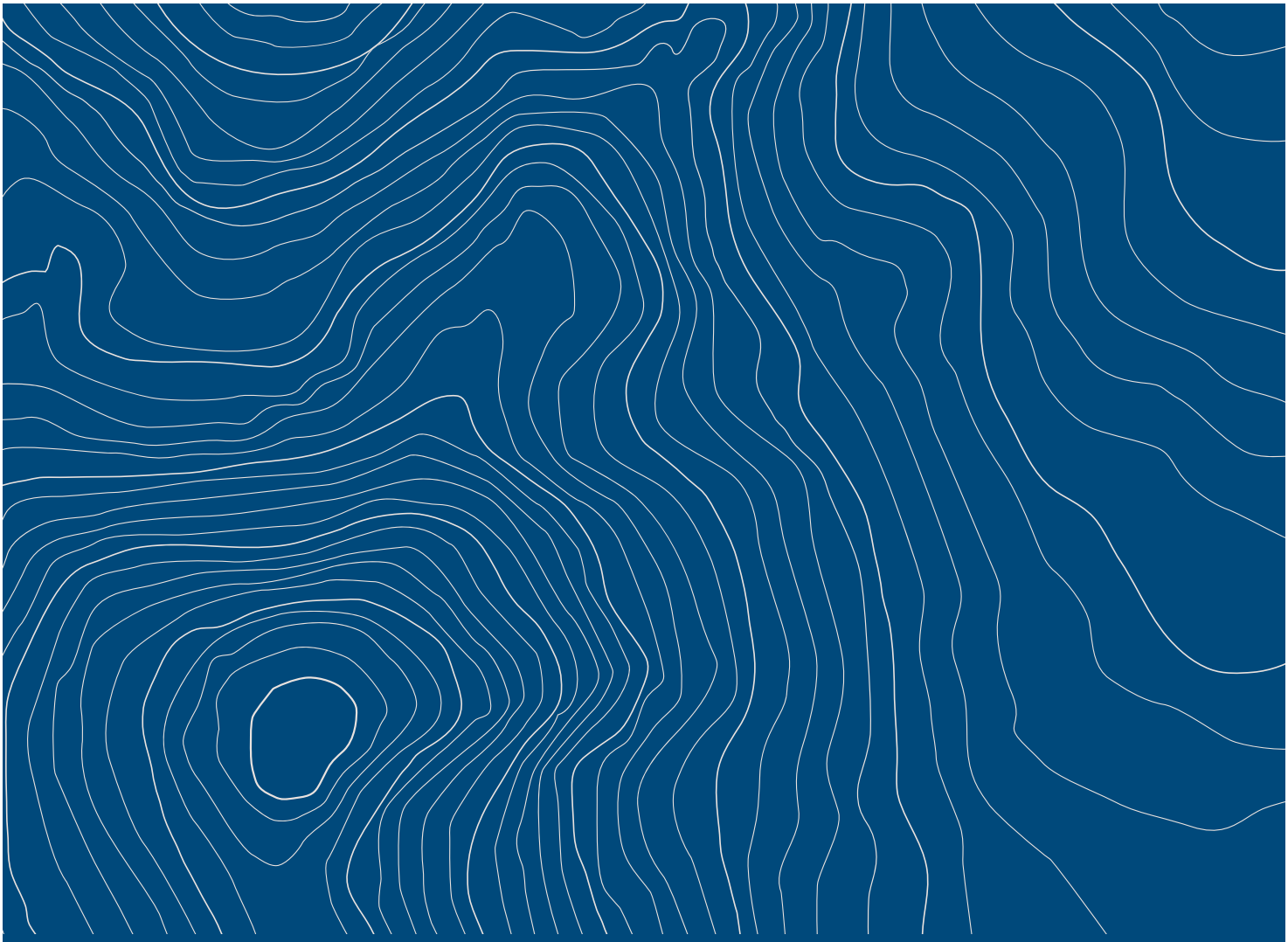

DublinArray
Generation for generations

EIAR Volume 6: Onshore Infrastructure
Technical Appendices
Appendix 6.5.2-1: Biodiversity Technical Baseline Report

Kish Offshore Wind Ltd

RWE SLR GoBe APEM Group

www.dublinarray-marineplanning.ie

Dublin Array Offshore Wind Farm

Environmental Impact Assessment Report

Volume 6, Appendix 6.5.2-1: Biodiversity Technical Baseline Report

Contents

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Acronyms

Term	Definition
AA	Appropriate Assessment
BCT	Bat Conservation Trust
BoCCI	Birds of Conservation Concern in Ireland
CBD	Convention on Biological Diversity
CDP	County Development Plan
CIEEM	Chartered Institution of Ecology and Environmental Management
cm	Centimetres
DBB	Dublin Bay Biosphere
DBBP	Dublin Bay Biosphere Partnership
DLRCC	Dún Laoghaire-Rathdown County Council
Dublin Array	Dublin Array Offshore Wind Farm
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environment Protection Agency
EU	European Union
FAR	Further Assessment Required
GCP	Grid Connection Point at existing Carrickmines 220kV substation
ha	Hectares
HWM	High-Water Mark
IAS	Invasive alien species
ITM	Irish Transverse Mercator
km	Kilometres
LAT/mLAT	Lowest Astronomical Tide/meters relative to Lowest Astronomical Tide
LIBS	Locally important Biodiversity Sites
MW	Megawatts
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Areas
NI	Northern Ireland

Term	Definition
NPWS	National Parks Wildlife Service
O&M	Operations and maintenance
OSS	Onshore Substation
OES	Onshore Electrical System
Onshore ECR	Onshore Export Cable Route
PFR	Potential Roosting Feature
pNHA	proposed Natural Heritage Areas
PRA	Preliminary Roost Assessment
PRF	Potential Roost Features
ROI	Republic of Ireland
RSES	Regional Spatial and Economic Strategy
RSPB	Royal Society for the Protection of Birds
RWE	RWE Renewables Ireland Ltd (a wholly owned subsidiary of RWE AG)
SAC	Special Areas of Conservation
SAC	Special Area of Conservation
SDZ	Strategic Development Zone
SPA	Special Protection Areas
SPA	Special Protection Area
UN	United Nations
WTG	Wind Turbine Generators
SWWTF	Shanganagh Wastewater Treatment Plant
ZoI	Zone of Influence

1 Introduction

1.1 Baseline characterisation report

1.1.1 Dublin Array Offshore Wind Farm (hereafter referred to as Dublin Array) is a proposed offshore wind farm on the Kish and Bray banks. The Kish and Bray banks are located, approximately 10 km off the east coast of Ireland, immediately south of Dublin city off the coast of counties Dublin and Wicklow. The offshore wind farm will be located within an area of approximately 54 km^2, in water depths ranging from 2 metres to 50 metres lowest astronomical tide (LAT[1]).

1.1.2 The purpose of this technical baseline report is to characterise the terrestrial ecological environment (biodiversity) for the onshore infrastructure works. This report addresses terrestrial ecology from the High-Water Mark (HWM) at Shanganagh Cliffs inland to the proposed OSS, and the grid connection point (GCP) at the existing Carrickmines EirGrid 220kV substation, and the proposed operations and maintenance (O&M) Base in Dún Laoghaire Harbour. Technical baseline reporting has been prepared separately for the offshore elements of the project (Volume 3).

1.1.3 The potential impacts that may result from the construction, operation and decommissioning of the Dublin Array onshore infrastructure works, the sensitivity of the receiving environment, the magnitude of any effects, and the overall significance of those effects are presented within the relevant chapter of the Environmental Impact Assessment Report (EIAR) (Volume 5, Chapter 5: Biodiversity).

1.1.4 A detailed description of the project is provided within Volume 2, Chapter 6, Project Description (hereafter referred to as the Project Description Chapter.

1.1.5 This technical appendix describes the baseline relevant to the assessment of potential environmental effects that might result from the Onshore Electrical System (OES) and Operations and Maintenance Base (O&M Base). The baseline relevant to the assessment of potential environmental effects that might result from the offshore infrastructure on the marine environment is addressed in Volume 4 of this EIAR.

1.2 Practitioner Competency

1.2.1 This report has been prepared by Ecologists from SLR Consulting. The competent practitioners responsible for the preparation of this baseline report include:

- SLR Technical Director Richard Arnold was responsible for providing a technical review of this report. Richard is a Technical Director with SLR. Richard has a BSc (Hons) in Ecology, an MRes in Environmental Science, is a full member of CIEEM and a Chartered

[1] The Lowest Astronomical Tide (LAT) is the height above the lowest tidal water level, which can be used for a level alone on the basis of the contained locally dominant tidal conditions.

Environmentalist. Richard has 23 years of experience as a consultant ecologist, including projects of all sizes and stages of development in the UK and Ireland.

- SLR Associate Ecologist Dr Jonathon Dunn holds an MA (Cantab.) in Zoology from Homerton College, Cambridge, an MSc in Ecology, Evolution and Conservation from Imperial College London, and a PhD in avian ecology from Newcastle University. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has worked in the environmental sector since 2014. He has experience as a project manager on many wind farm developments throughout Ireland. Jonathon was responsible for the project management for the ecology aspects and led and assisted with the technical aspects of the surveys and this report.

- SLR Senior Ecologist Jake Matthews (MSc, BSc). Jake authored this report and was also responsible for conducting or leading most of the ecological surveys. Jake has five years' experience undertaking ecological surveys and reports within the UK and Ireland and has a broad general ecological skillset over a range of fauna with particular skills with birds and bats.

- SLR Project Ecologist Brogan Costello. Brogan assisted with bat presence/absence surveys. Brogan is a Project Ecologist with SLR. Brogan holds a BSc Science (Botany) from National University of Ireland Galway, and a MSc Global Change, Ecosystem Science and Policy from University College Dublin. Prior to working with SLR Brogan undertook traineeships with Galway County Council Environmental Department and the European Commission in Brussels. She is a qualifying member of the Chartered Institution of Ecology and Environmental Management (CIEEM). Brogan has undertaken a number of ecology surveys including bat surveys.

- SLR Project Ecologist Alice Magee. Alice assisted with bat Preliminary Roost Assessment (PRA) surveys and bat presence/absence surveys. Alice has undertaken many bird surveys for onshore and offshore wind farm projects since joining SLR, including vantage point surveys and intertidal surveys. She has previously assisted with habitat classification and preliminary roost assessment in buildings.

- SLR Graduate Ecologist Hugo Brooks. Hugo assisted with bat PRA surveys and bat presence/absence surveys. Hugo is a Graduate Ecologist with SLR and has worked in ecological consultancy since 2022. Hugo graduated from University College Dublin in 2021 with a BSc degree in Zoology. Hugo has contributed to a range of projects including wind farm, residential development, and transport infrastructure projects. Hugo's field experience includes habitat surveys, a range of bird surveys, preliminary bat roost assessments, bat emergence, and re-entry surveys.

- SLR Graduate Ecologist Michael James. Michael is a Graduate Ecologist with SLR. Michael holds a BA (Hons) in Zoology from Trinity College Dublin. Since starting at SLR, he has been involved in various surveys. These include bird surveys and bat surveys (transects and bat emergence) for wind farms. Michael assisted with bat emergence surveys as part of this project.

- The aquatic surveys were completed by Bill Brazier and Ross Macklin of Triturus Environmental Ltd.

- Ross Macklin is a graduate of University College Cork and principal ecologist at Triturus Environmental Ltd. He has a BSc in Applied Ecology, Higher Diplomas in Integrated Pest Management and Geographical Information Systems. He is completing a Ph.D. in fisheries science at UCC. His expert areas are aquatic ecology and fisheries science. Ross has 18 years of professional experience and worked on many of Ireland's largest infrastructure projects including flood relief schemes, renewables (solar & wind farms), greenways, blueways, residential, roads and biodiversity. He has also worked on projects in the waste management, petrochemical, pharmaceutical, agricultural and aquaculture industry sectors. He also has held over 30 NPWS wildlife filming licences, numerous derogation licences and over 200 section 14 licences for fisheries related work. Ross has held over 30 NPWS national licences for freshwater pearl mussel *Margaritifera margaritifera*, white-clawed crayfish *Austropotamobius pallipes* and amphibian species holding full national licences for all of these species.

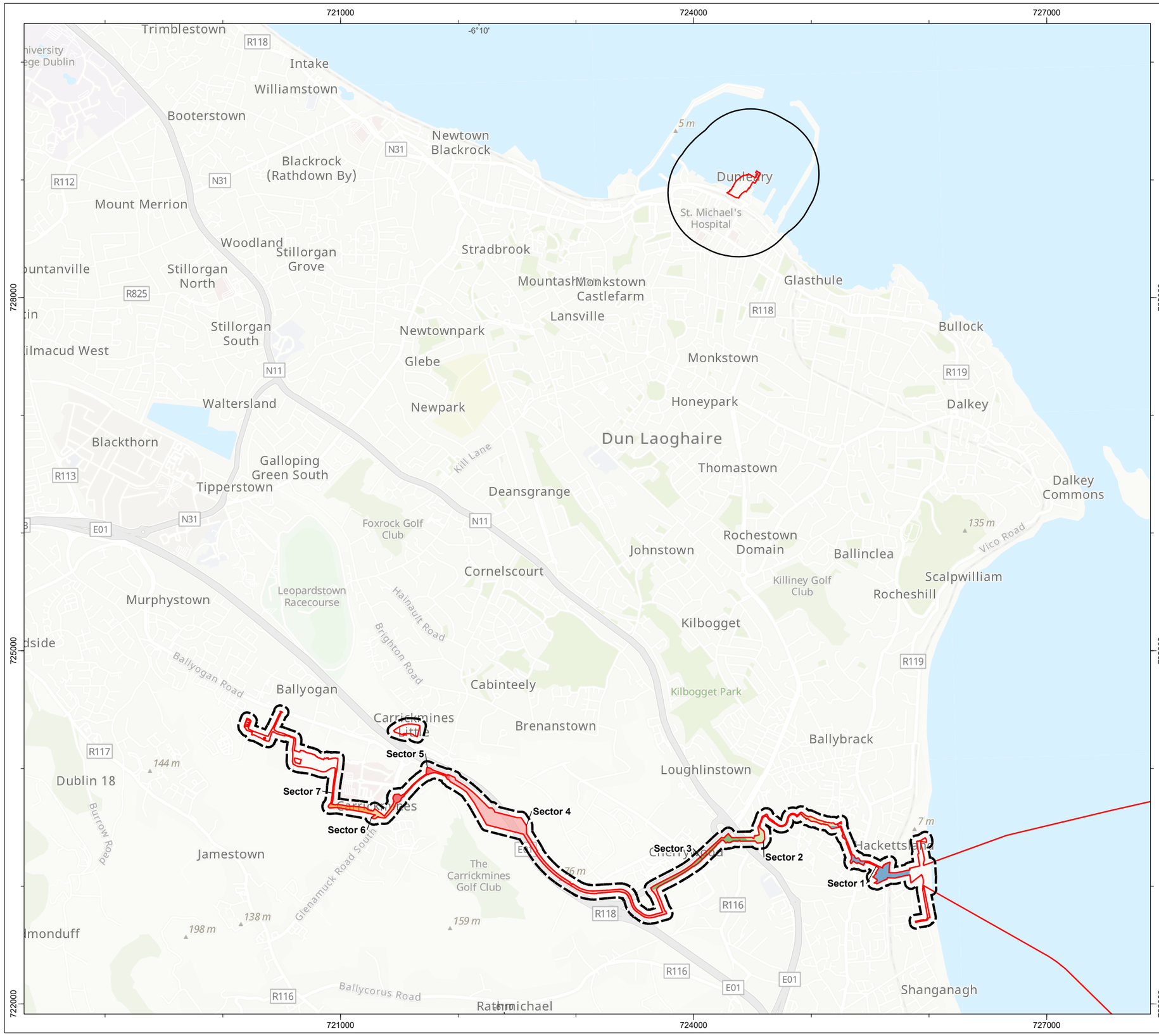
- Bill Brazier (Ph.D. (candidate), B.Sc. (Hons.) Applied Freshwater & Marine Biology, MCIEEM, MIFM) is an aquatic, fisheries and mammalian ecologist with over 11 year's professional experience in Ireland. He is a senior ecologist at Triturus Environmental Ltd. and is completing a Ph.D. in fish genetics at UCC. He has extensive experience in a wide range of ecological and environmental projects including EIAR, EcIA and AA/NIS reporting, as well as the areas of renewable energy developments, flood relief schemes, road schemes, invasive species management, blueways/greenways, biodiversity projects and non-volant mammal monitoring. He specialises in aquatic ecology and fisheries ecology, inclusive of fisheries assessments, macrophytes, water quality, otter *Lutra lutra*, freshwater pearl mussel, white-clawed crayfish and amphibians. Bill is one of Ireland's most experienced electro-fishing operators, having held over 200 section 14 authorisation licences for fisheries related work.

2 Methodology

2.1 Approach

2.1.1 The methodology for baseline characterisation has comprised a combination of a detailed desktop review to establish the baseline information available on the onshore biodiversity within the defined overall study area (described in Section 2.2). This desktop review was then combined with field surveys and site walkovers of publicly accessible areas or land where access was granted by the owner within the overall study area. These surveys provided further understanding of the study area in relation to the biodiversity to inform the baseline description of the project's receiving environment.

2.1.2 The onshore export cable route (ECR) connects the transition joint bays (TJBs) at the Landfall site at Shanganagh Cliffs to the proposed onshore substation (OSS) in Jamestown. For ease of reference in the EIAR technical chapters, the onshore ECR has been split into seven sectors. These sectors have been included to aid the reader identify features identified in the EIAR along the onshore ECR.



Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Operations and Maintenace Base (O&M Base) 500 m Study Area

Export Cable Route (ECR) Sector

- Sector 1
- Sector 2
- Sector 3
- Sector 4
- Sector 5
- Sector 6
- Sector 7

DRAWING STATUS

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Study Area

DRAWING NUMBER: 1

PAGE NUMBER: 1 of 1

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0 0.1 0.3 0.4 0.5 Miles

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SCALE 1:33,000 PLOT SIZE A3

DATUM IRENET95 VERTICAL REF. CDN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

2.2 Study areas

2.2.1 The overall study area for onshore biodiversity is shown on Figure 1 and comprised the following areas:

2.2.2 Additional study areas relating to onshore biodiversity included several survey locations across the various watercourses that run close to the OES (refer to the Aquatic Ecology Report, provided in Annex 3). Some of these locations were slightly outside of the overall study area but were chosen to describe baseline conditions downstream of the proposed OES, thus providing a fuller picture of aquatic ecology within the ZoI for aquatic ecological features.

