed HV cable routes prior to the route being finalised.

P-T A moderate number of utility services is located along the section P-T. However, this section has multiple residential properties which will likely include many service connections to properties including water, sewer, electricity, gas and telecoms.

Q The proposed Irish Water GDD Outfall Line will cross the R107 at location Q.

T-V There is a significant number of utility services indicated along this section including Eir, Virgin Media and Aurora Telecom.

There are three major residential developments in the form of apartment blocks, along this section of the road R107, which will require utility connections, such as water, sewer, electricity, gas and telecoms. The service records for these may not be readily available.

V-W There is a moderate number of services in this section of the road R139, such as storm water drainage service, of the like, mainly concentrated along the inner lanes and footpaths on both sides of the road.

W-Y An existing sewer main is present along this section, adjacent to the Mayne River.

### 3.2.3 Existing/Proposed HV Cables

#### **Existing HV Cables**

The following 220 kV and 110 kV circuits enter the Belcamp 220 kV station from the road R139 adjacent to section W-Y. These are the 220 kV Finglas – Belcamp cable and 110 kV Belcamp – Darndale 1 and 3 cable.

#### **Proposed/Future HV Cables**

The future 220 kV Belcamp – Shellybanks cable route will approach the 220 kV GIS station from the west, after crossing the DAA owned land. Thus, no conflict with this MetroLink HV cable route option is anticipated.

There may be conflict with the future 110 kV Belcamp – Newbury 1 and 2 cables, depending on the location where the two HV cables will emerge on the road R139, which is anywhere along the section V-W, and perhaps even further, between location W and L (see Option 1).

As discussed in detail in Option 1, the potential conflict with the future NISA project may be expected along the Stockhole Lane (A-D) and Baskin Lane (D-N). Nothing more can be said about this until the NISA HV cable route plan is available for review.

The current rating impact that will result from the newly constructed HV cables being installed in the vicinity or crossing existing HV cables will be examined at detailed design stage.

### 3.2.4 Traffic Impact

This route passes through a variety of areas with varying traffic levels.

- The Stockhole Lane, section A-D, as per Option FL-B\_1.
- Baskin Lane, section D-N, see Figure 5, is a two-lane Local Primary Road, see Figures 3 and 4. The width of individual lanes is ca. 2.5 m, and the overall road width is ca. 5 m. It has a low to moderate traffic level. The HV cable trenching and ducting works will typically require a single lane closure. It is unlikely that the construction works along the Baskin Lane will cause significant traffic disruption in the area.
- Installation of a 220 kV cable joint bay (ca. 10 m (L) x 2.5 m (W) x 2.5 m (D)) or 110 kV cable joint bay (ca. 6.5 m (L) x 2.5 m (W) x 2.5 m (D)) anywhere along this section of the HV cable route will take the entire width of one of the traffic lanes.
- The R107 is largely made up of a two-lane single carriageway, see Figure 7, before increasing to a four-lane section towards the southern end. This road is heavily trafficked. It was noted during a site visit on 12 August 2021, that a single lane closure for roadworks adjacent to The Balgriffin Inn caused significant traffic congestion, see Figure 8. Construction works along this route and in particular the HV cable jointing works, have potential to cause significant traffic disruption and will be subject to agreement with the Fingal County Council. Numerous bus stops are also located along this road section and may require temporary relocation.
- The Clarehall junction at the intersection of the roads R107 & R139 is a busy multi-lane traffic light-controlled intersection. Any construction works here will be subject to agreement with Fingal County Council.

- The R139 between V-W is a heavily trafficked four-lane carriageway. The location of existing services in the inner lanes may require installation of the new HV cable(s) in the outer lanes, or in the road median, which has the potential to cause traffic disruption. The trenching and ducting works may need to be limited to night-time, with additional safety & health measures implemented to protect the working crews from the traffic.

### 3.2.5 Third Party Stakeholders

#### **National Monuments Service**

The road R107 passes through the Zone of Notification of a Stone Cross at the entrance to St Doolaghs Church and graveyard (DU015-009002-). The construction of an HV cable route within this area requires advance notification to the National Monuments Service. It is possible that an archaeological assessment will be required prior to any excavation works in this area.

#### **Private Landowners**

Sections of this route may need to be installed in the private property to avoid constraints in the public carriageway i.e., Stockhole Lane Bridge over the M1, as discussed in FL-B1, and the Cuckoo Stream bridge. Route options may also exist in the footpath or verge of the road R107 to minimise disruption to this heavily trafficked section of the route. Clarification of ownership will be required in these areas and engagement with the landowners should be undertaken at the earliest opportunity.

#### **Bus Operators**

Several bus routes were noted along the R107. Construction activities in this area are likely to cause disruption to these bus routes and will potentially require temporary relocation of bus stops. Discussion should be undertaken with the bus operators in this area before the commencement of the construction works.

#### **Schools**

Malahide/Portmarnock Educate Together National School (NS) and St Nicholas of Myra NS are both located on the road R107 in Kinsealy. Where possible, the construction activities in this area should be limited to dates outside of the school calendar to avoid disruption, or conversely during the night-hours.

#### **Irish Water**

The Greater Dublin Drainage project's Outfall Line will cross this potential cable route at R107/Malahide Road at location Q. While it's not anticipated that this will cause any conflicts, discussion should be undertaken with Irish Water for clarification on their planned works in this area.

### 3.2.6 Ecology

A detailed ecological assessment will be required as part of the planning application.

#### **Watercourses**

There were six watercourse crossings identified along this route, two stream/drains at location C, a drain/stream at location N, the Cuckoo Stream crossing at location S and two Mayne River crossings at Location U and X.

These crossings should be assessed on a case-by-case basis and where possible the HV cable(s) should remain in the bridge or roadway above the culvert to avoid crossing through the stream itself.

#### **Japanese Knotweed**

As discussed in FL-B1, signage indicating Japanese Knotweed was found in the road verge at location C. While it is not anticipated that the HV cable route will be constructed in the verge in this area, care should be taken to avoid disturbance of these plants during construction activities to prevent its spreading to the adjacent areas.

### 3.2.7 Archaeology

#### **St Doolaghs Church and Graveyard**

The road R107 passes through the Zone of Notification of a Stone Cross at the entrance to St Doolaghs Church and graveyard (DU015-009002-). The construction of an HV cable route within this area may require an archaeological assessment will be required prior to any excavation works in this area.

### 3.2.8 HV Cable Route Option 2 (FL-B\_2) – Photos



Figure 6 – Baskin Lane



Figure 7 – Road R107/Malahide Road



Figure 8 – Road R107, traffic build-up during roadworks of 12 August 2021

### 3.3 HV Cable Route Option 3 (FL-B\_3)

#### 3.3.1 HV Cable Route Overview

The HV cable route option FL-B\_3, when combined with section A-D of FL-B\_1 and D-T of FL-B\_2 is approx. 8 km long as shown in Figure 1. The northern route sections are as described in FL-B\_1 & FL-B\_2, and from location T, the route turns west along the proposed East-West Link Road, shown in Figure 1 and Figure 9. A timeline for potential construction of this road is unknown and discussion should be undertaken with Fingal County Council for any plans to progress this project. This alternative route would bypass the very busy Clarehall junction and remove two crossings of the Mayne River. Installation of the HV cable(s) will be aligned with the construction of the proposed road, which will greatly reduce any impact on traffic and existing utilities.