- The proposed OES which comprises the proposed Landfall Site (including a temporary construction compound), the onshore ECR (Sectors 1 – 7 and 50 m buffer either side) the proposed OSS, the onshore grid connection route to the existing Carrickmines substation and Temporary Construction Compounds (TCCs) at Clifton Park and Leopardstown; and
- The proposed O&M Base, that will be located adjacent to, and on St. Michael's Pier in Dún Laoghaire Harbour, which includes a new pontoon fixed to the existing harbour wall. This area includes the proposed site of the O&M Base on Dún Laoghaire Harbour, plus the pontoon adjacent to the harbour wall and a 500m buffer around these areas.

2.2.3 Additional areas of study relating to onshore biodiversity included several survey locations across the various watercourses that run close to the Onshore OES (refer to the Aquatic Ecology Report, provided in Annex 3).

2.2.4 Grid squares are used to provide study areas as species records from the National Biodiversity Centre (NBDC) are provided as grid squares rather than as point data and are detailed in the sections below.

OES study area

2.2.5 The OES study area comprises the area within which the proposed onshore works area relating to the OES and described in Section 1.2 will be located (the EIA Project boundary), alongside an extended area (buffer). The buffer has been set at 50 m (50 m around the OES), which is the limit to which direct and indirect effects relating to biodiversity are expected to occur. The TCC areas are also included in the OES study area.

2.2.6 The proposed OES alignment is divided into a total of 7 Sectors along the onshore ECR for reference purposes. The sectors run from the Clifton Park TCC in Sector 1 to the approach to the OSS in Sector 7 and are shown on Figure 1. At the end of Sector 7 is the site of the OSS and grid connection, which is part of the OES study area (the same 50 m either side of the OES boundary applies here).

OES desk study

2.2.7 An updated desk review for species records was conducted on 7th November 2023. This search area comprised 14 No. 1 x 1 km^2 grid squares that include the proposed OES (O2023, O2024, O2123, O2124, O2222, O2223, O2224, O2322, O2323, O2423, O2522, O2523, O2622, O2623), which covered the proposed onshore OES from Shanganagh Cliffs to the OSS and GCP at the existing Carrickmines EirGrid substation and the TCC areas.

2.2.8 The desk study included a search for European designated sites located downstream and/or within 15 km of the onshore OES (the search area). The desk study included a search for nationally and locally designed sites within 2 km or downstream of the onshore OES (i.e., the OES study area).

OES field survey

2.2.9 A 50 m buffer was applied to all aspects of the OES during the habitat surveys. This was deemed reasonable for a detailed habitat survey due to the limited nature of the likely impacts from the construction works and operation from various elements of the OES.

O&M Base study area

2.2.10 The O&M building for the development is proposed to be located at St. Michael's Pier in Dún Laoghaire Harbour. The footprint of the existing O&M building used by DLR Harbour O&M team, and St. Michael's pier were used to develop the design and constitute the EIA project boundary for the O&M Base.

O&M Base desk study

2.2.11 Species records from one 2 x 2 km grid square (O22P) were used to cover the O&M Base. This area covered the proposed O&M Base and a significant amount of the surrounding terrestrial habitats.

2.2.12 The desk study included a search for designated sites within 15 km of the O&M Base (the search area). The desk study included a search for nationally and locally designed sites within 2 km or downstream of the O&M Base (i.e., the O&M Base study area).

O&M Base field survey

2.2.13 Given the nature of the proposed development of the O&M Base a 500 m buffer was considered reasonable for a detailed habitat survey (i.e., the O&M Base survey area).

2.3 Data sources

Desktop study

2.3.1 A desktop study was carried out to collate the available ecological information in the overall study area. Data sources used during the desk study include:

- National Parks and Wildlife Service (NPWS) online resources were accessed for information on sites with a statutory designation for nature conservation, specifically European sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)), Ramsar sites and Natural heritage Areas (NHAs), and other sites such as proposed Natural Heritage Areas (pNHA) that are not legally designated but are identified as being of conservation interest, and protected habitats and species as defined under the NPWS Checklist of Protected and Threatened Species in Ireland (Nelson et al., 2019).
- National Biodiversity Data Centre (NBDC) (NBDC, n.d.) online resource was accessed for information on protected habitats and species (Nelson et al., 2019).
- Records of Annex I habitats, and Annex II and IV species of the Habitats Directive (92/43/EEC) using Article 12 and Article 17 reports.
- Habitats listed under the DLRCC County Development Plan.
- Records of Annex I birds from the Birds Directive (2009/147/EC)[2].
- Environmental Protection Agency (EPA) Maps (EPA Maps, 2023) were accessed for environmental information, such as surface water features, relevant to the assessment of likely significant effects.
- The BirdWatch Ireland website (BirdWatch Ireland, n.d.) was accessed for information on birds of conservation concern. Birds of Conservation Concern in Ireland (BoCCI), published by BirdWatch Ireland and the Royal Society for the Protection of Birds (RSPB) Northern Ireland (NI), is a list of priority bird species for conservation action on the island of Ireland. The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists; Red, Amber and Green; based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, Amber List are of medium conservation concern and Green List are not considered threatened.
- The protection of mammals is evaluated using one or more of the following documents; Wildlife Acts 1976 – 2018 (ISB, n.d.), the Red List of Terrestrial Mammals (Marnell et al.,

[2] Annex B - Bird species' status and trends report format (Article 12) for the period 2013 – 2018. https://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envxztxxq/IE_birds_reports_20191031-130157.xml&conv=612&source=remote#A003_W [Accessed: December 2023].

2019), and Annexes of the EU Habitats Directive 92/43/EEC12 (European Commission, n.d.).

- Where available and relevant, ecology reports prepared for other projects within the overall study area were reviewed. These included the following:
  - Biodiversity Plan and Cherrywood Strategic Development Zone (SDZ) Development Area 5 Ecological Appraisal report for Cherrywood Strategic Development Zone (SDZ) (DLRCC, 2023);
  - The biodiversity chapter of the EIAR for Glenamuck District Distributor Road (planning application ref.: HA06D.303945) (Openfield ecological services, 2019);
  - Plans relating to Shanganagh Wastewater Treatment Facility (SWWTF) (planning application ref.: D23A/0706);
  - The biodiversity chapter of the EIAR relating to Priorsland Cherrywood SHD (planning application ref.: ABP31332222) (Altemar Ltd., 2022);
  - Plans for DLRCC Harbour plans for car parking relating (planning application ref.: D12A/0192); and
  - An EcIA relating to Beckett Road (planning application ref.: DZ21A/1017) and located within the Cherrywood SDZ: (Scott Cawley, 2022).

Field surveys

2.3.2 Field surveys were carried out across the OES and O&M Base study areas described in Section 2.2. Areas beyond this initial study areas were surveyed where habitats of higher value were noted.

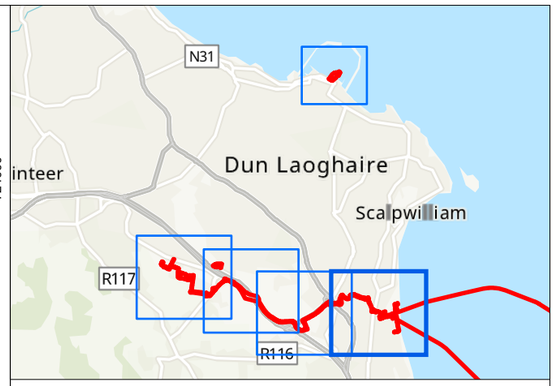
2.3.3 The dates and names of the surveys are provided in the survey metadata, which is provided in Annex 2.

2.3.4 The approach to the field surveys is based on accepted standard practice and methods. Habitats within the study areas were classified after 'A Guide to Habitats in Ireland' (Fossitt, 2000) and Annex I habitats as defined be European Commission (EC) (2013) 'Interpretation Manual of European Union Habitats'. The dominant plant species present in each habitat type were recorded during the field surveys and this is considered sufficient to allow accurate classification of the habitats present.

2.3.5 The study areas were also appraised for its suitability to support Annex II and IV species (Habitats Directive) flora and fauna such as amphibians, reptiles, badger, bats, and other notable species and Annex I birds (as defined by Nelson et al., 2019). Incidental sightings of birds, mammals and amphibians were noted during the habitat survey and the habitats within the study areas were evaluated for their potential to support protected species.

2.3.6 The study areas were appraised for its suitability to support birds listed on Annex I of the Birds Directive and Birds of Conservation Concern in Ireland (BoCCI).

2.3.7 Trees or structures suitable for bat roosts and potential suitable bat foraging were noted where they occurred within the study areas. Trees or structures within this area were visually inspected from the ground level for Potential Roost Features (PRF) where it was considered likely that they may be suitable for use by roosting bats. The tree roost potential can be seen in Figure 2 to Figure 6 below.



- Application Site Boundary
- Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

- TJB
- Temporary Trenchless Crossing Compound
- Underground Joint Bay
- Onshore Export Cable Route (Trenchless)
- Onshore Export Cable Route (Trenched)
- Temporary Construction Compound (TCC)
- Landfall TJB Area

Export Cable Route (ECR) Sector

- Sector 1
- Sector 2
- Sector 3

Tree Roost Potential

- High
- Moderate
- Low

DRAWING STATUS

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Trees and Bat Roosting Potential

DRAWING NUMBER: **Figure 2**

PAGE NUMBER: **1 of 1**

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0 125 250 375 500 Feet

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SCALE 1:8,000 PLOT SIZE A3

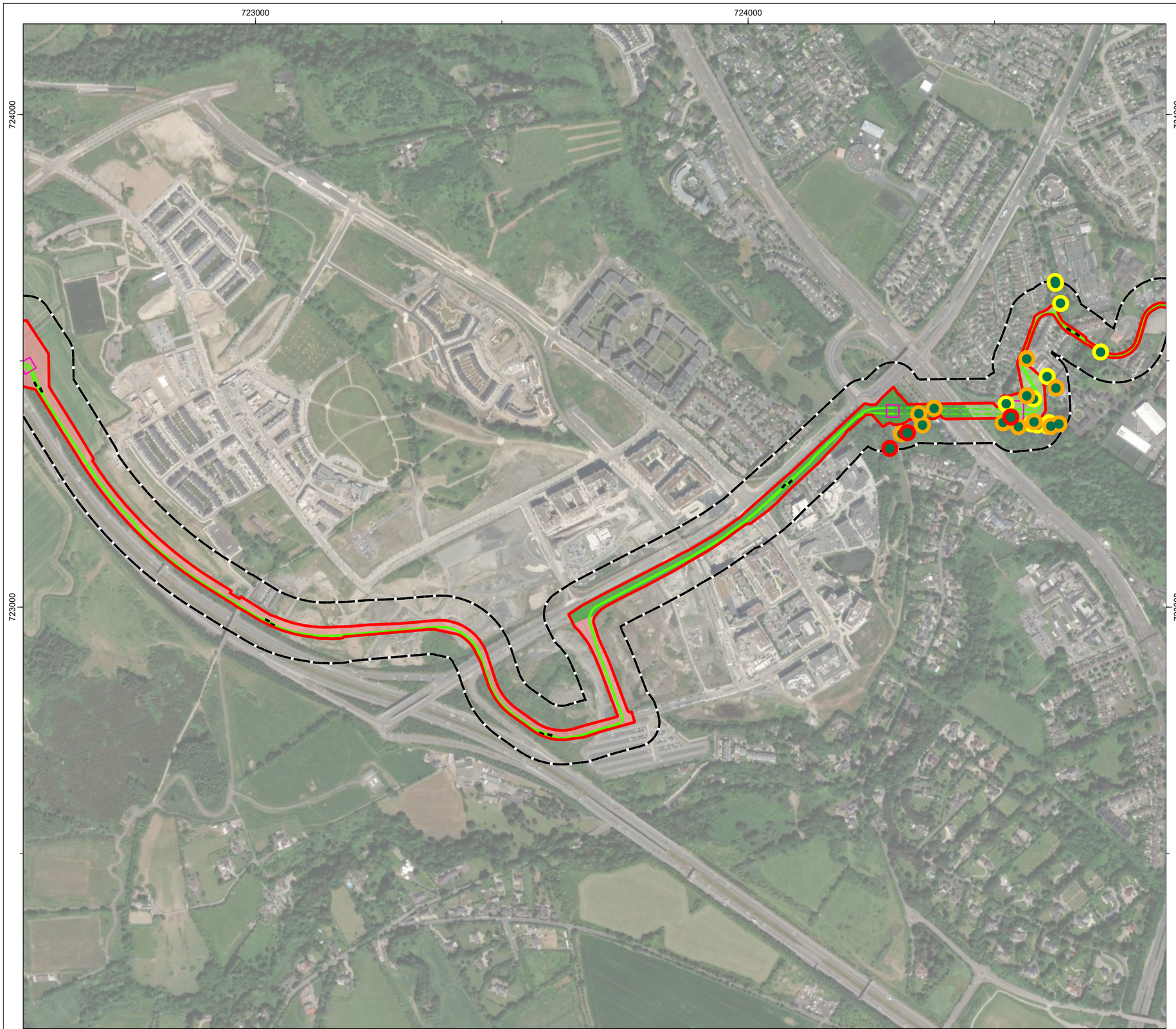
DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW

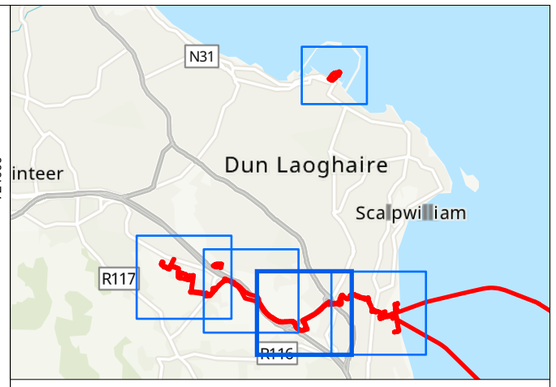
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Boundary

Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

Temporary Trenchless Crossing Compound

Underground Joint Bay

Onshore Export Cable Route (Trenchless)

Onshore Export Cable Route (Trenched)

Export Cable Route (ECR) Sector

Sector 2

Sector 3

Sector 4

Tree Roost Potential

High

Moderate

Low

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MAP NOTES / DATA SOURCES:
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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity:
Trees and Bat Roosting Potential

DRAWING NUMBER: **Figure 3**

PAGE NUMBER: **1 of 1**

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0 125 250 375 500 Feet

N GRID NORTH

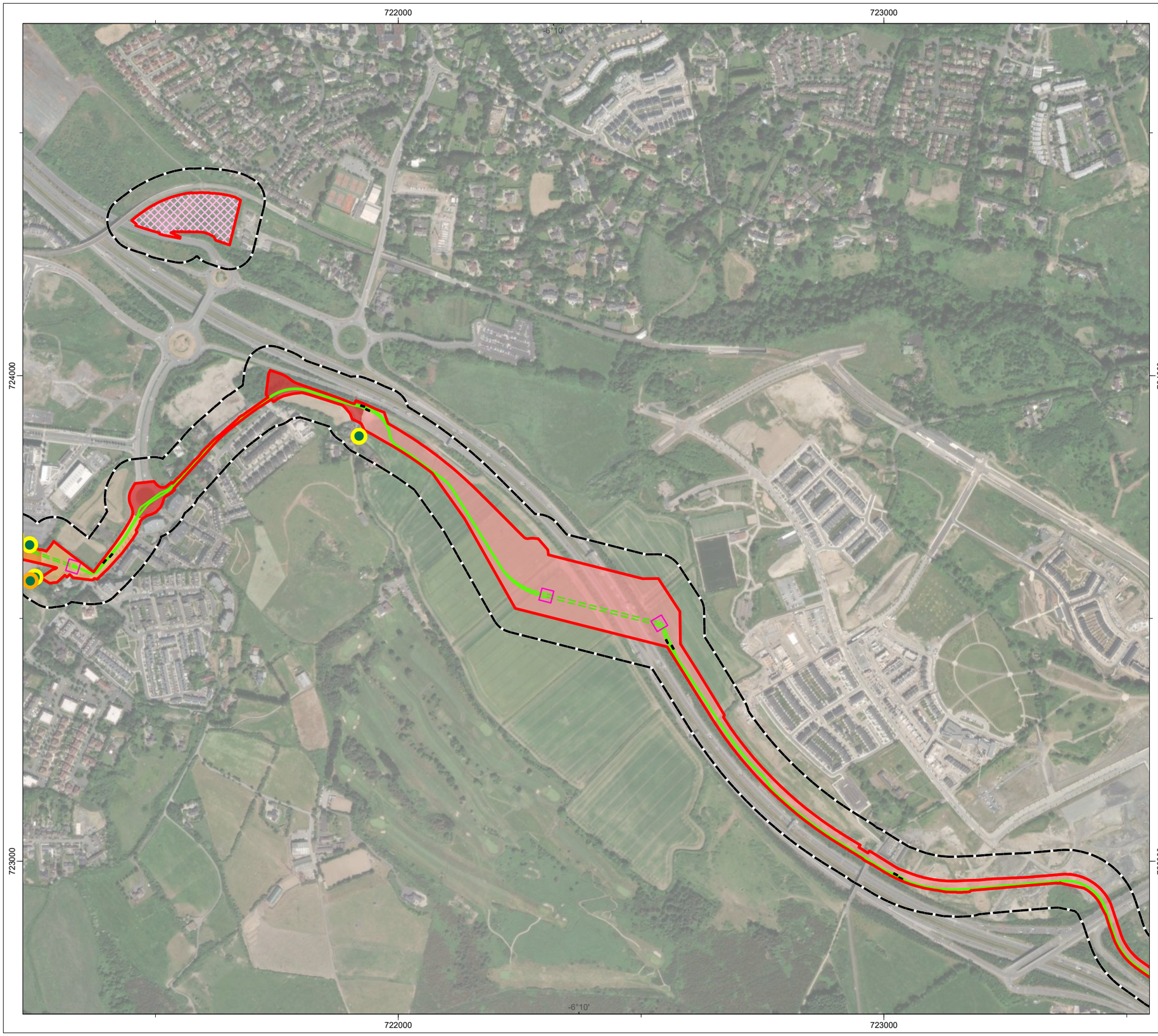
SCALE 1:8,000 PLOT SIZE A3

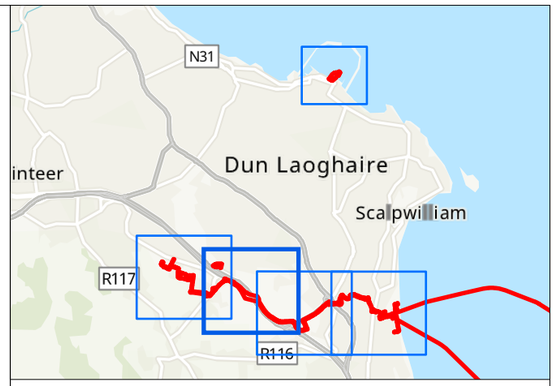
DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array
Generation for generations
Kish Offshore Wind Limited - Bray Offshore Wind Limited