South Fingal Transport Study – Fingal Dublin Fringe Sub Area Report



5.1 Recommendations Summary Map

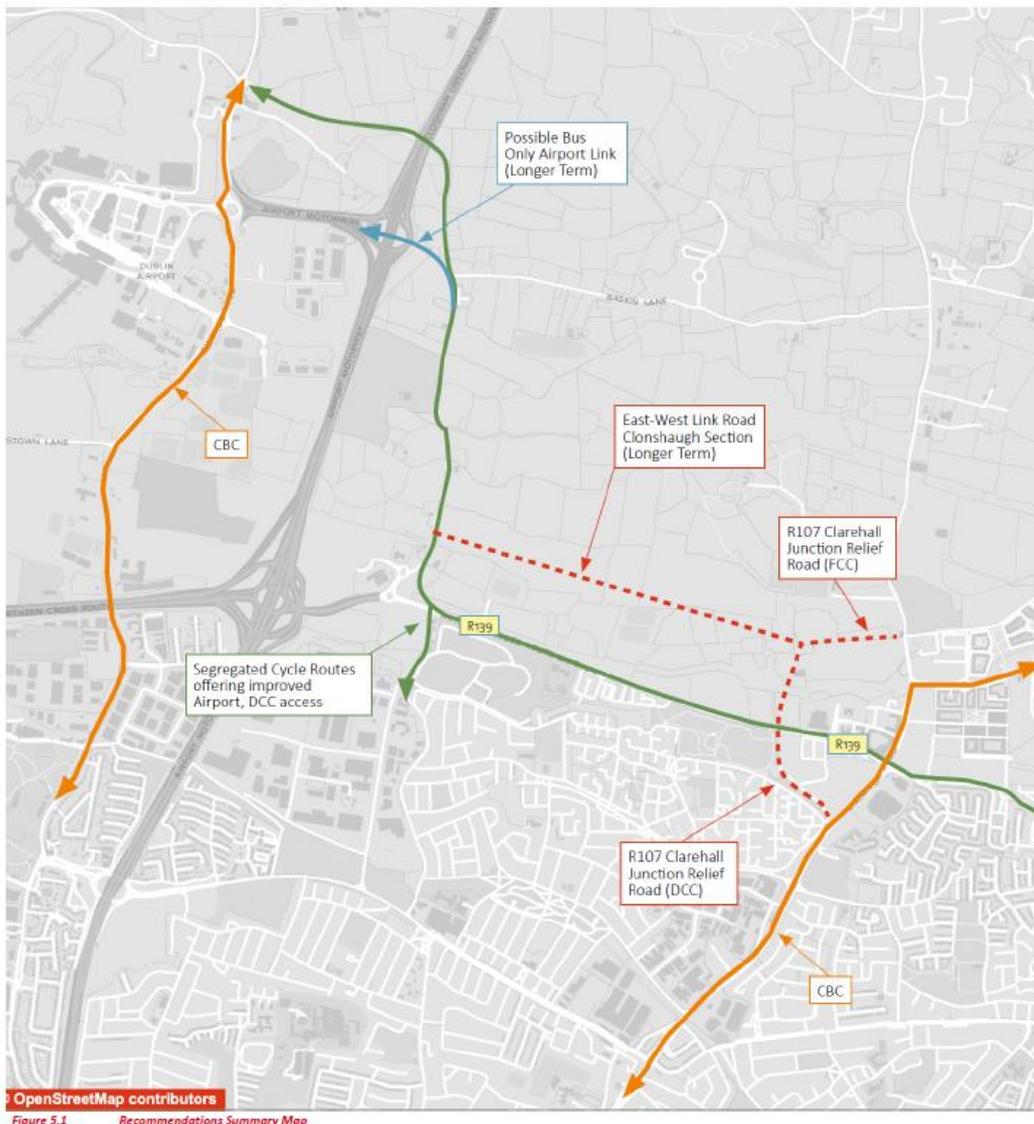


Figure 9 - Extract from South Fingal Transport Study 2019

## 3.4 Forest Little to Belcamp – Preferred HV Cable Route

### 3.4.1 HV Cable Route Selection Matrix

Forest Little – Belcamp HV cable route, Option 1 (FL-B\_1) and Option 2 (FL-B\_2), are envisaged for execution along the existing roads, and are thus available. Option 3 (FL-B\_3) is like FL-B\_2, except for the location T, where it runs along the proposed East-West Link Road. As discussed, the timeline for potential construction of this road is unknown, and there was no time available for consultation with Fingal County Council regarding the plans to progress the project. For that reason, we considered FL-B\_3 to be unavailable for MetroLink project at this point in time.

Pending site investigation, both FL-B\_1 and FL-B\_2 routes appear constructable, but FL-B\_2 more so, considering the number of utility services buried in the Baskin Lane and Malahide Road/R107, as opposed to the Stockhole Lane. Furthermore, western approach to the Belcamp 220 kV station along the road R139, seems more congested than the eastern approach along the same road.

FL-B\_1 is approximately 4.7 km long, while FL-B\_2 is 8.5 km long.

As for the HV Cable Maintenance Wayleave/Easements Requirements, both FL-B\_1 and FL-B\_2 are in the public roads, and thus equal in this respect.

In respect of HV cables, the FL-B\_1 route is having 110 kV Belcamp – Darndale 1 & 3 cables installed along the southern side of the road R139, as well as the 220 kV Belcamp – Finglas cable, on the western approach to the Belcamp station. Both FL-B\_1 and FL-B\_2 may encounter MV/LV cables along their respective routes.

The Stockhole Lane appears to have more utility services, including herewith the DAA aviation fuel line, buried in the road than Baskin Lane. As for the Malahide Road/R107, the utility services buried in the road will have to be verified during the site investigation. This is especially the case for the utility services associated with a number of large residential developments along both sides of the road.

The impact on the local residents, in terms of the utility outages, may be comparable, considering that both Stockhole Lane and Baskin Lane belong to the same category of roads – local primary roads.

The same applies in respect of the impact on the traffic flow.

The horizontal directional drilling requirements will have to be assessed during the detailed design stage. It is the FL-B\_2 route at Clarehall junction, which may require HDD, if unavoidable.

The number of water crossings appears equal for both FL-B\_1 and FL-B\_2.

No flooding should be expected, while the presence of contaminated ground remains to be confirmed during the site investigation.

The cultural heritage sites can be found along FL-B\_2, but they should not be affected by the HV cabling works in the Malahide Road/R107, or its verge.

Biodiversity (flora and fauna) and/or landscaping requirements do not seem to present an issue along either route.

I\_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package  
Preferred HV Cable Route Selection Report

An HV cable route selection matrix for the 220/110 kV Forrest Little – Belcamp cable can be found below.

Evaluation Criteria	HV Cable Route Options		
	FL-B_1	FL-B_2	FL-B_3
HV Cable Route Availability	4	4	N/A
HV Cable Route Constructability	2	6	--
HV Cable Route Length	4	2	--
HV Cable Maint. Wayleave/Easement Requirements	4	4	--
Other HV cables in Road Reserve	2	4	--
Utility Services in Road Reserve	1	5	--
Impact on Local Residents	4	4	--
Impact on Traffic Flow	4	4	--
Horizontal Directional Drilling for Road Crossings	4	4	--
Number of Water Crossings	4	4	--
Flooding History/Potential	4	4	--
Contaminated Ground	4	4	--
Cultural Heritage Sites	4	3	--
Biodiversity (Flora and Fauna)	4	4	--
Landscaping Requirements	4	4	--
Sum of ranking	53	60	N/A
Overall Ranking – Least Constrained Route Option	2	1	N/A

7	6	5	4	3	2	1
Least Constrained				Most Constrained		

## 4 Newbury to Ballystruan

The Newbury to Ballystruan route will consist of a single 110 kV circuit. The route will run from the existing Newbury 110 kV station situated in the Clonshaugh Business Park to the proposed Ballystruan 110 kV station at Metrolink Dardistown.

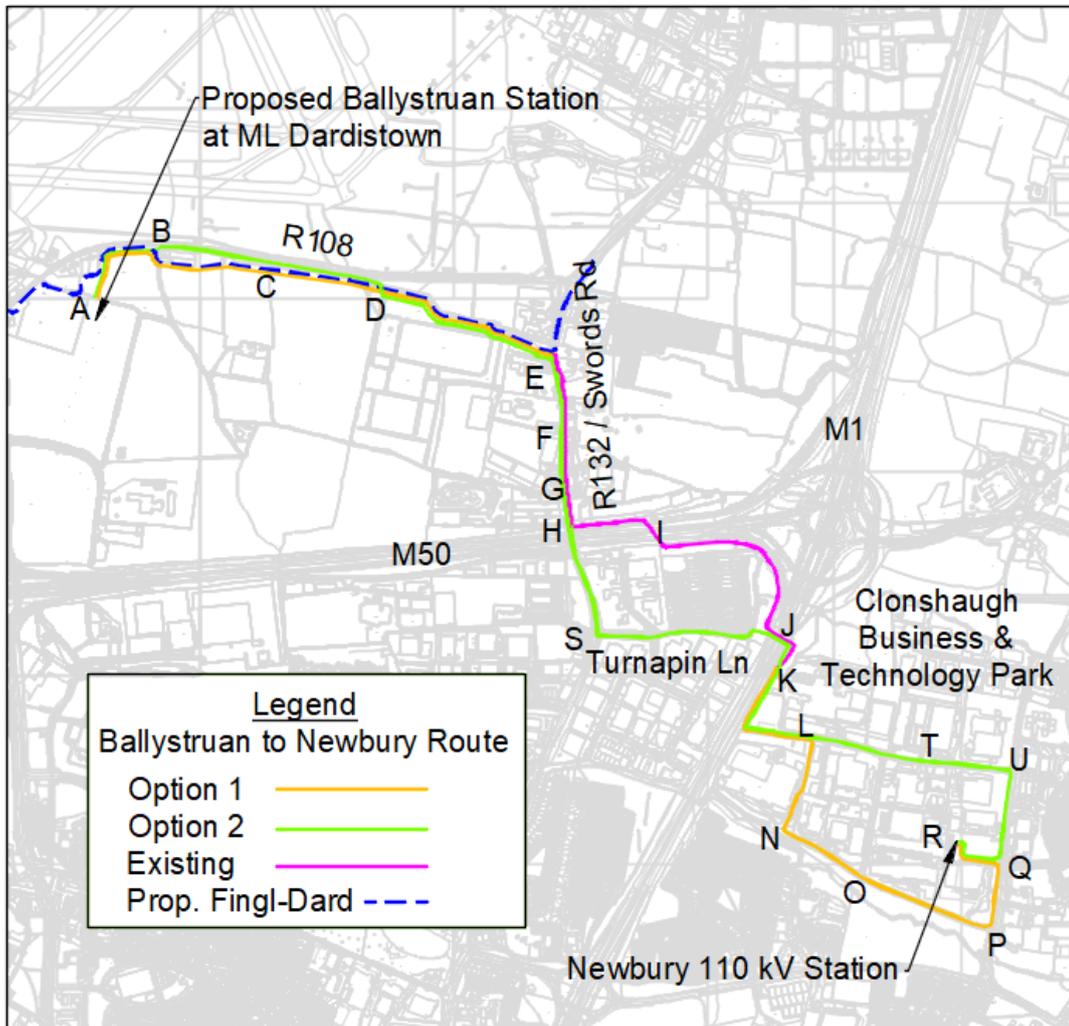


Figure 10 - Newbury to Ballystruan HV Cable Route, N-BS\_1 and 2

## 4.1 Newbury - Ballystruan Route Option 1 (N-BS\_1)

### 4.1.1 HV Cable Route Overview

HV cable route option N-BS\_1 is approx. 5.1 km long as shown in Figure 10. Starting at the proposed Ballystruan 110 kV station at Metrolink Dardistown, the HV cable route initially runs through private property south of the R108, through the north perimeter of the two GAA pitches, and parallel to the proposed Finglas - Dardistown 110 kV circuit (construction 2022), before entering Comer Group's property (i.e., presently used as agricultural land) and then into the Quickpark carpark. The HV cable route subsequently joins the road R132/Swords Road before heading south in the existing spare ducts installed parallel to the existing 110 kV Dardistown - Kilmore cable. At the M50 motorway it turns east, running along the north side of the motorway before crossing to the southside adjacent to the Turnapin Green/Turnapin Cottages area and then follows the slip road alignment to the south along the M1 before crossing the motorway into the Clonshaugh Business Park. The route then runs south, adjacent to the M1 before turning east and then south again adjacent to Kilmore Station, turning east along the road just north of the Santry River. At the main entrance road to Clonshaugh Business Park the circuit turns north before entering Newbury 110 kV station to the west.

The existing ducts between locations E-K are subject to the site investigation – duct proving exercise, which will confirm their size, number and status before their use can be considered for this project. The available route records do not suggest availability of any Kilmore – Baskin spare ducts along the section K-L-N.

### 4.1.2 Existing Utilities

Please refer to Figure 11 for the sections or locations below.

A-C The Starlights GAA pitch and Na Fianna GAA pitch are leased from DAA. The existing pitch floodlighting can be found in this area. Further investigation is required to identify the location of the power supply to the floodlighting as no information is shown on the service records.

Both GAA pitches are being redeveloped/redesigned, and the more precise extent of potential conflict of the trenching and ducting works with the new/redesigned pitches and/or their floodlights will be assessed when detailed design of the development is received and reviewed. The assessment will also cover the power supply to these floodlights and other potential services in the area.

Note that this HV cable route runs adjacent to the replacement 110 kV Finglas – Dardistown cable and proposed 110 kV Ballystruan – Forrest Little cable (BS-FL\_1 or BS-FL\_3). Any potential conflict with the future GAA pitch floodlights is expected to be solved as part of the 110 kV Finglas – Dardistown project in the year 2022-23.

No utilities are indicated on the service records obtained.

C-D This area is owned by the developer, the Comer Group, but is presently used as agricultural land with no services shown on the available records.

D An airport landing light installation is found at this location, and the proposed Irish Water GDD route also crosses at this location.

D-E The Quickpark carpark has a low/moderate number of services indicated on service records. Presently, closed.