- Application Site Boundary
- Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

- Temporary Trenchless Crossing Compound
- Underground Joint Bay
- Onshore Export Cable Route (Trenchless)
- Onshore Export Cable Route (Trenched)
- Temporary Construction Compound (TCC)

Export Cable Route (ECR) Sector

- Sector 4
- Sector 5
- Sector 6
- Sector 7

Tree Roost Potential

- Moderate
- Low

DRAWING STATUS

PUBLIC

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MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity:
Trees and Bat Roosting Potential

DRAWING NUMBER: **Figure 4**

PAGE NUMBER: **1 of 1**

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0 125 250 375 500 Feet

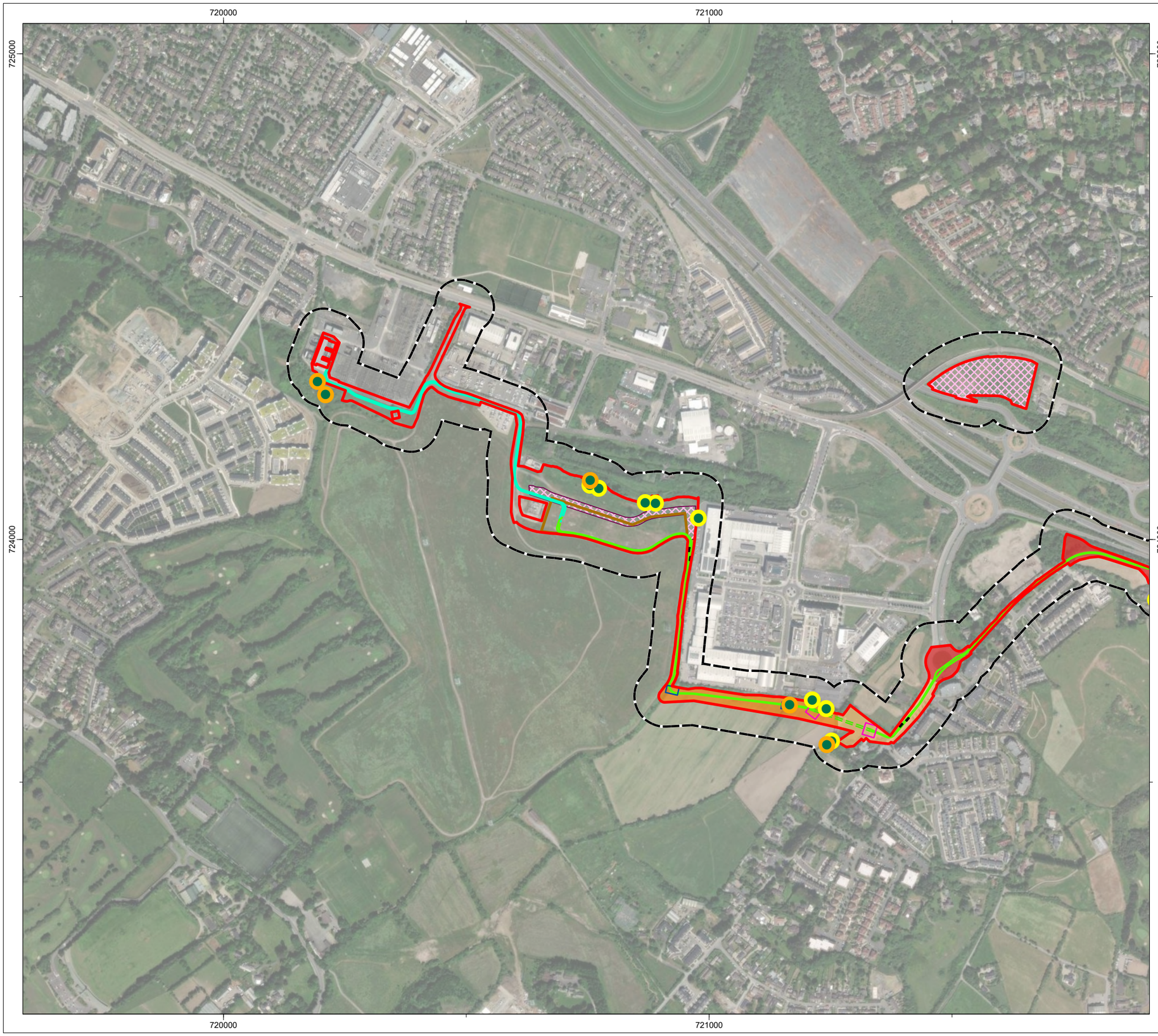
N GRID NORTH

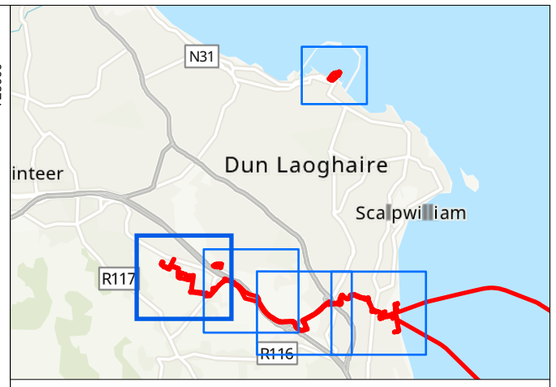
SCALE	1:8,000	PLOT SIZE	A3
DATUM	IRENET95	VERTICAL REF	CDN/LAT/MLLW
PRJ	IRENET95 Irish Transverse Mercator		

SLR

Dublin Array
Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





- Application Site Boundary
- Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

- Onshore ECR Watercourse Crossing (trenched)
- Temporary Trenchless Crossing Compound
- Underground Joint Bay
- Onshore Export Cable Route (Trenchless)
- Onshore Export Cable Route (Trenched)
- Grid Connection Cable
- Onshore Substation (OSS) Boundary
- Temporary Construction Compound (TCC)

Export Cable Route (ECR) Sector

- Sector 5
- Sector 6
- Sector 7

Tree Roost Potential

- Moderate
- Low

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity:
Trees and Bat Roosting Potential

DRAWING NUMBER: **Figure 5**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
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02	2025-02-06	PUBLIC	JK	CM	AM

0 50 100 150 200 Meters

0 125 250 375 500 Feet

N GRID NORTH

SCALE 1:8,000 PLOT SIZE A3

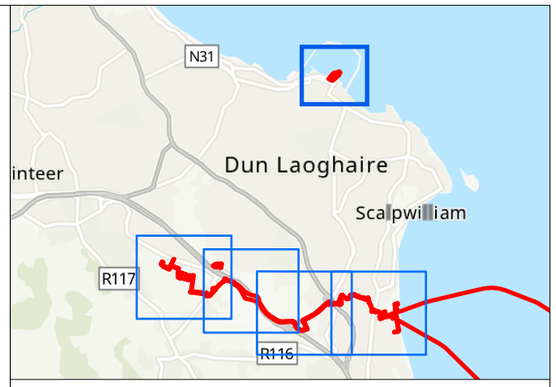
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array
Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited



Application Site Boundary

Operations and Maintenace Base (O&M Base) 500 m Buffer

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

Maxar, Microsoft, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS ©Ordnance Survey Ireland 2023 © Tailte Eireann. (CYSL50270365) Not to be used for Navigation.

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity:
Trees and Bat Roosting Potential

DRAWING NUMBER: **Figure 6**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-12	DRAFT	JK	SW	AE
02	2025-02-06	PUBLIC	JK	CM	AM

0 50 100 150 200 Meters

0 125 250 375 500 Feet

N GRID NORTH

SCALE 1:5,500 PLOT SIZE A3

DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

2.3.8 Potential roosts/roost features and bat foraging habitat were evaluated using the criteria set out in the Bat Conservation Trust (BCT) guidelines (Collins, 2026; Collins, 2023) (detailed further in Table 1).

Table 1 BCT categories of habitat suitability for roosting, commuting and foraging bats

Suitability	Roosting habitats in structures or trees[3]	Potential flight-paths and foraging habitats[3]
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e., a complete absence of crevices/suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e., no habitats that provide continuous lines of shade/protection for flight-lines or generate/shelter insect populations available to foraging bats).
Negligible	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flightpaths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis by larger numbers of bats (i.e., unlikely to be suitable for maternity and not a classic cool/stable hibernation site but could be used by individual hibernating bats). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the characterisation described in this table is made irrespective of species	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used

[3] Adapted from Table 4.1 (Collins, 2016).

Suitability	Roosting habitats in structures or trees[3]	Potential flight-paths and foraging habitats[3]
	conservation status, which is established after presence is confirmed).	by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roosts, e.g., maternity or classic cool/stable hibernation site.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flightpaths such a river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.3.9 All trees identified with moderate potential for roosting bats, noted within the OES field survey area, that were considered likely to be impacted by the proposed development underwent bat presence/absence surveys.

2.3.10 These surveys were conducted following the Collins (2016) BCT guidance. The surveys started no later than 15 minutes prior to sunset and ended no later than 1 hour 30 minutes after sunset with surveyors holding Anabat Swift or Elekon Batlogger M bat detectors whilst visibly monitoring Potential Roosting Features (PRFs) on the tree.

2.3.11 Invasive species were noted where present. For the purposes of this report “invasive species” are those which are listed in Part 1 and Part 2 of the Third Schedule within the Habitats Directive.

2.3.12 Aquatic ecology was appraised to assess whether nearby watercourses may support a range of notable species including otter, white-clawed crayfish, lamprey, salmonids including Atlantic salmon *Salmo salar* and brown trout *Salmo trutta*, and a range of survey techniques were undertaken including eDNA, Q-sampling, and otter surveys (Triturus, 2023). The methodology of the aquatic ecology surveys is detailed fully in the Aquatic Ecology Report (provided in Annex 3). A total of 14 survey sampling locations were undertaken (detailed in Table 2).

Table 2 Aquatic survey sites

Site no.	Watercourse	EPA code	Location	Alternative name	X (ITM	Y (ITM)
A1	Unnamed stream	n/a	Jamestown	n/a	720615	724202
A2	Barnacullia river	10899	Jamestown	Ballyogan Stream	720891	724089
A3	Jamestown Stream	10J01	Carrickmines Great	n/a	720922	723686
A4	Glenamuck North Stream	10G19	Carrickmines Great	Golf Stream	721167	723658
A5	Unnamed stream	n/a	Carrickmines Great	n/a	721259	723629
A6*	Carrickmines Stream	10C04	Carrickmines Little	n/a	721772	724212
A6b	Carrickmines Stream	10C04	Carrickmines Park & Ride	n/a	722200	724024
A7	Laughanstown Stream	10L07	Carrickmines Great	n/a	722386	723149
A7b	Laughanstown Stream	10L07	Carrickmines Great	n/a	722481	723921
A8*	Carrickmines Stream	10C04	Cherrywood Park	Loughlinstown River North	724338	723387
A9*	Shanganagh River	10S01	Shanganagh Wood	n/a	725587	723085
B1	Kill-O-The-Grange River	10K02	R118 road culvert	Deansgrange River	724617	723919
B2	Kill-O-The-Grange River	10K02	Glencar Lawn	Deansgrange River	724998	723617
B3*	Kill-O-The-Grange River	10K02	Achill Road	Deansgrange River	725167	723512

*eDNA sampling for Atlantic salmon, brown/sea trout, European eel *Anguilla anguilla* & lamprey *Lamptetra* sp.

Limitations

Desktop study

2.3.13 Desktop study data is unlikely to be exhaustive especially in respect of species, as it is reliant on existing records, and is intended mainly to set a context for the field surveys. It is therefore possible that important habitats or protected species not identified during the data search do occur within the vicinity of the study areas but have not been previously recorded. Interpretation of maps and aerial photography has been carried out using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field survey areas.

Field surveys

2.3.14 There are a number of locations within the overall study area where it was not possible to access due to lack of land access or health and safety restrictions/issues. These areas are mostly within the Cherrywood SDZ. Where access was not possible, the field surveys area was viewed where possible from a distance, using binoculars and available up to date aerial photography and effort made to classify habitats present. It is considered that habitats could be accurately mapped using this method. However, there was a limitation that not all plant species could be identified. This is not considered to pose a significant constraint, however, as species were likely similar to those in other, accessible areas.

2.3.15 The lack of access to some locations within the overall study area is not considered to be a significant limitation to providing an accurate biodiversity baseline. This is due to the urban location of the proposed underground OES within habitats that are commonly occurring and widespread in distribution throughout Ireland. Land access was chiefly restricted to areas within Cherrywood SDZ that are currently being developed or will be developed in the near future; and therefore, has been subject of previous analyses and will be subject to future development under extant approvals.

2.3.16 Bat roost presence/absence surveys were planned for trees T24 and T25, located within the grounds of Eurofound in Sector 2. However, due to a lack of nocturnal access into this area, only one bat survey within the Eurofound property was possible and this was limited to late October 2023. This was due to the prior lack of nocturnal access to the site after 19:00. As such, the decision was made to delay the survey until later in the year, when sunset was earlier; the potential presence of a maternity or summer roost may have been missed as a result. Furthermore, due to the same access limitation, it was not possible to conduct the final 30 minutes of the survey once the 19:00 deadline was reached. Therefore, it is possible that later emerging bats were missed. These limitations have been mitigated through the provision of supplementary static detector data in September 2023. This supplementary data provided greater insight into the species of bats in the Eurofound site. Although it does not provide data on roosts directly. These limitations may impact the assessment, preventing a full assessment of the site for bats to be concluded.

2.3.17 No specific species surveys were conducted for amphibians as no suitable waterbodies were located within the overall study area. Rivers and streams may provide some suitability for common frogs and potential terrestrial habitats were search (i.e., under potential refugia areas) to search for incidental sightings of amphibians across the site.

2.3.18 In accordance with CIEEM's Advice Note on the 'Lifespan of Ecological Reports and Surveys' (CIEEM, 2019), the details of this report will remain valid for a period of 18-months from the date of the survey (i.e., until May 2025).

2.3.19 The community gardens within Sector 1 were fenced off with no access at the time of survey. However, it could be seen and photographed from the fence line. As such, this is not considered to impair the assessment.

2.4 Relevant legislation and policy

2.4.1 This section details the relevant legislation, policy and guidance used within the assessment.

International legislation and policy

- UN Convention on Biological Diversity (CBD); and
- The Ramsar Convention on Wetlands of International Importance.

European legislation and policy

- EU Habitats Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) (as amended) (the Habitats Directive);
- EU Birds Directive on the conservation of wild birds (2009/147/EC) (as amended);
- The Berne Convention on the Conservation of European Wildlife and Natural Habitats;
- The Bonn Convention on the Conservation of Migratory Species of Wild Animals;
- EU Water Framework Directive establishing a framework for Community action in the field of water policy (2000/60/EC) (as amended);
- EU Environmental Liability Directive (2004/35/EC);
- EU EIA Directive on the assessment of the effects of certain public and private projects on the environment (2011/92/EU) (as amended);
- EU Biodiversity Strategy 2020;
- Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, as amended, together with Commission Implementing Regulation (EU) 2016/1141 and Implementing Regulation (EU) 2019/1262; and
- EU Nature Restoration Law 2023 2022/0195(COD).

National legislation and policy

- The Wildlife Acts 1976, as amended;
- S.I. No. 477/2011 - Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations;
- S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, as amended;
- S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations;

- European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 to 2018;
- The Flora (Protection) Order 2022;
- The Heritage Act, 2018 (as amended);
- Planning and Development Act, 2000 (as amended);
- Project Ireland 2040;
- National Heritage Plan 2030;
- Ireland's 4th National Biodiversity Action Plan 2023–2030;
- European Communities (Planning and Development) (Environmental Impact Assessment (EIA)) Regulations 2018, as amended;
- European Communities (Water policy) Regulations, 2003, as amended; and
- European Communities Environmental Objectives (Surface Waters) Regulations 2009;

Local policy

2.4.2 The relevant component of chapters from DLRCC County Development Plans (CDP) (see Annex 1) have also been considered including:

- DLRCC County Development Plan 2022 - 2028;
- DLRCC Biodiversity Action Plan 2021-2025; and
- Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region (EMRA 2019).

Guidance

2.4.3 The relevant guidance has been followed:

- 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).
- 'Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority' (NRA, 2009a.);
- 'Ecological Surveying Techniques for Protecting Flora and Fauna during the Planning of National Road Schemes' (NRA, n.d.);
- 'Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes' (NRA, 2009b);
- 'Surveying Badgers' (Harris et al., 1989)

- ‘Guidelines for Ecological Impact Assessment in the UK and Ireland’ (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018);
- Guidance Note 08/23: ‘Bats and Artificial Lighting at Night’ (Institute of Lighting Professionals (ILP) and Bat Conservation Trust (BCT), 2023);
- ‘Bat Surveys for Professional Ecologists – Good Practice Guidelines’ (Collins 2016; and Collins, 2023);
- ‘A Guide to Habitats in Ireland’ (Fossitt, 2000);
- ‘The Status of Ireland’s Breeding Seabirds’: Birds Directive Article 12 Reporting 2013 – 2018 (Cummins et al., 2019);
- ‘The Status of EU Protected Habitats and Species in Ireland’ (National Parks and Wildlife Service (NPWS), 2019);
- ‘Common Standards Monitoring Guidance for Reptiles and Amphibians’ (Joint Nature Conservation Committee (JNCC), 2004);
- ‘UK BAP Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation’ (Cresswell et al, 2012); and
- ‘New Atlas of the British and Irish Flora: An Atlas of the Vascular Plants of Britain, Ireland, The Isle of Man and the Channel Islands’ (Preston et al., 2022).