- E-H The route runs in the spare ducts installed along the existing 110 kV Kilmore – Dardistown cable, as a double circuit. This area has a high density of services, including the T50 Network (up to 18 nos. communication ducts), two gas mains, including a high-pressure steel main, water, public lighting and multiple communication ducts. The high-pressure steel gas main is equipped with cathodic protection, which may get affected by the HV cables in the vicinity. GNI require baseline surveys to be completed on the cathodic protection, before and after energisation of the HV cable, where it is installed within 5 m of this gas main.
- H-K This section runs along the existing 110 kV Kilmore – Dardistown cable, in the spare ducts, as double circuit. An exception to this is crossing the M1 and M50 motorways.
- K-N For this section, see under Existing/Proposed HV Cables. It runs in part through the Amazon-owned land, with apparently limited number of utility services.
- N-P This section has a moderate number of existing utility services, including gas, Eir, sewer and water, but lots of various telecom services.
- P-Q This section has a high number of existing services present including HV cables, gas, Eir, sewer and water.

### 4.1.3 Existing/Proposed HV Cables

- A-E Runs parallel to the replacement 110 kV Finglas - Dardistown 110 kV cable (construction 2022) and possibly 110 kV Ballystruan - Forrest Little cable (Option 1 – BS-FL\_1).
- E-K Runs parallel to the 110 kV Dardistown – Kilmore cable, as a double circuit.
- K-L Runs in parallel with the 110 kV double circuit, Kilmore – Dardistown and Kilmore – Baskin cables, and 38 kV double circuit, Finglas - Clonshaugh and Collinstown - Clonshaugh cables.
- L-N Runs in parallel with the 110 kV double circuit, Kilmore – Dardistown and Kilmore – Baskin cables.
- N-P Runs adjacent to the 220 kV Belcamp - Finglas cable.
- O-P Runs parallel to the 110 kV Kilmore - Poppintree cable.
- P-Q Runs parallel to the 110 kV Finglas - Grange cable.
- Q-R As discussed, the HV cable route will take one of the future 110 kV Belcamp – Newbury cables.

The current rating impact resulting from the new HV cable being installed in the proximity or crossing the existing HV cables will be reviewed at detailed design stage.

### 4.1.4 Traffic Impact

Most of this HV cable route is either in private property or utilises existing ducts and therefore should not have a significant impact on traffic. An exception to the above may be HV cable jointing works, although it would appear that the HV cable joint bay on the R132/Swords Road is located off road or envisaged to be installed there.

Excavation works will be required on the R132/Swords Rd at the Quickpark entrance at location E, as shown in Figure 11, to tie into the existing spare ducts there. This area is close to a busy R108/R132 junction, and potential traffic disruption should be considered there.

Section J-R running through the Clonshaugh Business Park has potential to cause disruption to businesses in this area. Consultation should be undertaken with the business park owners and businesses in the area to identify any possible limitations on working hours or locations for construction of the potential route.

### 4.1.5 Third Party Stakeholders

#### **Industrial Development Agency (IDA)**

As discussed, the Clonshaugh Business & Technology Park is privately owned, and consultations with the business owners should be undertaken at the earliest opportunity before any construction works can commence in the area. As some sections of this area are heavily congested with the utility services, the cable route may have to be considered in the verge or footpath adjacent to the road. Clarification on the ownership and discussion with every affected business will be required before any route can be finalised.

#### **TII**

This route utilises the existing ducts which pass under the M1 and M50. Discussion should be undertaken with the TII before works to clarify any access or working hours requirements when working near motorways or slip roads.

#### **Private Landowners**

Large sections of this route are through private lands including GAA pitches, developer's/agricultural lands, DAA lands, carparks, lands adjacent to the M1 and M50. No consultation has taken place with private landowners as part of this report. Clarification of ownership and engagement with the landowners should be undertaken at the earliest opportunity.

#### **Irish Water**

The Greater Dublin Drainage project's Orbital Sewer Line will cross this potential cable route at location D. Consultation should be undertaken with Irish Water for clarification on their planned works in this area.

### 4.1.6 Ecology

A detailed ecological assessment will be required as part of the planning application.

#### **Watercourses**

An open drain/stream crossing is identified at location A, there is no current bridge in this location. Confirmation of the planned construction works in the area as part of Metrolink Dardistown should be confirmed before a possible crossing method can be assessed.

This route crosses the Mayne River at Turnapin Bridge on the Swords Rd and a stream at location E approx. 150 m to the north. If the existing ducts are found to be suitable for the new circuit, there should be no disruptive works required at this bridge.

## 4.2 Newbury – Ballystruan Route Option 2 (N-BS\_2)

### 4.2.1 HV Cable Route Overview

The HV cable route option N-BS\_2 is approx. 4.8 km long as shown in Figure 10. Starting at the proposed Ballystruan Station at Metrolink Dardistown, the route runs to north from the station, turning east across the northern boundary of Starlights GAA pitch and entering the verge running to the south of the R108. The circuit then enters the north west corner of Quickpark carpark and runs parallel to the proposed 110 kV Finglas – Dardistown cable. At the R132/Swords Rd, the circuit turns south, running along the R132, and crossing the M50 via the existing underpass road. At Turnapin Lane the circuit turns east and crosses the M1 via an HDD following the 110 kV Kilmore – Finglas cable into Clonshaugh Business Park, the route then continues east to the main business park access road, turning south and eventually entering Newbury Station from the west.

### 4.2.2 Existing Utilities

Please refer to Figure 10 for the locations below.

A-B The Starlights GAA pitch is leased from DAA. The existing pitch floodlighting can be found in this area. Further investigation is required to identify the location of the power supply to the floodlighting as no information is shown on the service records.

The GAA pitch is being redeveloped/redesigned, and the more precise extent of potential conflict of the trenching and ducting works with the new/redesigned pitches and/or their floodlights will be assessed when detailed design of the development is received and reviewed. The assessment will also cover the power supply to these floodlights and other potential services in the area.

Note that this HV cable route runs adjacent to the replacement 110 kV Finglas – Dardistown cable and proposed 110 kV Ballystruan – Forrest Little cable (BS-FL\_1 or BS-FL\_3). Any potential conflict with the future GAA pitch floodlights is expected to be solved as part of the 110 kV Finglas – Dardistown project in the year 2022-23.

No utilities are indicated on the service records obtained.

B-D The Old Airport road is heavily congested with various utility services and construction of new HV cables is generally deemed unsuitable within the roadway. The road verge to the south of the road is identified as a possible route option but will require the removal of the large clay berm at this location.

D-E The DAA landing lights and the proposed Irish Water GDD route are located close to location D. The D-E section is the Quickpark Carpark and a low/moderate number of services have been indicated on service records within the carpark. Presently, the car park is closed.

E-S This area is heavily congested with existing services including two gas mains, out of which one is high-pressure steel main, T50 telecoms/fibre, water, sewer and other communication services.

S-J This section runs through the Airways Industrial Estate and contains a moderate number of existing services.

J-R This section runs through the Clonshaugh Business and Technology Park and contains a large number of existing utility services and existing HV cables.

### 4.2.3 Existing/Proposed HV Cables

- A-B Runs parallel to the replacement 110 kV Finglas - Dardistown and 110 kV Ballystruan - Forrest Little 110 kV cable (BS-FL\_1).
- B-D Runs adjacent to the existing 110 kV Finglas – Dardistown cable (future 220 kV Belcamp – Shellybanks cable).
- D-E Runs parallel to the replacement 110 kV Finglas – Dardistown and 110 kV Ballystruan - Forrest Little cable (Option 1 – BS-FL\_1).
- E-H Runs parallel to the 110 kV Kilmore – Dardistown cable, as a double circuit.
- H-S No HV cable along this section on record.
- S-J Runs parallel to the 38 kV Finglas – Clonshaugh cable.
- J-K Crosses the M1 motorway in spare ducts installed along the 110 kV Kilmore – Dardistown cable.
- K-L Runs parallel to the 110 kV double circuit, Kilmore – Baskin and Kilmore – Dardistown double circuit, and 38 kV double circuit, Finglas – Clonshaugh and Collinstown – Clonshaugh cables.
- L-T Runs parallel to the 38 kV double circuit, Finglas – Clonshaugh and Collinstown – Clonshaugh cables, to the Clonshaugh 38 kV station. On the southern side of the road there is a 110 kV Kilmore – Newbury city-type cable, and 110 kV Kilmore – Chromcastle 1 and 2 cables and 110 kV Kilmore – Poppintree cable.
- T-U Runs parallel to the 110 kV Chromcastle – Kilmore No.1 and 2 cables and the 110 kV Kilmore - Newbury city-type cable. Note that the latter HV cable will become 110 kV Grange – Kilmore cable after completion of DN0556 Newbury to Belcamp Transfer project.
- U-Q Runs adjacent to the 220 kV Belcamp - Finglas cable, 110 kV Kilmore – Chromcastle 2 cable and 110 kV Kilmore – Newbury city-type cable.
- Q-R Following the DN0556 Newbury to Belcamp Transfer, the existing 110 kV Grange – Newbury and 110 kV Kilmore - Newbury cables will become 110 kV Belcamp – Newbury 1 and 2 cables. This HV cable diversion will be executed in the year 2024, or later.

At a later date, the 110 kV Newbury – Ballystruan will take place of one of the 110 kV Belcamp – Newbury cables and run in parallel with another along this section of the HV cable route.

The current rating impact that will result from the newly constructed HV cable installed in the proximity or crossing the existing HV cables will be examined at detailed design stage.

#### 4.2.4 Traffic Impact

- Section A-B is in private property, see Figure 12, and should only have a minimal impact on traffic at the road access point.
- The cable route section on the R108 along the section B-D is in the verge to the south of the road. While the construction works may be contained within the verge here, a large amount of material will need to be removed from this area and it may have a moderate impact on the traffic along the R108.
- Section H-S. The R132/Swords Rd is a heavily trafficked road consisting of two traffic lanes and two bus lanes. It may be possible to construct the HV cable route in the bus lane to try to minimise disruption to traffic in the area. This is subject to confirmation of the location of existing utilities following site investigation works.
- The western section of Turnapin Lane, see Figure 13, is a four-lane road which serves the Airways Industrial Estate and Woodford Business Park and has a low to moderate traffic flow.
- The eastern end of Turnapin Lane, see Figure 14, reduces to a two-lane road, and provides access to a cul-de-sac residential area. Lane closures in this area are believed to have a moderate effect on the traffic in the area.
- Clonsaugh Business and Technology Park is largely a commercial area and construction works may have the potential to cause moderate disruption to businesses in the area. Consultation should be undertaken with businesses in this area to determine specific access requirements, i.e., HGV, 24-hour access, etc.

#### 4.2.5 Third Party Stakeholders

##### DAA

Section B-D of this route is proposed within the verge to the south side of the Old Airport Road. This verge currently has a large clay berm which would need to be removed to facilitate installation of the proposed HV cables. Agreement would need to be reached with the DAA and a suitable alternative found if this route was selected, as it would not be possible to reinstate the berm once the HV cable is installed. The aforementioned clay berm is also used as an airport viewing area for members of the public, the aircraft spotters. It is not known whether these enthusiasts have official DAA approval for their activities, or whether the said clay berm was assigned to them for the aircraft spotting. If this is a DAA assigned aircraft spotting location, a suitable alternative location would need to be discussed and agreed with the DAA.

##### Aircraft Spotters

If the aforementioned enthusiasts belong to an aircraft spotters club, the club representatives will be contacted as part of the stakeholders' engagement as well.

##### Private Landowners

Sections of this route run through private lands including GAA pitches, DAA lands, carpark lands and lands adjacent to the M1 and M50, Airways Industrial Estate and the Clonsaugh Business and Technology Park. No discussions have taken place with private landowners as part of this report, clarification of ownership and engagement with the landowners should be undertaken at the earliest opportunity.

### **TII**

The route requires the crossing of the M50 via the existing underpass on the R132/Swords Road. If the Kilmore – Dardistown spare ducts are not available, a new HDD crossing under the M1 from Turnapin Lane to Clonshaugh Business Park will be required. Both of the above crossings are subject to agreement with TII.

### **GNI**

It was noted that the high-pressure steel gas main along the R132/Swords Rd contains cathodic protection and that may be affected by the nearby HV cables. GNI require baseline surveys to be completed on the cathodic protection, before and after energisation of the circuit, where HV cables are being installed within 5 m of this gas main.

### **Irish Water**

The Greater Dublin Drainage project's Orbital Sewer Line will cross this potential cable route at location D. Discussion should be undertaken with Irish Water for clarification on their planned works in this area.

## 4.2.6 Ecology

A detailed ecological assessment will be required as part of the planning application.

### **Watercourses**

This route crosses the Mayne River at Turnapin Bridge on the Swords Rd and a stream at location E approximately 150 m to the north. The existing Dardistown - Kilmore 110 kV circuit passes parallel to this proposed route so it is assumed there is sufficient depth in the road to accommodate the new circuit, detailed site investigation will be required for clarification.

An open drain/stream crossing is identified at location A, there is no current bridge in this location and confirmation of planned construction works in the area as part of Metrolink Dardistown should be confirmed before a suitable crossing method can be assessed.

### **Clay Berm Removal**

This route proposal requires the removal of the large clay berm to the south of the Old Airport Road. A suitable alternative reinstatement should be agreed with the landowner as it will not be possible to replace the berm once the circuit is installed. Further investigations are required to determine if there would be any negative environmental impact to the flora and fauna or watercourses in this area by the removal of this berm.

#### 4.2.1 HV Cable Route Option 1 & 2 (N-BS\_1 & 2) – Photos



Figure 11 - R132 /Swords Rd at Quickpark entrance



Figure 12 - Northern boundary at Starlights GAA Grounds



Figure 13 - Turnapin Lane, western end



Figure 14 - Turnapin Lane, eastern end

### 4.3 Newbury to Ballystruan – Preferred HV Cable Route

The Newbury – Ballystruan HV cable route, Option 1 (N-BS\_1) and Option 2 (N-BS\_2), are envisaged for execution along the existing roads, and are thus considered available. This is subject to the outcome of spare ducts proving exercise. These spare ducts are installed across the M1 and M50 and Swords Road/R132, in the form of a double circuit, with the existing 110 kV Kilmore – Dardistown cable.