2.4.4 As required under The European Communities (Birds and Natural Habitats Regulations 2015 (S. I. No. 477 of 2011) transpose the Habitats Directive and the Birds Directive. The 2011 Regulations were amended by S.I. No. 355 of 2015. An assessment of the changes in the physical marine environment, as a result of the Dublin Array, on Natura 2000 sites and their supporting features is presented in the NIS (GoBe, 2024).

2.4.5 Where specific Irish guidance is not available given the infancy of offshore wind in Ireland, a number of other guidance documents specific to the consideration of onshore biodiversity are available from jurisdictions/countries with established offshore renewable energy sectors where comprehensive guidance has been developed. The principal guidance documents for this assessment are:

- ‘Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects’ (Barnes, 2017);
- ‘Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects’ (Scally et al., 2018);
- ‘Ecological Monitoring and Mitigation Policies and Practices at Offshore Wind Installations in the United States and Europe’ (Allen, 2020);

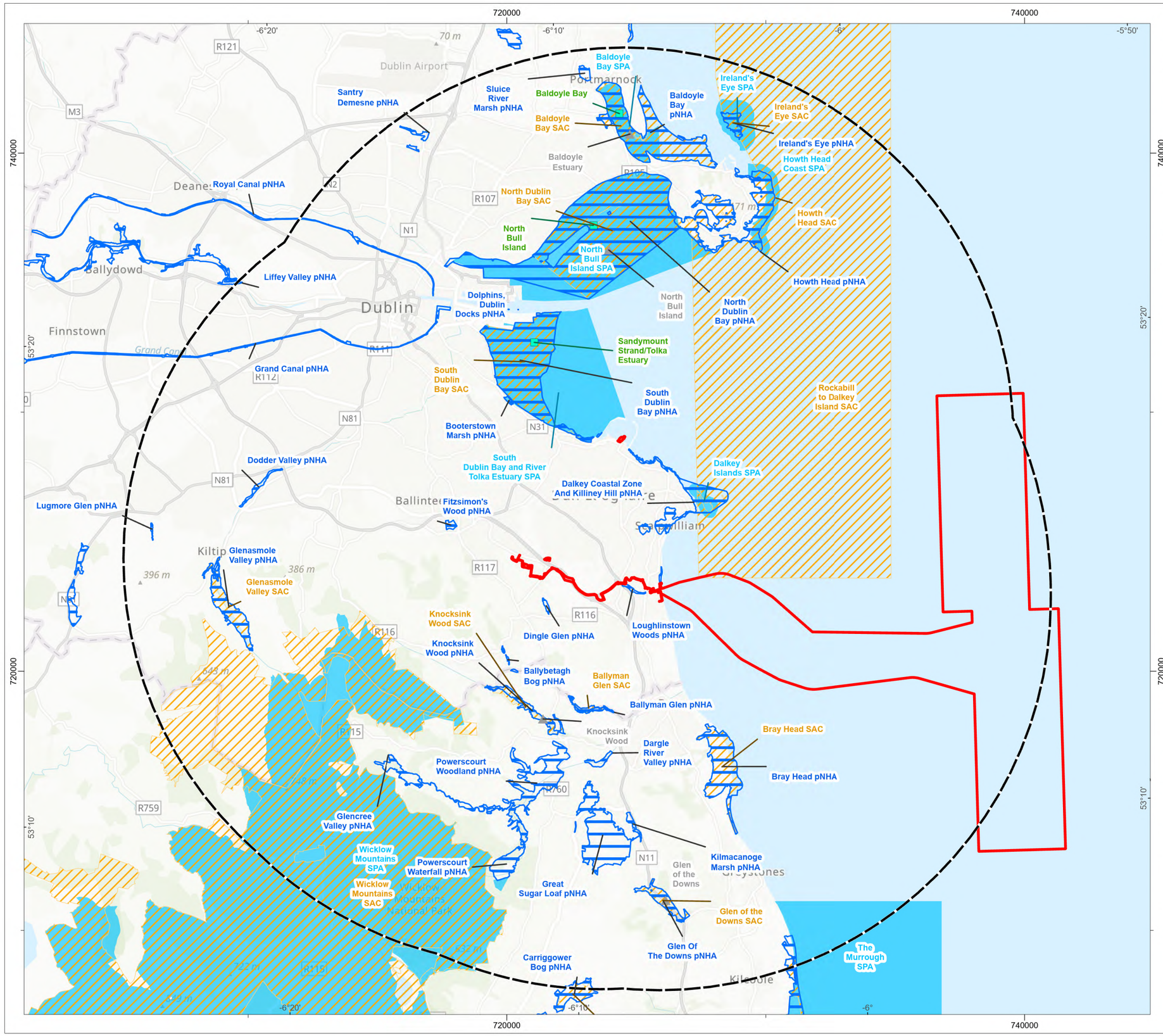
- ‘Summary Report: Best Management Practices Workshop for Atlantic Offshore Wind Facilities and Marine Protected Species’ (Bureau of Ocean Energy Management (BOEM), 2018);
- ‘Assessing Significance of Impacts from Onshore Wind Farms with Designated Areas’ (Scottish Natural Heritage, 2006).

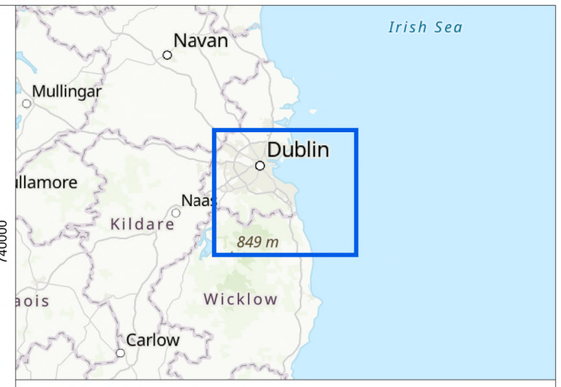
3 Receiving environment

3.1.1 This section sets out the baseline conditions for the ecological features and biodiversity within the overall study area using the findings of the desk study and field survey as required by the Directive.

3.2 Designated sites

3.2.1 The designated sites within located within a 15 km radius can be seen in Figure 7 to Figure 9 below.





- Application Site Boundary
- Onshore Electrical System (OES) and Operations and Maintenace Base (O&M Base) 15 km Buffer
- Special Protected Area (SPA)
- Special Area Conservation (SAC)
- Proposed Natural Heritage Area (pNHA)
- RAMSAR Wetland Site
- Nature Reserve

Note: No NHA's within Study Area

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Designated Sites

DRAWING NUMBER: **Figure: 7**

PAGE NUMBER: **1 of 1**

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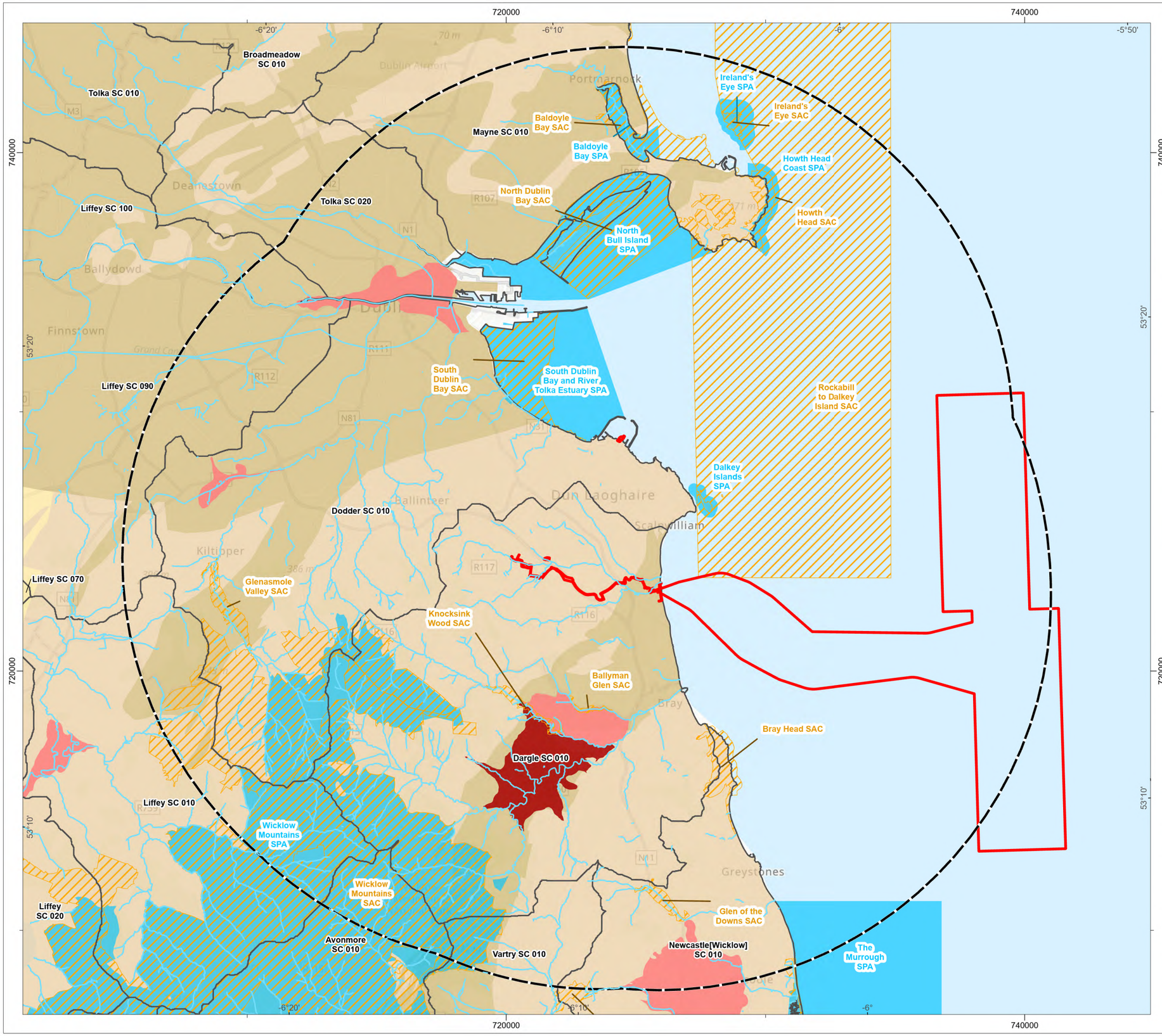
02	2025-02-06	PUBLIC	JK	CM	AM

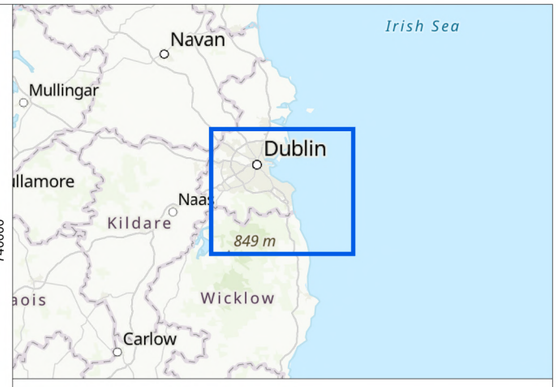
0 1.25 2.5 3.75 5 Kilometers
0 0.5 1 1.5 2 Miles

SCALE 1:150,000 PLOT SIZE A3
DATUM IRENET95 VERTICAL REF CD/LAT/MLLW
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array
Generation for generations
Kish Offshore Wind Limited - Bray Offshore Wind Limited





- Application Site Boundary
- Onshore Electrical System (OES) and Operations and Maintenace Base (O&M Base) 15 km Buffer
- Special Protected Area (SPA)
- Special Area Conservation (SAC)
- Sub-Catchment
- Watercourse

Gravel Aquifer

- Locally important gravel aquifer
- Regionally important gravel aquifer

Bedrock Aquifer

- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Unclassified

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: SPA and SAC with Hydrological Connections

DRAWING NUMBER: **Figure: 8**

PAGE NUMBER: **1 of 1**

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02	2025-02-06	PUBLIC	JK	CF	AM

0 1.25 2.5 3.75 5 Kilometers
0 0.5 1 1.5 2 Miles

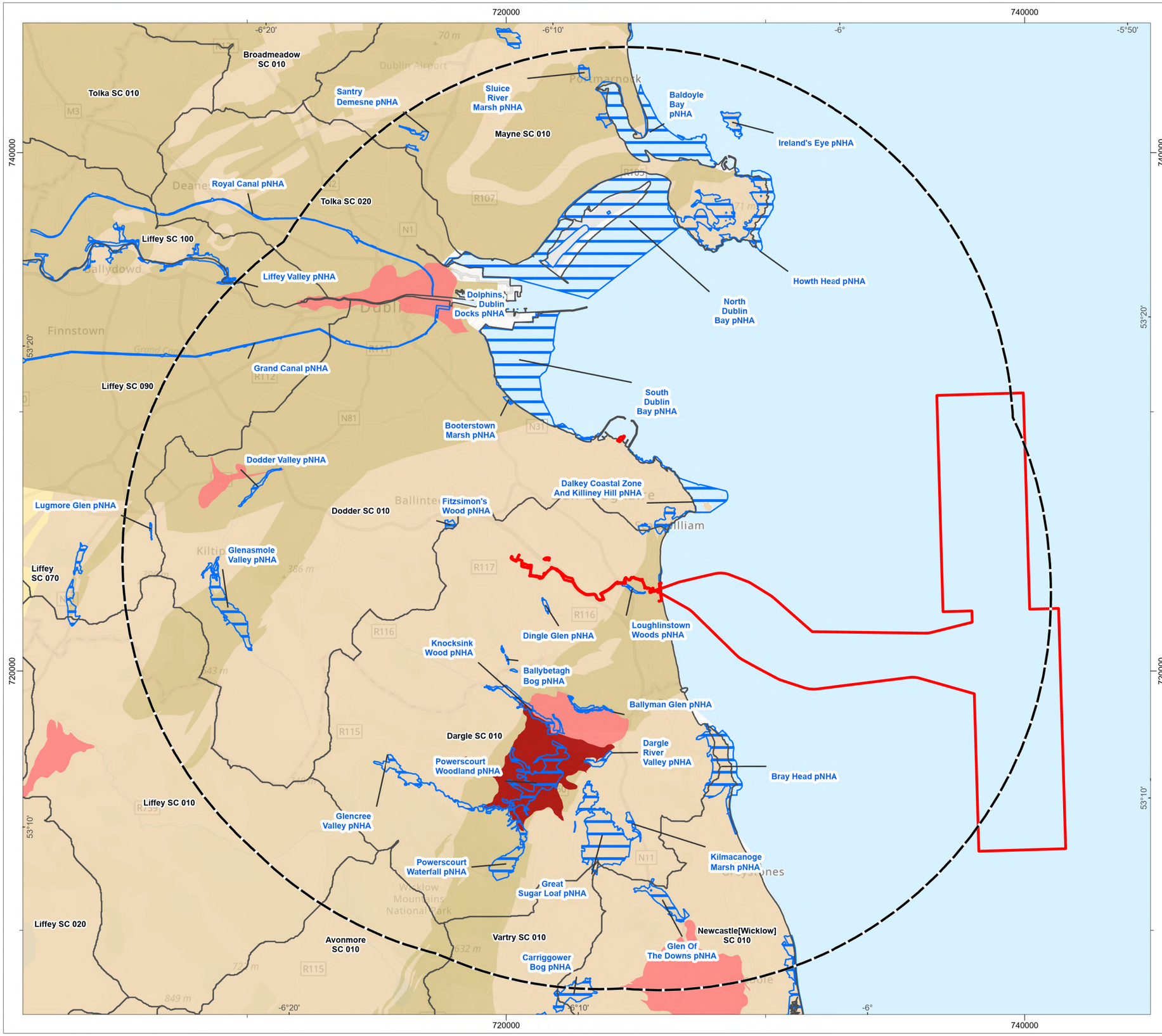
N GRID NORTH

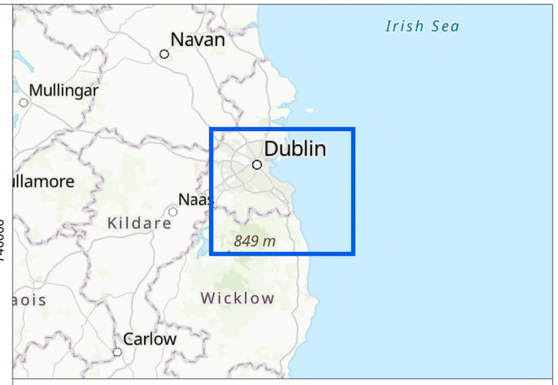
SCALE 1:150,000 PLOT SIZE A3
DATUM IRENET95 VERTICAL REF LDN/LAT/MLLW
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





- Application Site Boundary
- Onshore Electrical System (OES) and Operations and Maintenace Base (O&M Base) 15 km Buffer
- Proposed Natural Heritage Area (pNHA)
- Sub-Catchment

Gravel Aquifer

- Locally Important Gravel Aquifer
- Regionally Important Gravel Aquifer

Bedrock Aquifers

- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Unclassified

Note: No NHA's within Study Area

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: NAH and pNHA with Hydrological Connections

DRAWING NUMBER: **Figure: 9**

PAGE NUMBER: **1 of 1**

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02	2025-02-06	PUBLIC	JK	CM	AM

0 1.25 2.5 3.75 5 Kilometers
0 0.5 1 1.5 2 Miles

N GRID NORTH

SCALE 1:150,000 PLOT SIZE A3
DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Internationally designated sites for nature conservation

OES

3.2.2 A total of 16 Natura 2000 sites were located downstream and/or within 15 km of a central point along the OES (approximate ITM coordinates 723208 723369). Table 3 summarises the European sites identified within 15 km of the proposed OES.

3.2.3 There are no European sites within the OES study area (as detailed in Section 2). The closest European sites comprise Rockabill to Dalkey Island SAC [003000], Ballyman Glen SAC [000713], and Dalkey Islands SPA [004172].

3.2.4 The DLRCC CDP includes Policy Objectives GIB18 and GIB19, which aim to protect European designated sites such as those listed in Table 3.

3.2.5 All European designated sites are assessed as important on an **international level.**

Table 3 Designated sites within 15 km and downstream of the closest point of the OES

Site name	Site code	Distance to the closest point of the boundary of the OES (km)	Qualifying interests
SACs			
Rockabill to Dalkey Island SAC	003000	1.5	**Habitats** ▪ 1170 Reefs **Species** ▪ 1351 Harbour Porpoise *Phocoena phocoena*
Ballyman Glen SAC	000713	3.9	**Habitats** ▪ 7220 Petrifying springs with tufa formation *Cratoneurion** ▪ 7230 Alkaline fens
Knocksink Wood SAC	000725	4.4	**Habitats** ▪ 7220 Petrifying springs with tufa formation *Cratoneurion** ▪ 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles ▪ 91E0 Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior *Alno-Padion, Alnion incanae*, *Salicion albae**
South Dublin Bay SAC	000210	4.7	**Habitats** ▪ 1140 Mudflats and sandflats not covered by seawater at low tide ▪ 1210 Annual vegetation of drift lines ▪ 1310 Salicornia and other annuals colonising mud and sand

Site name	Site code	Distance to the closest point of the boundary of the OES (km)	Qualifying interests
			▪ 2110 Embryonic shifting dunes
Bray Head SAC	000714	5.1	**Habitats** ▪ 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ 4030 European dry heaths
Wicklow Mountains SAC	002122	5.6	**Habitats** ▪ 3110 Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae* ▪ 3160 Natural dystrophic lakes and ponds ▪ 4010 Northern Atlantic wet heaths with Erica tetralix ▪ 4030 European dry heaths ▪ 4060 Alpine and Boreal heaths ▪ 6130 Calaminarian grasslands of the Violetalia calaminariae ▪ 6230 Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* ▪ 7130 Blanket bogs (* if active bog) ▪ 8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) ▪ 8210 Calcareous rocky slopes with chasmophytic vegetation ▪ 8220 Siliceous rocky slopes with chasmophytic vegetation ▪ 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles **Species** ▪ 1355 Otter *Lutra lutra*
North Dublin Bay SAC	000206	10.0	**Habitats** ▪ 1140 Mudflats and sandflats not covered by seawater at low tide ▪ 1210 Annual vegetation of drift lines ▪ 1310 Salicornia and other annuals colonising mud and sand ▪ 1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae* ▪ 1410 Mediterranean salt meadows (Juncetalia maritimi)

Site name	Site code	Distance to the closest point of the boundary of the OES (km)	Qualifying interests
			▪ 2110 Embryonic shifting dunes ▪ 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) ▪ 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* ▪ 2190 Humid dune slacks **Species** ▪ 1395 Petalwort *Petalophyllum ralfsii*
Glen of the Downs SAC	000719	10.9	**Habitats** ▪ 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles
Glenasmole Valley SAC	001209	10.5	**Habitats** ▪ 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates *Festuco-Brometalia* (* important orchid sites) ▪ 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils *Molinion caeruleae* ▪ 7220 Petrifying springs with tufa formation *Cratoneurion**
Howth Head SAC	000202	13.0	**Habitats** ▪ 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ 4030 European dry heaths
The Murrough Wetlands SAC	002249	14.9	**Habitats** ▪ 1210 Annual vegetation of drift lines ▪ 1220 Perennial vegetation of stony banks ▪ 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) ▪ 1410 Mediterranean salt meadows (Juncetalia maritimi) ▪ 7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae ▪ 7230 Alkaline fens
SPAs			
Dalkey Islands SPA	004172	3.2	**Birds** ▪ A192 Roseate Tern *Sterna* dougallii ▪ A193 Common Tern *Sterna hirundo* ▪ A194 Arctic Tern *Sterna paradisaea*

Site name	Site code	Distance to the closest point of the boundary of the OES (km)	Qualifying interests
South Dublin Bay and River Tolka Estuary SPA	004024	4.7	**Birds** ▪ A046 Light-bellied Brent Goose *Branta bernicla hrota* ▪ A130 Oystercatcher *Haematopus ostralegus* ▪ A137 Ringed Plover *Charadrius hiaticula* ▪ A141 Grey Plover *Pluvialis squatarola* ▪ A143 Knot *Calidris canutus* ▪ A144 Sanderling *Calidris alba* ▪ A149 Dunlin *Calidris alpina* ▪ A157 Bar-tailed Godwit *Limosa lapponica* ▪ A162 Redshank *Tringa totanus* ▪ A179 Black-headed Gull *Chroicocephalus ridibundus* ▪ A192 Roseate Tern *Sterna dougallii* ▪ A193 Common Tern *Sterna hirundo* ▪ A194 Arctic Tern *Sterna paradisaea* **Habitats** ▪ Wetlands
Wicklow Mountains SPA	004040	5.9	**Birds** ▪ A098 Merlin *Falco columbarius* ▪ A103 Peregrine *Falco peregrinus*
North Bull Island SPA	004006	10.0	**Birds** ▪ A046 Light-bellied Brent Goose Branta bernicla hrota ▪ A048 Shelduck *Tadorna tadorna* ▪ A052 Teal *Anas crECRa* ▪ A054 Pintail *Anas acuta* ▪ A056 Shoveler *Anas clypeata* ▪ A130 Oystercatcher *Haematopus ostralegus* ▪ A140 Golden Plover *Pluvialis apricaria* ▪ A141 Grey Plover *Pluvialis squatarola* ▪ A143 Knot *Calidris canutus* ▪ A144 Sanderling *Calidris alba* ▪ A149 Dunlin *Calidris alpina* ▪ A156 Black-tailed Godwit *Limosa limosa* ▪ A157 Bar-tailed Godwit *Limosa lapponica*

Site name	Site code	Distance to the closest point of the boundary of the OES (km)	Qualifying interests
			▪ A160 Curlew *Numenius arquata* ▪ A162 Redshank *Tringa totanus* ▪ A169 Turnstone *Arenaria interpres* ▪ A179 Black-headed Gull *Chroicocephalus ridibundus* **Habitats** ▪ Wetlands
Howth Head Coast SPA	004113	13.5	**Birds** ▪ A188 Kittiwake *Rissa tridactyla*
The Murrough SPA	004186	14.9	**Birds** ▪ A001 Red throated diver *Gavia stellata* ▪ A043 Greylag goose *Anser anser* ▪ A046 Light-bellied brent goose *Brant bernicia hrota* ▪ A050 Wigeon *Anas penelope* ▪ A052 Teal *Anas crECRa* ▪ A179 Black-headed gull *Larus argentatus* ▪ A184 Herring gull *Larus argentatus* ▪ A195 Little tern *Sterna albifrons* ▪ A999 Wetland and waterbirds

3.2.6 Note that several of the sites listed in Table 3 also partially form part of the Dublin Bay Biosphere, which is an internationally recognised designation. aim to conserve biodiversity, restore and enhance ecosystem services, and foster the sustainable use of natural resources (DBB Partnership (DBBP), 2022). Designated sites within the DBB include the following:

- North Dublin Bay SAC;
- Rockabill to Dalkey Island SAC;
- Howth Head SAC and SPA;
- North Bull Island SPA; and
- South Dublin Bay and River Tolka Estuary SPA.

3.2.7 The Biosphere designation itself brings no new regulations (DBBP, 2022). Development in the DBB is subject to existing legislation and policy framework. Despite this, DBB has been integrated into local policy and incorporated into local development plans for DLRCC and Dublin City Council (DCC).

3.2.8 The DBB is afforded local policy protections under the following:

- Policy GIB10 of the DLRCC CDP, which states the following:

- "It is a Policy Objective to participate, support and contribute to the management of the biosphere, along with its partners and to aim to raise awareness and education to people living, working and using the biosphere, through an Education Strategy. In furtherance of this Policy Objective, DLR have contributed to the development of an Environmental Code of Practice for those working in the Biosphere, and all partners carry out conservation actions including gathering biodiversity data, and monitoring within the biosphere."

- Policies GIB137 and GIB139 of the DCC County Development Plan.

  - Policy 137 states the following: *"To ensure a co-ordinated approach to the protection and management of Dublin Bay with other State and Semi-State agencies through the Dublin Bay UNESCO Biosphere Partnership in line with its management plan for the sustainable development of Dublin Bay and the Lima Action Plan of theUNESCO MAB World Network of Biosphere Reserves."*

  - Policy 139 states the following: *"To raise awareness of the international importance for nature conservation of Dublin Bay by improving information and interpretation of its biodiversity for recreational users and visitors. To increase public engagement and actions to conserve nature in line with the objectives of the UNESCO Biosphere Reserve."*

O&M Base

3.2.9 In total, 17 European sites were located within 15 km of the proposed O&M Base. Table 4 summarises the European sites identified within 15 km of the proposed O&M Base.

3.2.10 In summary, the closest European site comprises the South Dublin Bay and River Tolka Estuary SPA [004024], located approximately 730 m north of the proposed O&M Base, and within the 2 x 2 km square used in the desk study.

3.2.11 Additional European sites are located outside but within proximity to the study area including South Dublin Bay SAC [000210], located approximately 1.5 km west of the proposed O&M Base, and Dalkey Island SPA [004172], located approximately 3.2 km southeast of the proposed O&M Base.

3.2.12 The DLRCC CDP includes Policy Objectives GIB18 and GIB19, which aim to protect European designated sites such as those listed in Table 4.

3.2.13 All European designated sites are assessed as important on an **international level.**

Table 4 Designated sites within 15 km of the O&M Base

Site name	B Site code	Distance to O&M Base (km)	Qualifying interests
SACs			
South Dublin Bay SAC	000210	1.4	**Habitats** ▪ 1140 Mudflats and sandflats not covered by seawater at low tide ▪ 1210 Annual vegetation of drift lines ▪ 1310 Salicornia and other annuals colonising mud and sand ▪ 2110 Embryonic shifting dunes
Rockabill to Dalkey Island SAC	003000	2.7	**Habitats** ▪ 1170 Reefs **Species** ▪ 1351 Harbour Porpoise *Phocoena phocoena*
North Dublin Bay SAC	000206	5.5	**Habitats** ▪ 1140 Mudflats and sandflats not covered by seawater at low tide ▪ 1210 Annual vegetation of drift lines ▪ 1310 Salicornia and other annuals colonising mud and sand ▪ 1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae* ▪ 1410 Mediterranean salt meadows (Juncetalia maritimi) ▪ 2110 Embryonic shifting dunes ▪ 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) ▪ 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* ▪ 2190 Humid dune slacks ▪ **Species** ▪ 1395 Petalwort *Petalophyllum ralfsii*
Howth Head SAC	000202	7.8	**Habitats** ▪ 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ 4030 European dry heaths
Ballyman Glen SAC	000713	10.2	**Habitats** ▪ 7220 Petrifying springs with tufa formation *Cratoneurion** ▪ 7230 Alkaline fens
Knocksink Wood SAC	000725	10.6	**Habitats** ▪ 7220 Petrifying springs with tufa formation *Cratoneurion**

Site name	B Site code	Distance to O&M Base (km)	Qualifying interests
			▪ 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles ▪ 91E0 Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior *Alno-Padion, Alnion incanae*, *Salicion albae**
Baldoyle Bay SAC	000199	10.6	**Habitats** ▪ 1140 Mudflats and sandflats not covered by seawater at low tide ▪ 1310 Salicornia and other annuals colonising mud and sand ▪ 1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae* ▪ 1410 Mediterranean salt meadows *Juncetalia maritimi*
Bray Head SAC	000714	11.5	**Habitats** ▪ 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ 4030 European dry heaths
Wicklow Mountains SAC	002122	11.8	**Habitats** ▪ 3110 Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae* ▪ 3160 Natural dystrophic lakes and ponds ▪ 4010 Northern Atlantic wet heaths with Erica tetralix ▪ 4030 European dry heaths ▪ 4060 Alpine and Boreal heaths ▪ 6130 Calaminarian grasslands of the Violetalia calaminariae ▪ 6230 Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* ▪ 7130 Blanket bogs (* if active bog) ▪ 8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) ▪ 8210 Calcareous rocky slopes with chasmophytic vegetation ▪ 8220 Siliceous rocky slopes with chasmophytic vegetation ▪ 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles **Species** ▪ 1355 Otter Lutra lutra

Site name	B Site code	Distance to O&M Base (km)	Qualifying interests
Ireland's Eye SAC	002193	12.3	**Habitats** ▪ 1220 Perennial vegetation of stony banks 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
SPAs			
South Dublin Bay and River Tolka Estuary SPA	004024	0.7	**Birds** ▪ A046 Light-bellied Brent Goose *Branta bernicla hrota* ▪ A130 Oystercatcher *Haematopus ostralegus* ▪ A137 Ringed Plover Charadrius hiaticula ▪ A141 Grey Plover Pluvialis squatarola ▪ A143 Knot Calidris canutus ▪ A144 Sanderling Calidris alba ▪ A149 Dunlin Calidris alpina ▪ A157 Bar-tailed Godwit Limosa lapponica ▪ A162 Redshank Tringa totanus ▪ A179 Black-headed Gull Chroicocephalus ridibundus ▪ A192 Roseate Tern Sterna dougallii ▪ A193 Common Tern Sterna hirundo ▪ A194 Arctic Tern Sterna paradisaea **Habitats** ▪ Wetlands
North Bull Island SPA	004006	5.4	**Birds** ▪ A046 Light-bellied Brent Goose Branta bernicla hrota ▪ A048 Shelduck *Tadorna tadorna* ▪ A052 Teal *Anas crecca* ▪ A054 Pintail *Anas acuta* ▪ A056 Shoveler *Anas clypeata* ▪ A130 Oystercatcher *Haematopus ostralegus* ▪ A140 Golden Plover *Pluvialis apricaria* ▪ A141 Grey Plover *Pluvialis squatarola* ▪ A143 Knot *Calidris canutus* ▪ A144 Sanderling *Calidris alba* ▪ A149 Dunlin *Calidris alpina* ▪ A156 Black-tailed Godwit *Limosa limosa* ▪ A157 Bar-tailed Godwit *Limosa lapponica* ▪ A160 Curlew *Numenius arquata* ▪ A162 Redshank *Tringa totanus* ▪ A169 Turnstone *Arenaria interpres* ▪ A179 Black-headed Gull *Chroicocephalus ridibundus*

Site name	B Site code	Distance to O&M Base (km)	Qualifying interests
			Habitats ▪ Wetlands
Howth Head Coast SPA	004113	8.8	**Birds** ▪ A188 Kittiwake (Rissa tridactyla)
Baldoyle Bay SPA	004016	10.6	**Birds** ▪ A046 Light-bellied Brent Goose (Branta bernicla hrota) ▪ A048 Shelduck *Tadorna tadorna* ▪ A137 Ringed Plover *Charadrius hiaticula* ▪ A140 Golden Plover *Pluvialis apricaria* ▪ A141 Grey Plover *Pluvialis squatarola* ▪ A157 Bar-tailed Godwit *Limosa lapponica* **Habitats** ▪ Wetlands
Ireland's Eye SPA	004117	11.9	**Birds** ▪ A017 Cormorant Phalacrocorax carbo ▪ A184 Herring Gull Larus argentatus ▪ A188 Kittiwake Rissa tridactyla ▪ A199 Guillemot Uria aalge ▪ A200 Razorbill Alca torda
Wicklow Mountains SPA	004040	12.2	**Birds** ▪ A098 Merlin Falco columbarius ▪ A103 Peregrine Falco peregrinus

3.2.14 Note that Ireland's Eye SAC and SPA also forms part of the DBB, which is detailed in paragraphs 3.2.6 to 3.2.8.

Ramsar sites

3.2.15 Three Ramsar sites were identified within 15 km of the O&M Base[4] including the following:

- Sandymount Strand/Tolka Estuary;
- North Bull Island; and
- Ballydoyle Bay.

[4] Ramsar (n.d.). The Convention of Wetlands. Available from: https://www.ramsar.org/country-profile/ireland. [Accessed December 2023].

Nationally designated sites of nature conservation

OES

3.2.16 Table 5 details the Natural Heritage Areas (NHA or potential NHAs (pNHAs) within 15 km of the OES. This also included all designated sites located downstream of the associated watercourses along the OES.

Table 5 NHA and pNHA within 15 km of the onshore OES

Site name	Site code	Distance to closest point of the OES (km)
Loughlinstown Woods pNHA	001211	0.005
Dalkey Coastal Zone and Killiney Hill pNHA	001206	0.01
Dingle Glen pNHA	001207	0.76
Fitzsimon's Wood pNHA	001753	2.43
Ballybetagh Bog pNHA	001202	2.87
Ballyman Glen pNHA	000713	3.85
South Dublin Bay pNHA	000210	4.72
Knocksink Wood pNHA	000725	4.97
Bray Head pNHA	000714	4.98
Powerscourt Woodland pNHA	001768	5.75
Powerscourt Woodland pNHA	001768	5.75
Booterstown Marsh pNHA	001205	5.80
Dargle River Valle pNHA	001754	5.82
Dargle River Valley pNHA	001754	5.85
Great Sugar Loaf pNHA	001769	7.00
Kilmacanoge Marsh pNHA	000724	8.25
Glencree Valley pNHA	001755	8.50
Grand Canal pNHA	002104	9.13
Powerscourt Waterfall pNHA	001767	9.83
North Dublin Bay pNHA	000206	10.11
Royal Canal pNHA	002103	10.52
Glenasmole Valley pNHA	001209	10.53
Glen of the Downs pNH	000719	10.89
Howth head pNHA pNHA	000202	13.33
Lugmore Glen	001212	13.91

Site name	Site code	Distance to closest point of the OES (km)
The Murrough pNHA	000730	14.79
Liffey Valley pNHA	000128	14.88

3.2.17 Dalkey Coastal Zone and Killiney Hill pNHA is the closest pNHA to the OES, located approximately 15 m from the proposed beach access ramp within the proposed Landfall area (Landfall Site). Loughlinstown Woods pNHA [001211] is located ca. 40 m from the proposed OES (Sector 2) at the closest point. No other NHA or pNHA are located within 2 km of the OES.