Pending site investigation, both N-BS\_1 and N-BS\_2 routes appear constructable, but N-BS\_1 will take less construction effort considering the significantly longer spare ducting route. The N-BS\_2 will also require trenching and ducting works through the Airways Industrial Estate. The B-D section of this route along the Old Airport Road may be in conflict with the existing HV cables and services buried there.

N-BS\_1 is approximately 5.1 km long, while N-BS\_2 is 4.8 km long.

As for the HV Cable Maintenance Wayleave/Easement Requirements, the N-BS\_1, owing to the longer ducted section (K-E) will have some advantage over N-BS\_2 (H-E). Both routes will require wayleave/easement from Amazon at location K, in the Clonshaugh Industrial Estate, but N-BS\_2 may require it for the section of its route (J-H) through the Airways Industrial Estate, with the remaining sections being equal in this respect.

In respect of HV cables, both N-BS\_1 and N-BS\_2 routes will deal with the existing HV cables, but N-BS\_1 perhaps less so. The longer ducted section is again having the advantage here. Along the Section B-E, N-BS\_1 route will run along at least the future 110 kV Finglas – Dardistown, and possibly even 110 kV Forest Little – Ballystruan cable, Option 1 (BS-FL\_1). Along the same section the N-BS\_2 route will run along the existing 110 kV Finglas – Dardistown cable (future 220 kV Shellybanks – Belcamp cable).

The N-BS\_2 route will encounter more utility services than N-BS\_1 route.

The N-BS\_2 is expected to have greater general impact on the industrial estates' tenants (i.e., the Airways Industrial Estate) than N-BS\_1. As for the local residents along the Swords Road/R132, the impact should be comparably equal.

The same applies in respect of the impact on traffic flow.

The N-BS\_2 route may require horizontal directional drilling across M50.

The number of water crossings appears equal for both N-BS\_1 and N-BS\_2.

No flooding should be expected along either HV cable route, while the presence of contaminated ground remains to be confirmed for the site investigation.

No cultural heritage sites are expected along either HV cable routes.

Biodiversity (flora and fauna) and/or landscaping requirements do not seem to present particular issue along either HV cable route, although any trenching and ducting works through the industrial estates grass verges, or the like, will require reinstatement.

I\_DN0566 LE MetroLink 56 MVA Design Work – Advanced Work Package  
Preferred HV Cable Route Selection Report

An HV cable route selection matrix for the 110 kV Newbury – Ballystruan cable can be found below.

Evaluation Criteria	HV Cable Route Options		
	N-BS_1	N-BS_2	--
HV Cable Route Availability	4	4	--
HV Cable Route Constructability	5	3	--
HV Cable Route Length	4	4	--
HV Cable Maint. Wayleave/Easement Requirements	5	3	--
Other HV cables in Road Reserve	5	3	--
Utility Services in Road Reserve	5	3	--
Impact on Local Residents	5	3	--
Impact on Traffic Flow	5	3	--
Horizontal Directional Drilling for Road Crossings	7	2	--
Number of Water Crossings	4	4	--
Flooding History/Potential	4	4	--
Contaminated Ground	4	4	--
Cultural Heritage Sites	4	4	--
Biodiversity (Flora and Fauna)	4	4	--
Landscaping Requirements	4	4	--
Sum of ranking	<b>69</b>	52	N/A
Overall Ranking – Least Constrained Route Option	<b>1</b>	2	1

7	6	5	4	3	2	1
Least Constrained				Most Constrained		

## 5 Ballystruan to Forest Little

The Ballystruan to Forest Little HV cable route will consist of a single 110 kV circuit. The route will run from the proposed Ballystruan Substation at Metrolink Dardistown to the proposed Forest Little Substation at Metrolink North Portal.

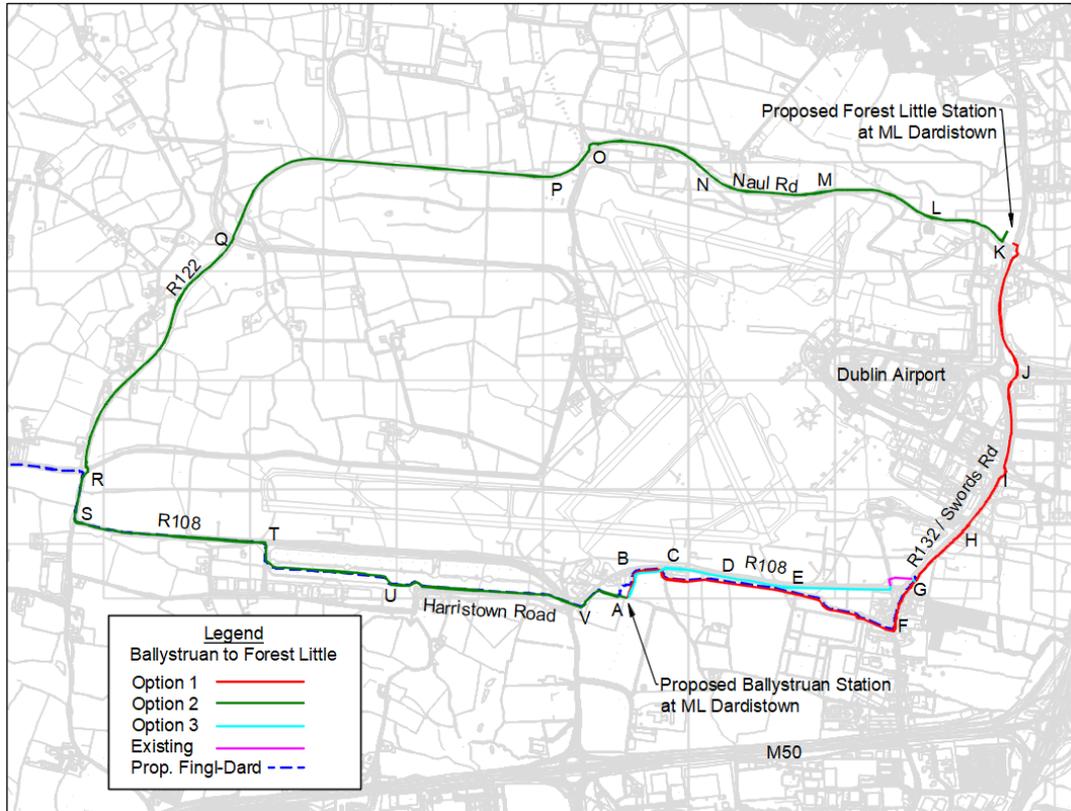


Figure 15 - Ballystruan to Forest Little HV Cable Route, BS-FL\_1 to 3

## 5.1 Ballystruan – Forest Little Option 1 (BS-FL\_1)

### 5.1.1 HV Cable Route Overview

Route option BS-FL\_1 is approximately 4 km long as shown in Figure 15. Starting at the proposed Ballystruan 110 kV station at Metrolink Dardistown, the route initially runs through private property south of the Old Airport Road across the two GAA pitches and parallel to the proposed 110 kV Finglas – Dardistown cable (construction 2022), before entering development/agricultural land and then into the Quickpark carpark. The HV cable route joins the public road at the R132/Swords Road turning north and continuing past the airport roundabout and entering the proposed Forest Little Substation at the Cloghran roundabout.