3.2.18 The DLRCC CDP includes Policy Objectives GIB18, GIB21 and GIB22 which affords protection to NHA and pNHA.

3.2.19 All pNHA identified within the study area are assessed as important on a **national level**.

O&M Base

3.2.20 Table 6 details the NHA and pNHA within 2 km of the O&M Base.

Table 6 NHA and pNHA within 15 km of the O&M Base

Site name	Site code	Distance to O&M Base (km)
Dalkey Coastal Zone and Killiney Hill pNHA	001206	0.44
South Dublin Bay pNHA	000210	0.86
Booterstown Marsh pNHA	001205	4.33
Loughlinstown Woods pNHA	001211	5.48
North Dublin Bay pNHA	000206	5.49
Dingle Glen pNHA	001207	6.76
Fitzsimon's Wood pNHA	001753	7.04
Howth Head pNHA	000202	7.90
Grand Canal pNHA	002104	8.34
Royal Canal pNHA	002103	8.98
Ballybetagh Bog pNHA	001202	9.10
Ballyman Glen pNHA	000713	9.95
Knocksink Wood pNHA	000725	10.39
Baldoyle Bay pNHA	000199	10.90
Powerscourt Woodland pNHA	001768	11.93
Bray head pNHA	000714	11.40
Dargle River Valley pNHA	001754	11.89
Great Sugar Loaf pNHA	001769	13.11

Site name	Site code	Distance to O&M Base (km)
Dodder Valley pNHA	000991	13.17
Santry Demesne pNHA	000178	13.63
Kilmacanoge Marsh pNHA	000724	14.3
Glencree valley	001755	14.99

3.2.21 The closest designated sites comprised Dalkey Coastal Zone and Killiney Hill pNHA (002106), located approximately 435 m southeast of the proposed development.

3.2.22 The DLRCC CDP includes Policy Objectives GIB18, GIB21 and GIB22 which affords protection to NHA and pNHA.

3.2.23 All pNHA identified within the study area are assessed as important on a **national level**.

Nature wildlife areas

3.2.24 Locally Important Biodiversity Sites (LIBS), are non-designated sites where action is being taken to promote biodiversity. They have no formal protection but serve to highlight sites which may be worthy of protection or enhancement and provides additional benefits to, or supports, the protected area network. They do not overlap with protected sites but may be adjacent to them.

3.2.25 These areas aim to support pollinating invertebrates, which would have additional benefits for bats and birds. The DLR CDP Policy Objective GIB18 provides local policy protection for them.

OES

3.2.26 Annex 9 includes Map B1 from the CDP, which details these areas along with other designated sites within DLRCC. This includes riparian habitats along Shanganagh River at approximate ITM coordinates 725743 723341.

3.2.27 One LIBS was located within the OES study area. This was located north of the SWWTF and extending southwest along the Shanganagh River. This will require a special crossing for the OES. No other LIBS were located within the study area and have been scoped out from further assessment.

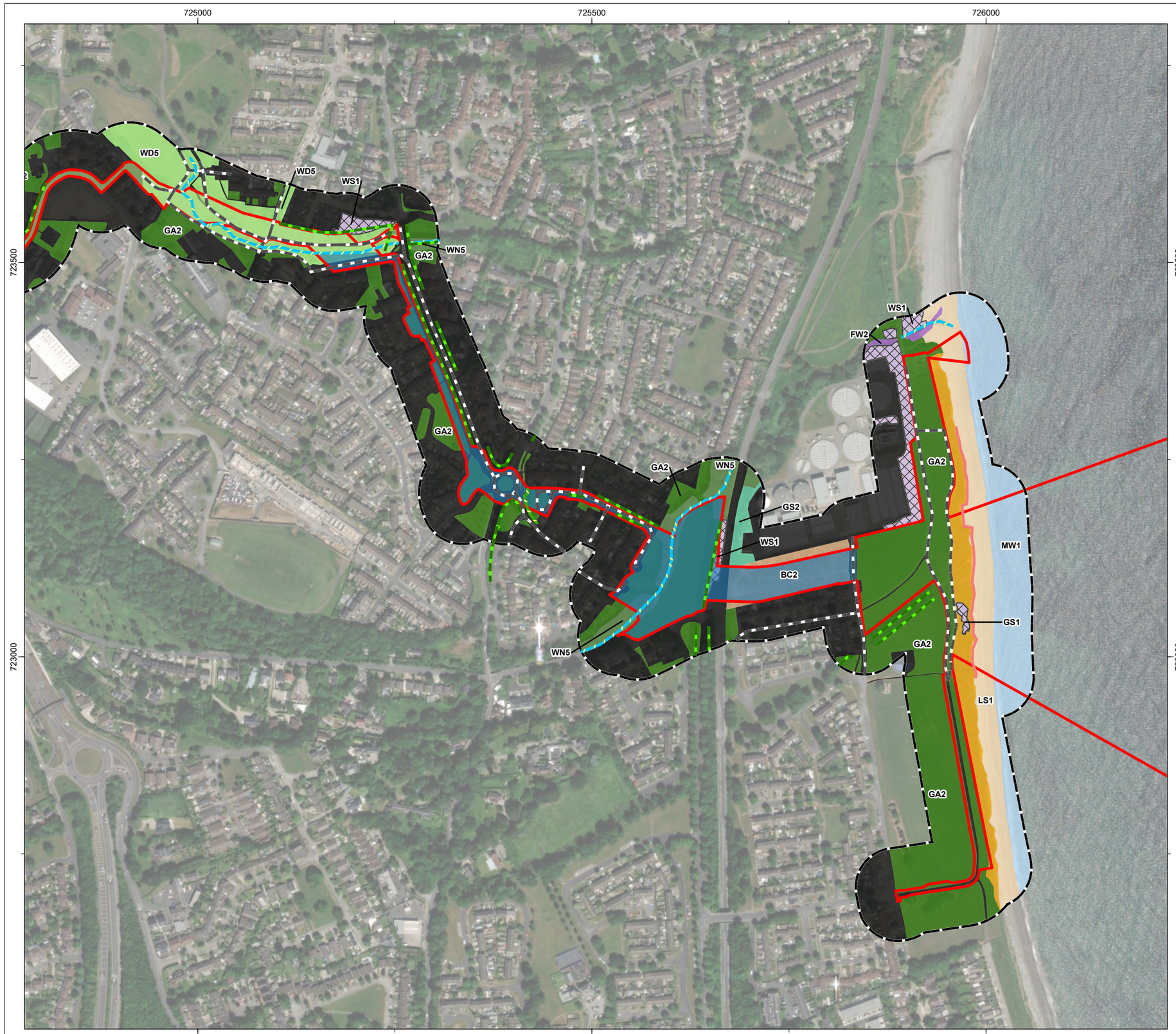
3.2.28 LIBS are assessed as important on a **county level**.

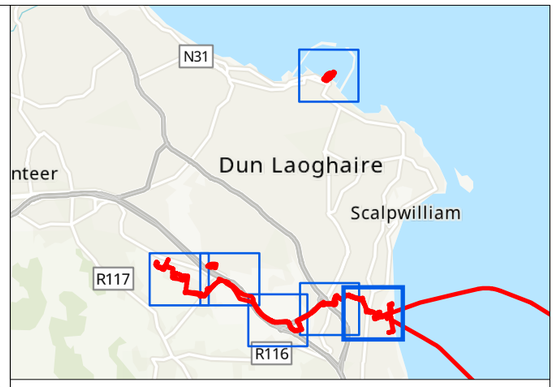
O&M Base

3.2.29 No LIBS were noted within the study area for the O&M Base.

3.3 Habitats

3.3.1 The habitats within the overall study area are dominated by built environment and road infrastructure as well as urban greenspaces such as public parks, private gardens, and landscaped areas as part of residential and commercial developments. The less frequently occurring habitats within the overall study area are small areas of woodland, scrub, grassland, and arable crops. There are also a number of watercourses within the study areas. In general, these watercourses have previously been modified through canalisation, deepening and culverting. The habitats present within the overall study area are described below and shown in Figure 10 to Figure 15.





Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Export Cable Route (ECR) Sector

Sector 1

Sector 2

Fossitt Habitat (Linear)

- BL3 - Built Land
- CS3 - Sedimentary Sea Cliff
- FW2 - Depositing River
- WL1 - Hedgerow
- WL2 - Treeline

Fossitt Habitats (Areas)

- BC2 - Horticultural Land
- BL3 - Buildings and Artifical Surfaces
- FW2- Depositing Lowland Rivers
- GA2 - Amenity Grassland (Improved)
- GS1 - Dry Calcareous and Neutral Grassland
- GS2 - Dry Meadows & Grassy Verges
- LS1 - Shingle Gravel Shore
- MW1 - Open Marine Waters
- WD5 - Scattered Trees and Parkland
- WN5 - Riparian Woodland
- WS1 - Scrub

DRAWING STATUS

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

DRAWING NUMBER: 10

PAGE NUMBER: 1 of 6

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GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

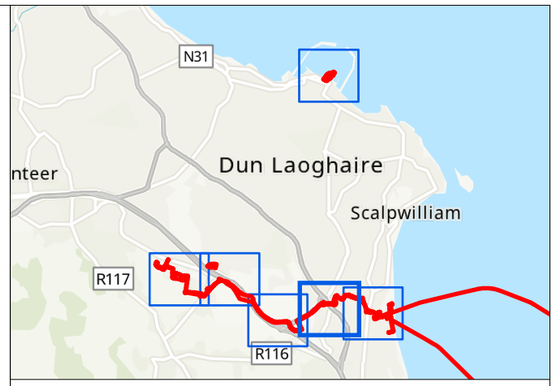
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited



Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Export Cable Route (ECR) Sector

- Sector 1
- Sector 2
- Sector 3
- Sector 4

Fossitt Habitat (Linear)

- BL3 - Built Land
- FW2 - Depositing River
- WL1 - Hedgerow
- WL2 - Treeline

Fossitt Habitats (Areas)

- BL3 - Buildings and Artifical Surfaces
- ED2 - Spoil and Bare Ground
- ED3 - Recolonising Bare Ground
- GA2 - Amenity Grassland (Improved)
- GS2 - Dry Meadows & Grassy Verges
- WD1 - Mixed Broadleaved Woodland
- WD5 - Scattered Trees and Parkland
- WS1 - Scrub
- WS2 - Immature Woodland

DRAWING STATUS

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

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PAGE NUMBER: **2 of 6**

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0 0.03 0.05 0.08 0.1 Miles

GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

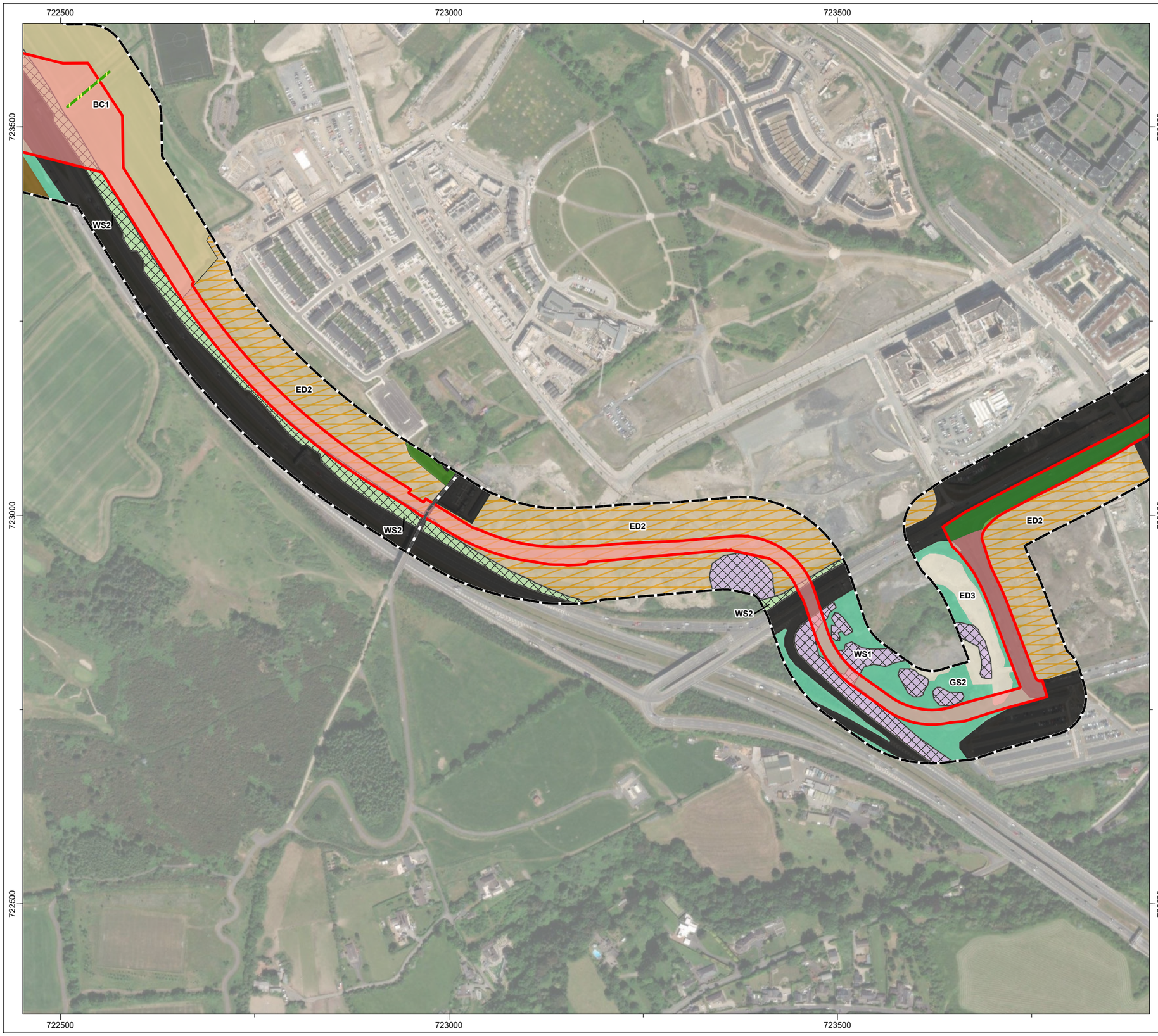
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

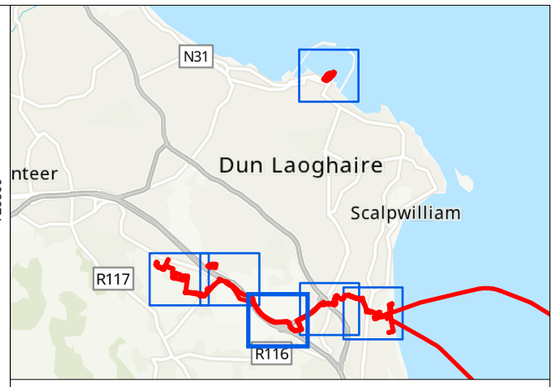
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Export Cable Route (ECR) Sector

- Sector 3
- Sector 4

Fossitt Habitat (Linear)

- BL3 - Built Land
- WL1 - Hedgerow

Fossitt Habitats (Areas)

- BC1 - Arable Crops
- BC3 - Tilled Land
- BL3 - Buildings and Artifical Surfaces
- ED2 - Spoil and Bare Ground
- ED3 - Recolonising Bare Ground
- GA2 - Amenity Grassland (Improved)
- GS2 - Dry Meadows & Grassy Verges
- WS1 - Scrub
- WS2 - Immature Woodland

DRAWING STATUS

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

DRAWING NUMBER: **12**

PAGE NUMBER: **3 of 6**

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02	2025-02-17	PUBLIC	JK	SW	AE

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

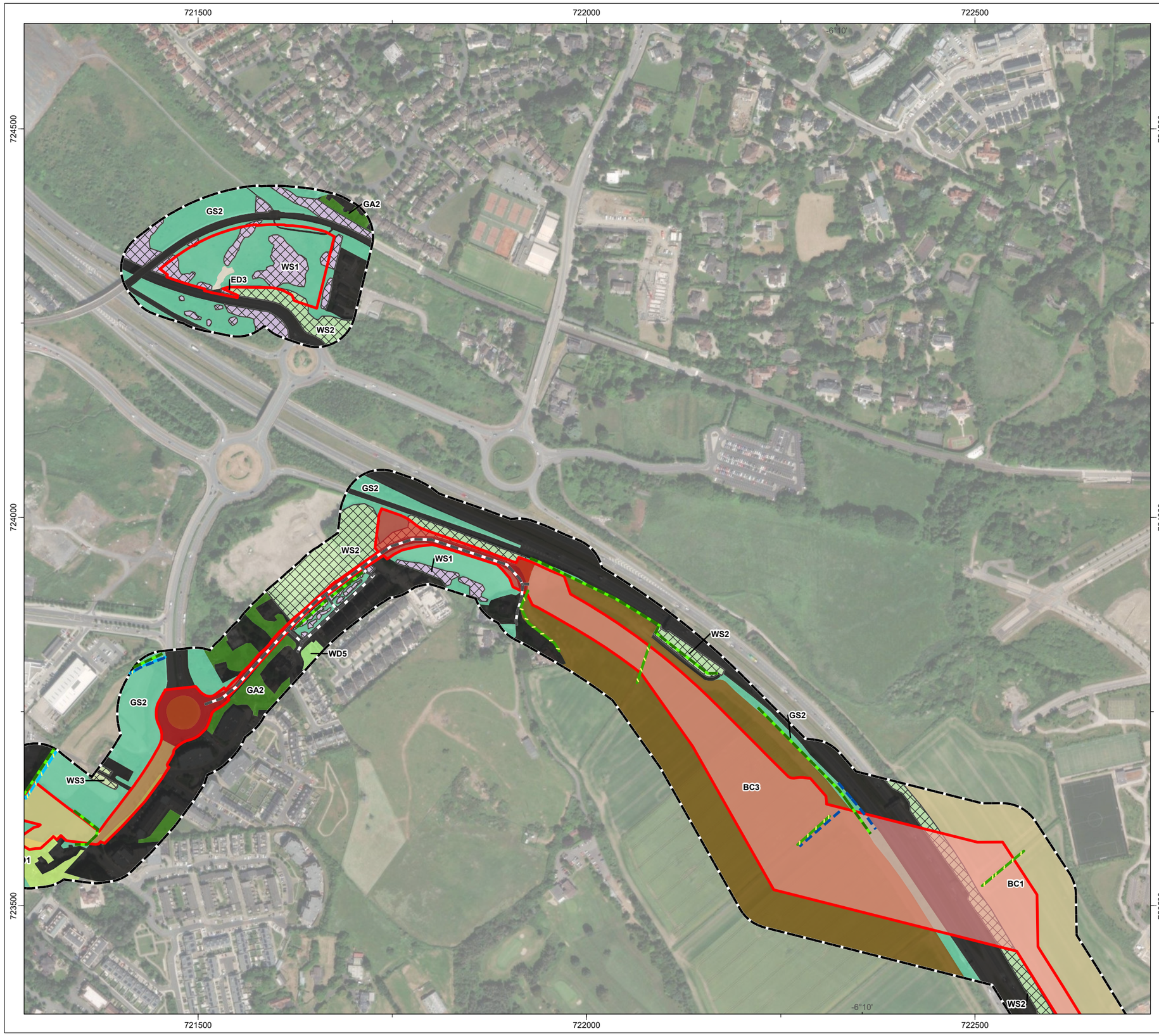
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