### 5.1.2 Existing Utilities

Please refer to Figure 15 for the locations below.

A-D The Starlights GAA pitch and Na Fianna GAA pitch are leased from DAA. The existing pitch floodlighting can be found in this area. Further investigation is required to identify the location of the power supply to the floodlighting as no information is shown on the service records.

Both GAA pitches are being redeveloped/redesigned, and the more precise extent of potential conflict of the trenching and ducting works with the new/redesigned pitches and/or their floodlights will be assessed when detailed design of the development is received and reviewed. The assessment will also cover the power supply to these floodlights and other potential services in the area.

Note that this HV cable route runs adjacent to the replacement 110 kV Finglas – Dardistown cable and proposed 110 kV Newbury – Ballystruan cable (N-BS\_1 or N-BS\_2). Any potential conflict with the future GAA pitch floodlights is expected to be solved as part of the 110 kV Finglas – Dardistown project in the year 2022-23.

No utilities are indicated on the service records obtained.

D-E This area is mainly agricultural land, but it is owned by the property developer Comer Group Ireland. Presently, no services are shown on the available records.

E An airport landing light installation is found at location E. The proposed Irish Water GDD Orbital Sewer Line also crosses at this location.

E-F The Quickpark carpark has a low/moderate number of services indicated on service records. Presently, the car park is not in service.

F-G The T50 Network is present in this location and contains up to 18 comms/fibre ducts.

F-K A large number of existing utilities are located in this area. It's also noted that this road was widened in the mid 2010's and it's not clear if services have been relocated during this work or if the service records have been updated. It was noted that the high-pressure steel gas main in this area contains cathodic protection which may be affected by nearby HV cables. GNI require baseline surveys to be completed on the cathodic protection, before and after energisation of the HV cables, where these are being installed within 5 m of this gas main.

### 5.1.3 Existing/Proposed HV Cables

- Section A-H will run parallel to the replacement 110 kV Finglas – Dardistown cable (construction 2022).
- Section A-F will run parallel to the 110 kV Ballystruan – Newbury cable, Option 1, and in part, Option 2 (E-F), which will be installed as part of the MetroLink project.
- Section F-H will run parallel to the 110 kV Kilmore – Dardistown cable.
- The future 220 kV Belcamp - Shellybanks 220 kV cable will cross this HV cable route perpendicularly at location G.
- Section I-J runs adjacent to the 38 kV Collinstown - Clonshaugh cable.
- At the Cloghran roundabout K, the circuit will enter Forest Little station from the east, in close proximity to the proposed 110/220 kV Forest Little - Belcamp cables.

The current rating impact resulting from the new HV cable being installed in the proximity or crossing the existing HV cables will be considered and reviewed at detailed design stage.

### 5.1.4 Traffic Impact

- The southern section of the R132/Swords Road, where the HV cable joins the public road at location F, is a two-lane & two bus lane road, see Figure 11, with high volumes of traffic. Options for route alignment may be limited in this area due to a high volume of existing services and may need to be installed in one of the centre lanes of the road, which may lead to significant disruption to traffic or limitations on working hours.
- The R132/Swords Rd in general, section G-K, is a four-lane & two bus lane road, see Figure 17, with high volume of traffic. Trenching and ducting works should be limited to works in the inner lane/bus lane where possible to reduce the possible impact on traffic flow in the area. The exact location of the cable route is subject to verification of the location of other existing services in the area.

It may be possible to work in the road median, between location H and the Airport Roundabout, location J. Along the aforementioned section, the median appears to be wide enough and free of utility services, and/or lighting poles.

- The Airport roundabout at location J is a large multilane roundabout and is the main access road for Dublin Airport traffic, construction works in this area is expected to be subject to approval from the DAA.

### 5.1.5 Third Party Stakeholders

#### **Private Landowners**

Sections of this route (A-F) run through private lands, including GAA pitches (although leased from DAA), agricultural lands (apparently owned by a property developer), DAA lands on lease, or used for the Airport landing lights, and Quickpark carpark. No consultations have taken place with private landowners as part of this report, therefore clarification of ownership and engagement with the landowners should be undertaken at the earliest opportunity.

### **DAA**

Works along the R132/Swords Rd and at the Airport Roundabout have the potential to impact traffic flow to and from the airport. Consultation should be undertaken with the DAA in advance of works taking place in this area.

### **GNI**

It was noted that the high-pressure steel gas main along the R132/Swords Rd contains cathodic protection which may be affected by nearby HV cables. GNI require baseline surveys to be completed on the cathodic protection, before and after energisation of the HV cables, where these are being installed within 5 m of this gas main.

### **Irish Water**

The Greater Dublin Drainage project will cross this potential cable route at location G. Consultation should be undertaken with Irish Water for clarification on their planned works in this area.

## **5.1.6 Ecology**

A detailed ecological assessment will be required as part of the planning application.

### **Watercourses**

The proposed HV cable route crosses the Cuckoo Stream at location H. There is an existing HV cable crossing the Cuckoo Stream within the roadway and site investigations should be undertaken to confirm that the new cable route can also cross within the road carriageway.

An open drain/stream crossing is identified at location A, there is no current bridge in this location and confirmation of planned construction works in the area as part of Metrolink Dardistown project should be confirmed before a possible crossing method can be assessed.

## 5.2 Ballystruan – Forest Little Option 2 (BS-FL\_2)

### 5.2.1 HV Cable Route Overview

Route option BS-FL\_2 is approx. 9.8 km long as shown in Figure 15. Starting at the proposed Ballystruan Station the circuit heads west through Ballymun Kickhams GAA onto the Harristown Road before crossing into the DAA Blue Carpark and through to the R108, continuing west before turning north onto the R122. The circuit follows the R122 north and eventually east around the perimeter of the airport. It continues east to join up with the Naul Road and into the proposed Forest Little station adjacent to the Cloghran roundabout.

### 5.2.2 Existing Utilities

Please refer to Figure 15 for the locations below.

- V The road junction at location V has a large number of existing utilities.
- V-T This section is largely in the verge and running through private property with a limited number of existing utilities. This section will run parallel with both replacement 110 kV Finglas - Dardistown and future 220 kV Belcamp – Shellybanks cables. Thus, the proposed Forest Little – Ballystruan HV cable will be the third one within the same corridor.
- T-S This section runs along the Old Airport Road, and has a limited number of services, including fibre optic and water.
- S-R This section includes the T50 Network, Eir, Aurora fibre optic, watermains and two aforementioned HV cables.
- R-K Records indicate a relatively low level of existing services in this section.
- N-M This section of road was recently realigned and its possible that service records may not have been updated or the services themselves may also have been realigned.

### 5.2.3 Existing/Proposed HV Cables

- A-R The HV cable route runs parallel to the replacement 110 kV Finglas – Dardistown cable.  
  
A Finglas – Dardistown HV cable joint bay is planned along this section of the HV cable route, some 100 m+ away from the location T, as witnessed by the H-slit trench opening on the northern side of the road. The said HV cable joint bay will take the entire width of one of the road lanes.
- V-R The HV cable route runs adjacent to the existing 110 kV Finglas – Dardistown cable, which will eventually become 220 kV Belcamp - Shellybanks cable.
- V The existing 110 kV Finglas – Dardistown cable, the future 220 kV Belcamp – Shellybanks cable crosses this proposed HV cable route at this location.

The current rating impact resulting from the new HV cable being installed in the proximity or crossing the existing HV cables will be considered and reviewed at detailed design stage.

## 5.2.4 Traffic Impact

- The Harristown Rd/R108 junction (V) has a high traffic flow and an alternative method of crossing the junction, such as an HDD may have to be considered.
- Harristown Road (V-U) and the road R108 (S-T) sections have a reasonably low traffic volume.
- Section S-Q along the R108 and associated junctions have a moderate to high traffic flow.
- The R122, northern section of the R108 and the Naul Road (Q-K), shown in Figure 16, have a moderate traffic flow.

## 5.2.5 Third Party Stakeholders

### **DAA**

Several of the roads along this route are under the control of the DAA and part of the proposed route passes through the DAA-owned Blue Carpark between locations (U-T). Any works on these roads or carpark is subject to agreement with the DAA.

### **Ballymun Kickhams GAA**

This proposed route passes through the Ballymun Kickhams GAA grounds, see Figure 18, and is subject to clarification of suitable space being available, and agreement with the GAA club.

## 5.2.6 Ecology

A detailed ecological assessment will be required as part of the planning application.

### **Watercourses**

There are approximately eight watercourse crossings located to the north west of the airport between locations Q-P. Confirmation of culvert depths and size is required prior to detailed design of the route in this area.

## 5.2.1 Archeology

### **National Monuments Service**

The Naul Road passes through the Zone of Notification of a Ringfort adjacent to the Halting Site at location L. The construction of a cable route within this area requires advance notification to the National Monuments Service. It is possible that an archaeological assessment will be required prior to any excavation works in this area.

### 5.3 Ballystruan – Forest Little Option 3 (BS-FL\_3)

Route option BS-FL\_3 is approx. 3.9 km long as shown in Figure 15. Section A-E is as described in A-D of route N-BS\_2 and section G-K as described in BS-FL\_1.

Section E-G would run parallel to the road R108 and adjacent to the Irish Water GDD alignment, before turning north to connect to the existing ducts which would allow the route to bypass the Old Airport Road/Swords Road junction. The existing ducts at the Old Airport Road/Swords Rd, running through the south-east corner of the DAA airport perimeter, will become available following the decommissioning of the existing Finglas - Dardistown 110 kV circuit, planned for 2022.

This potential route option is dependent on suitable space being available adjacent to the Irish Water GDD wayleave/easement, the proposed finished reinstatement plan in this area, agreement with the relevant landowners and further site investigations. Consultation should take place with Irish Water to clarify their proposed plans for this area, and with the relevant landowners.

### 5.3.1 HV Cable Route Option 1 – 3 (BS-FL\_1 – 3) – Photos



Figure 16 - Naul Road

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Preferred HV Cable Route Selection Report



Figure 17 - R132/Swords Road



Figure 18 - Ballymun Kickhams GAA, western end of grounds

## 5.4 Ballystruan – Forest Little – Preferred HV Cable Route

The Ballystruan – Forest Little HV cable route, Option 1 (BS-FL\_1), Option 2 (BS-FL\_2), and Option 3 (BS-FL\_3) are primarily designed for execution along the existing public roads and are thus considered available.

Pending the site investigation, all three HV cable routes appear constructable, but BS-FL\_2 will require more construction effort considering that it is much longer than the other two HV cable routes.

The BS-FL\_1 HV cable route is approximately 4 km long, BS-FL\_2 is 9.8 km long and BS-FL\_3 is 3.9 km long.

As for the HV Cable Maintenance Wayleave/Easement Requirements, BS-FL\_2 is expected to have advantage over the other two.

In respect of HV cables, along the section A-R the BS-FL\_2 HV cable route will run along the existing 110 kV Finglas – Dardistown cable (future 220 kV Shellybanks – Belcamp), and the replacement 110 kV Finglas – Dardistown cable.

The BS-FL\_1 route will run along the replacement 110 kV Finglas – Dardistown cable and Newbury – Ballystruan cable along the section A-F, while along section F-I it will run adjacent to the existing Kilmore – Dardistown, and replacement 110 kV Finglas – Dardistown cable.

The BS-FL\_3 route will run along the existing 110 kV Finglas – Dardistown cable (future 220 kV Shellybanks – Belcamp) along the section A-G, use the abandoned ducts across the Dublin airport perimeter south-east corner, while along section F-I it will run along the existing Kilmore – Dardistown cable, and replacement 110 kV Finglas – Dardistown cable.

At present, it is not clear whether the replacement 110 kV Finglas – Dardistown cable will use the 110 kV Kilmore – Dardistown spare ducts, and run with it in a double circuit formation along the section F-G-H-I.

The BS-FL\_1 and 3 routes will encounter more utility services than BS-FL\_2 route.

The BS-FL\_1 and 3 routes are expected to have greater general impact on the DAA and its tenants, including herewith two GAA clubs, than BS-FL\_2.

In respect of the traffic flow, the BS-FL\_1 and 3 routes will have greater impact than BS-FL\_2 route. This is especially the case for the Airport roundabout, Cloghran roundabout and R108/R132 junction.

The BS-FL\_1 and 3 routes may require horizontal directional drilling across the Airport roundabout.

There are water crossings required along all three HV cable routes, but they all appear manageable.

No flooding should be expected along either HV cable route, while the presence of contaminated ground remains to be confirmed by the site investigation.

No cultural heritage sites are expected along either HV cable routes.

Biodiversity (flora and fauna) and/or landscaping requirements do not seem to present particular issue along either HV cable route.

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Preferred HV Cable Route Selection Report

An HV cable route selection matrix for the 110 kV Ballystruan – Forrest Little cable can be found below.

Evaluation Criteria	HV Cable Route Options		
	BS-FL_1	BS-FL_2	BS-FL_3
HV Cable Route Availability	4	4	4
HV Cable Route Constructability	5	4	5
HV Cable Route Length	4	2	4
HV Cable Maint. Wayleave/Easement Requirements	3	4	3
Other HV cables in Road Reserve	3	4	3
Utility Services in Road Reserve	2	5	1
Impact on Local Residents	3	5	3
Impact on Traffic Flow	2	6	2
Horizontal Directional Drilling for Road Crossings	2	6	2
Number of Water Crossings	4	4	4
Flooding History/Potential	4	4	4
Contaminated Ground	4	4	4
Cultural Heritage Sites	4	4	4
Biodiversity (Flora and Fauna)	4	4	4
Landscaping Requirements	4	4	4
Sum of ranking	52	<b>64</b>	51
Overall Ranking – Least Constrained Route Option	2	1	3

7	6	5	4	3	2	1
Least Constrained				Most Constrained		

## 6 Conclusion

Following the HV cable route selection process, the three HV cable routes emerged as the preferred ones for the MetroLink project.

These are as follows:

1. Forest Little – Belcamp, Option 2 (FL-B\_2),
2. Newbury – Ballystruan, Option 1 (N-BS\_1), and
3. Ballystruan – Forest Little, Option 2 (BS-FL\_2).

The above HV cable routes are subject to verification via the site investigation and may be subject to change.