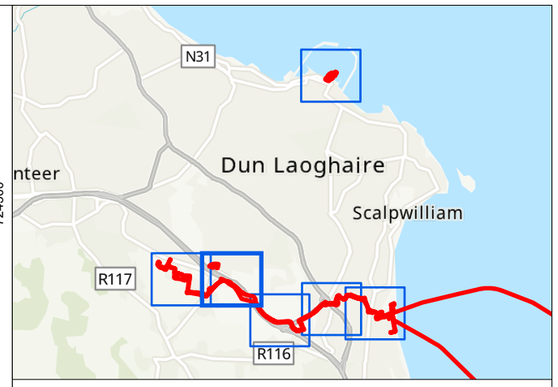
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Export Cable Route (ECR) Sector

- Sector 4
- Sector 5
- Sector 6

Fossitt Habitat (Linear)

- BL3 - Built Land
- FW2 - Depositing River
- FW4 - Drainage Ditch
- WL1 - Hedgerow
- WL2 - Treeline

Fossitt Habitats (Areas)

- BC1 - Arable Crops
- BC3 - Tilled Land
- BL3 - Buildings and Artifical Surfaces
- ED2 - Spoil and Bare Ground
- ED3 - Recolonising Bare Ground
- GA2 - Amenity Grassland (Improved)
- GS2 - Dry Meadows & Grassy Verges
- WD1 - Mixed Broadleaved Woodland
- WD5 - Scattered Trees and Parkland
- WS1 - Scrub
- WS2 - Immature Woodland
- WS3 - Ornamental/Non-Native Shrub

DRAWING STATUS

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

DRAWING NUMBER: 13

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-18-12	DRAFT	JK	SW	AE
02	2025-02-17	PUBLIC	JK	SW	AE

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

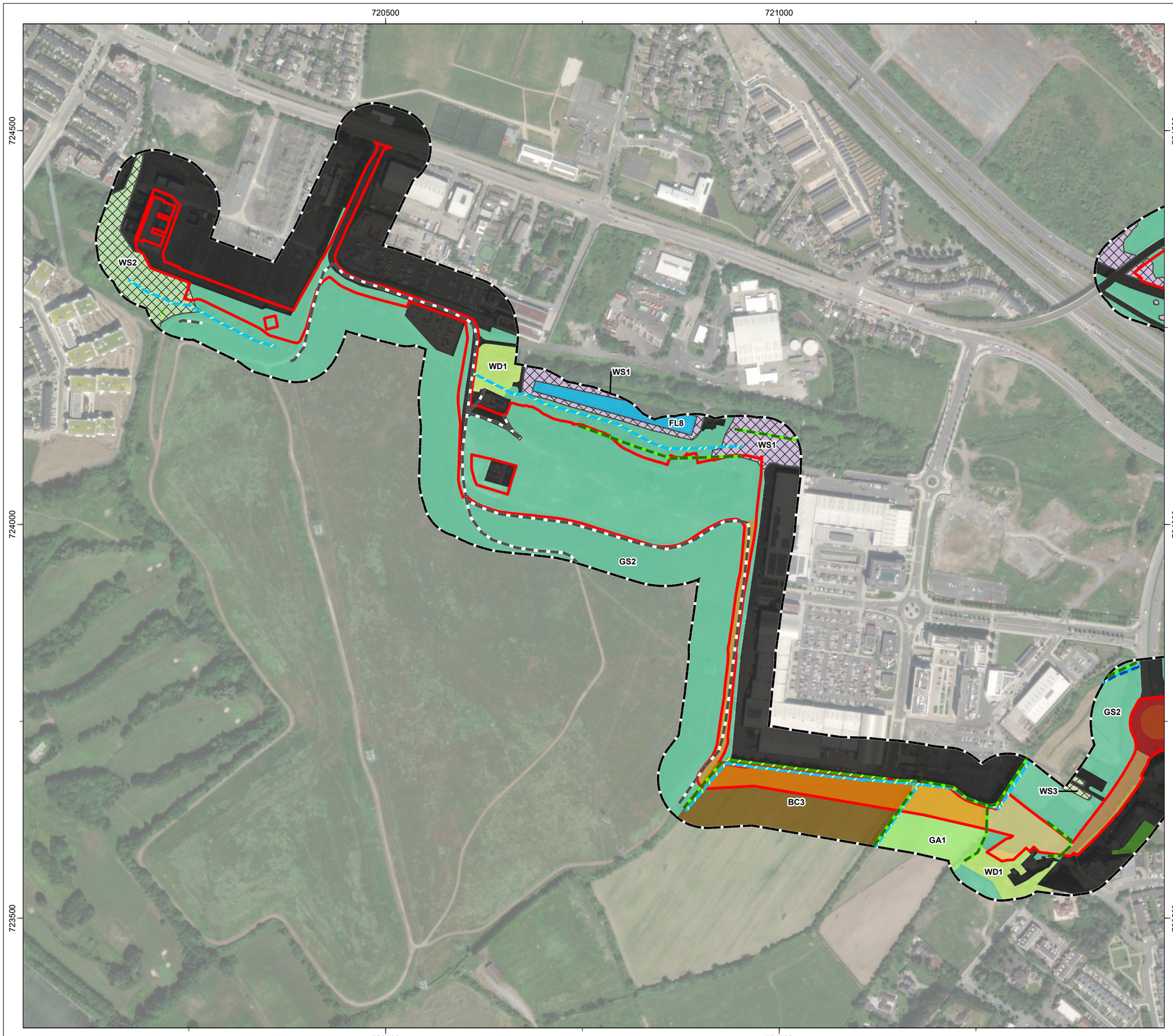
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

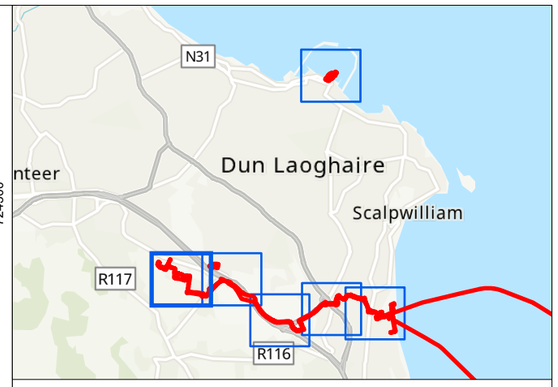
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Boundary

Onshore Electrical System (OES) 50 m Study Area

Export Cable Route (ECR) Sector

- Sector 5
- Sector 6
- Sector 7

Fossitt Habitat (Linear)

- BL3 - Built Land
- FW2 - Depositing River
- FW4 - Drainage Ditch
- WL1 - Hedgerow
- WL2 - Treeline

Fossitt Habitats (Areas)

- BC3 - Tilled Land
- BL3 - Buildings and Artifical Surfaces
- FL8 - Other Artifical Lakes and Ponds
- GA1 - Improved Agricultural Grassland
- GA2 - Amenity Grassland (Improved)
- GS2 - Dry Meadows & Grassy Verges
- WD1 - Mixed Broadleaved Woodland
- WS1 - Scrub
- WS2 - Immature Woodland
- WS3 - Ornamental/Non-Native Shrub

DRAWING STATUS

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

DRAWING NUMBER: 14

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02	2025-02-17	PUBLIC	JK	SW	AE

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0 0.03 0.05 0.08 0.1 Miles

GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

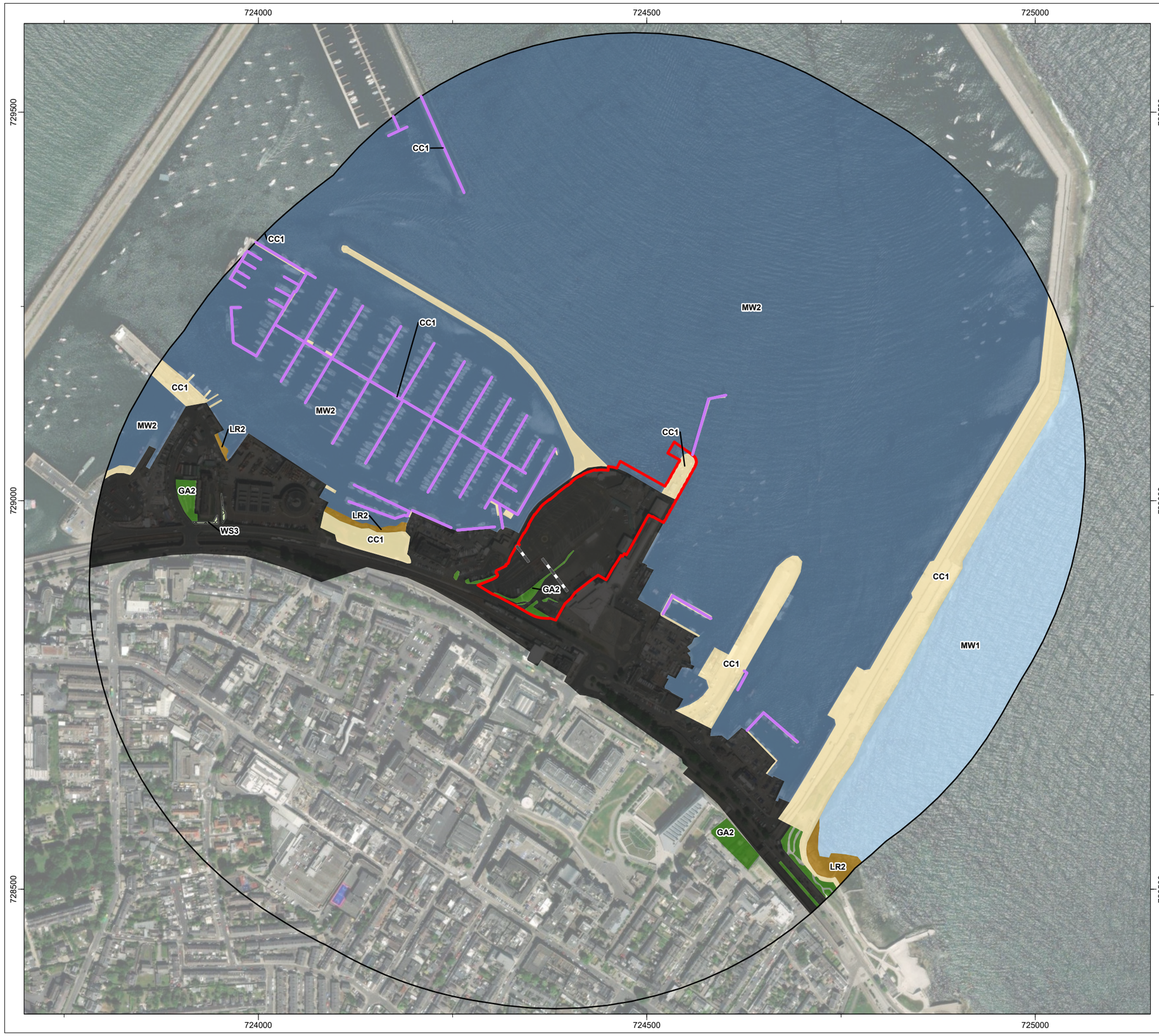
DATUM IRENET95 VERTICAL REF CDN/LAT/MLW

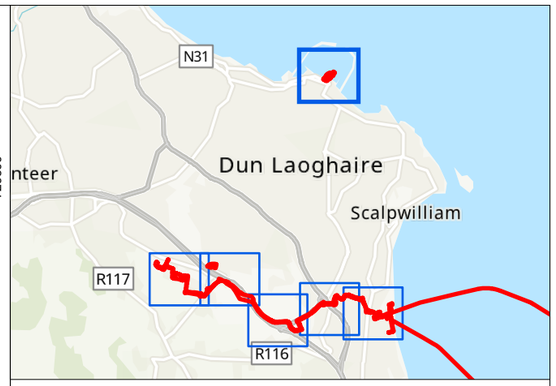
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Boundary

Operations and Maintenace Planning Boundary (O&M Base) 500 m Study Area

Fossitt Habitat (Linear)

- BL3 - Built Land
- CC1 - Coastal Constructuins

Fossitt Habitats (Areas)

- BL3 - Buildings and Artifical Surfaces
- CC1 - Coastal Constructions
- GA2 - Amenity Grassland (Improved)
- LR2 - Moderately Exposed Rocky Shores
- MW1 - Open Marine Waters
- MW2 - Sea inlets and bays
- WS3 - Ornamental/Non-Native Shrub

DRAWING STATUS

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Fossitt Habitat Survey

DRAWING NUMBER: 15

PAGE NUMBER: 6 of 6

VER	DATE	REMARKS	DRAW	CHEK	APRD
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02	2025-02-17	PUBLIC	JK	SW	AE

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:5,000 PLOT SIZE A3

DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Desk study

3.3.2 Consultation with Biodiversity Maps[5] no ancient and long-established woodland along the OES or at the O&M Base. One parcel of woodland identified in the National Survey of Native Woodlands 2010 (NSNW) is within the OES study area. This comprised Loughlinstown Woods, which was located approximately 40 m from the OES (Sector 2) at its closest point to the at ITM coordinates 724563 723371.

Field survey

3.3.3 The overall study area is located in the urban and suburban environment of DLRCC. As a result, the habitats within the study areas are dominated by built environment and road infrastructure as well as urban greenspaces such as public parks, private gardens, and landscaped areas as part of residential and commercial developments. The less frequently occurring habitats within the study areas are small areas of woodland, scrub and grassland. There are also a number of watercourses within the study areas. In general, these watercourses have previously been modified through canalisation, deepening and culverting. The habitats present within the study areas are described below and shown in Figure 10 to Figure 15.

3.3.4 The following section details the habitats identified within the OES and the O&M Base. Photographs are provided in Annex 4.

Landfall Site

Shingle gravel shore (LS1)

3.3.5 The Landfall Site and the eastern-most point of the OES comprised a gravel beach made up of shingle gravel shore habitat. The exposed seaward side of this habitat is largely unvegetated. The more sheltered leeward side is more vegetated with a coastal grassland structure. Red fescue *Festuca rubra* is abundant here along with kidney vetch *Anthyllis vulneraria* and lady's bedstraw *Galium verum.* Burnet saxifrage *Pimpinella saxifrage* is frequent. Other species present include common restharrow *Ononis repens*, red valerian *Centranthus ruber* and oxeye daisy *Leucanthemum vulgare.*

3.3.6 According to Fossitt (2000) A Guide to Habitats in Ireland, this habitat may comprise Annex I habitat 'perennial vegetation of stony banks (1220)'. This is a rare habitat in Ireland, comprising 1.29 km^2 and the habitat does match the habitat description provided in 'The Status of EU Protected Habitats and Species in Ireland' and covers 10 km^2 grid square O22, in which the Landfall area is located (NPWS, 2019 - see Annex 8).

[5] https://maps.biodiversityireland.ie/Map [Accessed: November 2023].

3.3.7 The DLRCC Biodiversity Action Plan 2021-2025 aims to complete a Habitat Management Plan for Shanganagh coast and cliffs to provide an understanding of the biodiversity role of the coastal habitats along the Shanganagh coastline and for their appropriate management. Furthermore, the DLRCC CDP Policy Objective GIB22 (refer to Annex 1) provides policy protection to Annex I habitats.

3.3.8 This habitat comprises a viable area of Annex I habitat, and, therefore, has been assessed as important on a **national level**.

Sedimentary sea cliffs (CS3)

3.3.9 This habitat is described by Fossitt (2000) as "*steep to almost vertical coastal cliffs that are greater than 3 m in height and are formed primarily of unconsolidated material. Sedimentary sea cliffs may comprise mud, sand, gravel or mixtures of these sediments. Stones and large boulders in a matrix of finer material may also be exposed on the cliff face in the case of sea cliffs that are composed of glacial till. Some sedimentary sea cliffs support substantial vegetation cover with a variety of seashore plants; others, especially those that are steep and unstable, may be completely unvegetated*."

3.3.10 While the sea cliffs within the study area at the Landfall do not strictly meet the classification of sedimentary sea cliffs in terms of vegetation, height, and structure, we have included them here as they have previously been classified as such by DLRCC as they form part of a sedimentary sea cliffs complex south of Shanganagh.

3.3.11 The cliff faces at the Landfall location are not vegetated or are very sparsely vegetated (See Plate 5). The habitat at the top of the cliff is ranked unmanaged grassland, this habitat has been classified as dry meadows and grassy verges (GS2) and is dominated by commonly occurring grass species such as false oat-grass *Arrhenatherum elatius,* cock's-foot *Dactylis glomerata* and red fescue with Yorkshire fog *Holcus lanatus* also present. The herbs within the grassland sward are also commonly occurring in this habitat type and scrub is encroaching in areas along the top of the cliffs.

3.3.12 Sedimentary sea cliff habitat is noted by Fossitt (2000) as loosely corresponding with the Annex 1 habitat '*Vegetated sea cliffs of the Atlantic and Baltic Coasts*' (code 1230). The sedimentary sea cliff habitat at the likely Landfall location does have the characteristics and assemblage of plant species that would meet the criteria for classification as the Annex 1 habitat. Furthermore, NPWS (2019) notes that all sea cliffs on the Irish coast can be considered to correspond to the EU Annex I habitat Vegetated sea cliffs of the Atlantic and Baltic coasts (1230). This Annex I habitat comprises 24,000 km^2 in Ireland and is present within the O22 10 km^2 grid square (NPWS, 2019) in which the Landfall is located (see Annex 8).

3.3.13 The DLRCC CDP Policy Objective GIB22: Non-designated areas of biodiversity importance in the DLR development plan (refer to Annex 1).

3.3.14 This habitat comprises a viable area of Annex I habitat, and, therefore, has been assessed as important on a **national level**.

Scrub (WS1)

3.3.15 Areas of scrub were located on the tops of the cliffs and adjacent to grassland habitat. Scrub was dominated by bramble, with other species including cow parsley *Anthriscus sylvestris*, dandelion *Taraxacum officinale* agg., creeping buttercup *Ranunculus repens*, yarrow *Achillea millefolium*, teasel *Dipsacus fullonum*, fulmitory *Fumaria officinalis*, three-cornered garlic *Allium triquetrum*, common nettle *Urtica dioica*, ribwort plantain *Plantago lanceolata*, thistles *Cirsium* spp., common hogweed *Heracleum sphondylium*, and wild mustard *Sinapis arvensis*.

3.3.16 Scrub is a common and widespread habitat that can support a range of local fauna. It has been assessed as important on a **local level**.

Dry calcareous grassland (GS1)

3.3.17 Grasslands closest to the cliff edges were of a noticeably longer sward and are anticipated to under a less regular mowing management regime than the amenity grassland. Forbs were more numerous than the amenity grassland with many ruderal species such as broadleaved dock *Rumex obtusifolius*, hogweed, cow parsley, common nettle present. This grassland was located adjacent to scrub areas and therefore bramble often encroached areas of grassland. This habitat may support local fauna and it has been assessed as important on a **local level**.

Amenity grassland (GA2)

3.3.18 Amenity grassland comprising a short sward comprised large areas of Landfall Site. This habitat was made up almost exclusively of grasses and was managed as a short sward of approximately 10 cm. It is anticipated that it undergoes a regular mowing regime. Forb species were limited to dandelion, ribwort plantain, and common daisy *Bellis perennis*.

3.3.19 Amenity grassland is considered of minor ecological importance, providing some foraging habitat for common garden birds and invertebrates. Overall, this habitat was assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Sector 1

Horticultural land (BS2)

3.3.20 A small area of horticultural land is present in Sector 1 of the Onshore ECR. This horticultural land comprises community allotments known as “Shanganagh Community Garden” and is positioned between the Shanganagh wastewater treatment plant (WWTP) and adjacent housing. The habitat here consists of small parcels of land used for the production of food and ornamental plants including growing vegetables within bare soil and young fruit trees.

3.3.21 Whilst this habitat may support common invertebrates and may provide foraging habitat for birds, its primary function is not ecological. Therefore, it has been assessed as being of **negligible importance** and scoped out from further assessment.

Buildings and artificial surfaces (BL3)

3.3.22 The majority of the proposed onshore ECR and associated infrastructure will be located within the existing road networks and other built lands within the OES study area. As a result, buildings and artificial surfaces is the dominant habitat within the study area. This habitat includes buildings and areas of hardstanding, such as roads. Residential areas comprising of dense housing with minimal greenspace has also been included in this habitat type due to their highly modified nature and lack of connectivity.

3.3.23 This habitat type is largely devoid of vegetation. The species that do occur are often ruderal in nature and includes cultivated garden plant species. Other species recorded within this habitat type include isolated trees which have been planted as part of landscaping. Buildings and artificial surfaces have **negligible importance** and have been scoped out.

Depositing river (FW2)

3.3.24 The Shanganagh River borders the northern extent of the Landfall Site and Sector 1 of the onshore ECR study area and reaches the coast. At the time of survey, the river was approximately 4 m wide and comprised slow-flowing and clear water. The banks were low and bordered by scattered trees, grassland and scrub.

3.3.25 The aquatic report (Annex 3) surveyed one sampling location here (A9). Riparian habitats included treelines of alder, ash, beech, sycamore, and willow *Salix* sp. with bramble *Rubus fructicosus* scrub.

3.3.26 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'.

3.3.27 NPWS (2019), notes that 82,200 km^2 of this Annex I habitat exists within Ireland, and it is widespread across the country, including within the O22 10 km^2 grid square associated with the proposed development (see Annex 8). As such this is considered Annex I habitat.

3.3.28 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

3.3.29 Overall, the river at this location was assessed as important at a **national level** as it may comprise Annex I habitat.

Treelines (WL2)

3.3.30 Treelines were generally young to semi-mature, and varied between silver birch *Betula pendula*, sycamore, beech *Fagus sylvatica*, hornbeam *Carpinus betulus*, cherry *Prunus avium*, laurel *Prunus laurocerasus*, field maple *Acer campestre*, hazel *Corylus avellana*, elder *Sambucus nigra*, oak *Quercus petraea*, and hawthorn *Crataegus monogyna*. Treelines support various native fauna, including birds, bats, and invertebrates.

3.3.31 Furthermore, treelines comprise such a linear feature that would afford protection under Article 10, which states the following:

"Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora.

Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species."

3.3.32 As such, they have been assessed as important on a **local level**.

Riparian woodland (WN5)

3.3.33 Riparian woodland was situated along the Shanganagh River. Canopy cover was comprised of mostly alder *Alnus glutinosa* and willow with occasional ash *Fraxinus excelsior*. Areas of riparian woodland located furthest from the river included field maple, sycamore *Acer pseudoplatanus*, elder, and elm *Ulmus minor*. Ground flora comprised mostly cow parsley, dandelion, cleavers *Galium aparine*, creeping buttercup, yarrow, teasel, fumitory, three-cornered garlic, ivy *Hedra helix*, common nettle, ribwort plantain, thistle, butterbur *Petasites hybridus*, hogweed, green alkanet *Pentaglottis sempervirens*, and wild mustard.

3.3.34 Annex I habitat Alluvial forests 91E0 with *Alnus glutinosa* and *Fraxinus excelsior* comprises 61,000 km^2 within Ireland and is recorded as present within the O22 10 km^2 grid square (NPWS, 2019) (see Annex 8).

3.3.35 In addition, DLRCC CDP includes Objective GIB23, which aims to protect a county-wide ecological network.

3.3.36 Overall, this habitat is considered likely to form Annex I habitat Alluvial forests 91E0. In addition, woodland is considered an important habitat for local fauna and is a scarce habitat within Ireland. It provides a substantial area of semi-natural habitat. As such, it is assessed as important on a **national level**.

Depositing river (FW2)

3.3.37 Fossitt (2000) links this habitat with the Annex I habitat. Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'.

3.3.38 NPWS (2019), notes that 82,200 km^2 of this Annex I habitat exists within Ireland, and it is widespread across the country, including within the O22 10 km^2 grid square associated with the proposed development (see Annex 8). As such this is considered Annex I habitat.

3.3.39 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

Sampling point A9 – Shanganagh River, Shanganagh Wood

3.3.40 The Shanganagh River runs through Sector 1, through existing residential developments and Loughlinstown Woods as it leads to the coast at Landfall Site. At the time of survey, the river was approximately 4 m wide and comprised slow-flowing and clear water. The banks were low and mostly heavily vegetated with ground flora (detailed under riparian woodland). The habitat at this sampling point (A9) was found to support salmonids, red-listed European eel, and was used by otter.

3.3.41 Overall, A9 was assessed as being important at a **national level**.

Amenity grassland (GA2)

3.3.42 Amenity grassland made up areas between roads and residential buildings, often comprising areas of open green space. These grasslands were managed as a short sward, with a regular mowing regime and comprised mostly grasses, with limited forbs including dandelion and creeping buttercup.

3.3.43 Amenity grassland is considered of minor ecological importance, providing some foraging habitat for common garden birds and invertebrates. Overall, this habitat was assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Buildings and artificial surfaces (BL3)

3.3.44 Buildings and artificial surfaces comprised mostly residential buildings, roads and pedestrian areas. Vegetated areas within this habitat included vegetated gardens and minor areas of roadside verges. Overall, these habitats have been assessed as being of **negligible value**.

Hedgerow (WL1)

3.3.45 Hedgerows were limited to garden boundaries comprised mostly of non-native, ornamental species. Despite this, hedgerows are likely to support various native fauna, including birds, foraging bats, and invertebrates.

3.3.46 The DLRCC CDP includes Policy GIB25, the protection of hedgerows (Annex 1). This policy objective is to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.

3.3.47 Furthermore, hedgerows comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.48 Overall, hedgerows have been assessed as important on a **local level**.

Treelines (WL2)

3.3.49 Tree lines were located mostly along roads and residential buildings. Species included ash and sycamore. Where an understorey layer was present species comprised bramble, hogweed, rose *Rosa* sp., broadleaved dock, cleavers, and common nettle. Treelines support various native fauna, including birds, bats, and invertebrates. Furthermore, treelines comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.50 As such, they have been assessed as important on a **local level**.

Sector 2

Depositing river (FW2)

3.3.51 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'.

3.3.52 NPWS (2019), notes that 82,200 km^2 of this Annex I habitat exists within Ireland, and it is widespread across the country, including within the O22 10 km^2 grid square associated with the proposed development (Annex 8). As such this is considered Annex I habitat.

3.3.53 The DLRCC CDP includes Policy GIB24 aims to protect the character and ecological value of the river and stream corridors in the County and, where possible, to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

Sampling points B1, B2, and B3 – Kill-O'the Grange Stream

3.3.54 Kill O'the Grange Stream runs through Sector 2, through open green space. Generally, the stream was approximately 2 m wide and contained flowing water. Parkland and scattered trees bordered much of this habitat, with the grasslands mown to a short ward other than an approximate 2 m strip adjacent to the stream.

3.3.55 The aquatic ecological report (provided in Annex 3) assessed three survey locations along Kill-O-The-Grange Stream within Sector 2 (B1, B2, and B3).

3.3.56 Species noted included curled pondweed *Potamogeton crispus*, water starwort *Callitriche* sp. and invasive Nuttall's pondweed *Elodea nuttallii* were present. Blue water speedwell *Veronica anagallis-aquatica*. reed canary grass *Phalaris arundinacea*, and fool's watercress *Apium nodiflorum*. Bank featured a mature treeline dominated by ash and sycamore with an understorey layer of bramble and cherry laurel. Open areas of the stream, surrounded by parkland featured a narrow riparian fringe of reed canary grass, nettle, cleavers, hogweed, willowherbs *Epilobium* sp., cow parsley, creeping buttercup and rank grasses. Scattered trees included alder and sycamore. A stand of non-native wall barley *Hordeum murinum* was present adjacent to the footbridge.

3.3.57 Overall, the habitat at these sampling points was found to support salmonids, European eel, and otter. As such, it was assessed as being important on a **national level**.

Scattered trees and parkland (WD5)

3.3.58 Areas of scattered trees and parkland were located within Sector 2, including a public open green space, and the Eurofound land. This habitat comprised mostly amenity grassland, however, many large and mature trees comprised a significant proportion of the habitat. As such, it has been attributed to scattered trees and parkland. Species included beech, oak, ash, alder, hornbeam, with ground flora including dandelion, perennial ryegrass, cleavers, common nettle, creeping buttercup.

3.3.59 This habitat is anticipated to be of value to birds, commuting, foraging and potentially roosting bats. It may also support other terrestrial mammals such as badger *Meles meles* and hedgehog *Erinaceus europaeus*. Furthermore, it provides a possible area of special amenity and could support county important populations of local fauna.

3.3.60 This habitat is likely to support populations of notable species such as bats and badgers. As such, it has been assessed as important on a **county level**.

Amenity grassland (GA2)

3.3.61 Small parcels of amenity grassland provided roadside verges as well as limited areas of open green space located between existing residential areas. Species comprised mostly grasses with occasional forbs including dead nettle *Lamium purpureum*, ragwort *Jacobaea vulgaris*, dandelion, primrose *Primula vulgaris*, and speedwell *Veronica* sp.

3.3.62 Amenity grassland is considered of minor ecological importance, providing some foraging habitat for common garden birds and invertebrates. Overall, this habitat was assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Buildings and artificial surfaces (BL3)

3.3.63 Much of Sector 2 comprised buildings and artificial surfaces made up of residential buildings, roads, and pedestrian paths. Buildings and artificial surfaces are of limited ecological value. Although nesting birds and roosting bats can find nesting and roosting opportunities within buildings. Overall, this habitat is of negligible ecological value and has been assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Hedgerows (WL1)

3.3.64 One hedgerow, located within the Eurofound land was made up of sycamore, hawthorn, ivy and bramble. Otherwise, most hedgerows were ornamental and comprised boundaries adjacent to residential gardens.

3.3.65 The DLRCC CDP includes Policy GIB25, for the protection of hedgerows (Annex 1). This policy objective is to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.

3.3.66 Furthermore, hedgerows comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.67 Overall, hedgerows have been assessed as important on a **local level**.

Treelines (WL2)

3.3.68 Treelines within sector 2 comprised mostly road-side trees of varying species. These included hazel, poplar *Populus* sp., sycamore, and large-leaved lime *Tilia platyphyllos*. Treelines support various native fauna, including birds, bats, and invertebrates. Furthermore, treelines comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.69 Overall, this habitat has been assessed as important on a **local level**.

Sector 3

3.3.70 Sector 3 runs along the R118 and contained minimal vegetated habitats other than grassland verges and habitats located within a public park, located to the northeast of Sector 3. The vegetated habitats that were noted are detailed below.

Depositing river (FW2)

3.3.71 Sampling point A8 – Carrickmines Stream, Cherrywood Park.

3.3.72 A second depositing river, Carrickmines Stream, was located within Sector 2, with one sampling location (A8) detailed in the aquatic ecology report (Annex 3). Species here included scrub comprised of sycamore, alder, elder, willow, horse chestnut *Aesculus hippocastanum*, hawthorn and beech with pendulous sedge *Carex pendula*, with ivy, bramble, and non-native buddleja *Buddleja davidii*.

3.3.73 This sampling location was assessed as important on a **local level**.

Scattered trees and parkland (WD5)

3.3.74 Public open parkland was located to the south of N11 and the north-eastern area of Sector 3. This area largely comprised amenity grassland with mature oak and leyland cypress trees *Cupressus x leylandii*.

3.3.75 This habitat is likely to support populations of notable species such as bats and badgers. As such, it has been assessed as important on a **county level**.

Immature woodland (WS2)

3.3.76 Immature woodland comprised public open green space located at ITM coordinates 724212, 723353. Species here included white poplar *Populus alba*, ash, oak, cherry, hazel, holly, willow, whitebeam *Sorbus aria*, hawthorn, yew *Taxus baccata*, and silver birch. Ground flora comprised hogweed, cleavers, dandelion, ivy, buttercup, broadleaved dock, daisy, and bramble.

3.3.77 Woodland is a scarce habitat within Ireland and can support a range of local and notable fauna. It is generally of high ecological value. However, these parcels are not nationally designated, and it is anticipated that its ecological value is limited by its close proximity to heavily urban areas, including the motorway. As such, this habitat has been assessed as being important on a **local level**.

Amenity grassland (GA2)/Dry meadows and grassy verges (GS2)

3.3.78 Amenity grasslands comprised roadside verges. Certain areas were left to grow to a longer sward and represented dry meadow and grassy verges; whereas other areas were managed at a short sward and represented amenity grassland.

3.3.79 Amenity grasslands are typically heavily managed areas of limited ecological value. Whilst they can still provide foraging opportunities to local foraging birds, overall, this habitat was assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Buildings and artificial surfaces (BL3)/Spoil and bareground (ED2)

3.3.80 Much of Sector 3 comprised a mixture of existing developments and roads, which were classified as buildings and artificial surfaces, or areas currently under construction, which represented spoil and bareground. Spoil and bareground areas were also noted in this area and generally comprised active construction sites with heavy plant use. Buildings and artificial surfaces and spoil bareground were assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Recolonising bare ground (ED3)

3.3.81 Areas of what is assumed to have been previous construction storage areas now represented recolonising bareground. These areas were made up almost exclusively of tall ruderal and competitive species that are generally abundant within disturbed land, such as broadleaved dock and thistles. Many of the areas containing this habitat were not accessible and comprised storage areas and/or construction areas within the Cherrywood SDZ.

3.3.82 Recolonising bareground habitat is generally of low ecological value yet may still provide foraging vale to passerine birds and may also support foraging badger, hedgehog, and other mammals. As such, it is assessed as being important on a **local level**.

Hedgerow (WL1)

3.3.83 Ornamental hornbeam hedgerows were located within greenspaces along urban areas. Whilst hedgerows are generally of ecological value, those in Sector 3 were heavily maintained, small in size, and located in heavily urbanised area.

3.3.84 The DLRCC CDP includes Policy GIB25, the protection of hedgerows (Annex 1). This policy objective is to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.

3.3.85 Furthermore, hedgerows comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.86 Therefore, it has been assessed as important on a **local level**.

Treelines (WL2)

3.3.87 Young treelines were located along existing roads, including within the central reservation. Species were dominated by sycamore. Treelines support various native fauna, including birds, bats, and invertebrates. Furthermore, treelines comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.88 As such, they have been assessed as important on a **local level**.

Sector 4

3.3.89 Much of Sector 4 comprises Cherrywood housing developments and also runs parallel to the M50. Many of the areas and the habitats within them were located within inaccessible lands. Habitats were assessed from a distance using binoculars. However, it is possible that ecological features may have been present and not recorded during the surveys. Additionally, detailed species lists could not be recorded for certain areas.

Immature woodland (WS2)

3.3.90 Immature woodland comprised a roadside buffer zone adjacent to the M50. This area could not be accessed and fully assessed. Rather it was mapped and assessed from nearby public areas using binoculars. Trees were generally young to semi-mature and combined a mixture of broadleaved and coniferous species including pine *Pinus* sp., hazel, goat willow *Salix caprea*, and field maple.

3.3.91 These habitats are considered limited in ecological value due to being located immediately adjacent to the M50 providing light, noise and nitrogen pollution, as well as a collision hazard for fauna. However, it is anticipated that this habitat will still support a range of local fauna including birds. As such, is has been assessed as being important on a **local level**.

Scrub (WS1)

3.3.92 Dense scrub comprising alder, dogwood, thistle, herb Robert, and bramble to the west of the Sector, and goat willow and willowherb to the east provided a field boundary around the grassland habitat.

3.3.93 Scrub habitat provides semi-natural habitat and likely provides suitable foraging and commuting linear features for local fauna. They have been assessed as important on a **local value**.

Tilled land (BC3)/Arable crops (BC1)

3.3.94 Tilled land comprised approximately 26.7 ha (hectares) of land located south of the M50 motorway. This land was recently ploughed and lacked vegetation but comprised arable crops during the aquatic sampling survey of Site A7.

3.3.95 This habitat may provide ground nesting opportunities for ground-nesting birds during certain times of crop growth. However, overall, it was assessed as being of limited ecological value and of **negligible importance**. This habitat has been scoped out from further assessment.

Building and artificial surfaces (BL3)/Spoil and bare ground (ED2)/Recolonising bareground (ED3)

3.3.96 A former stable comprised a lone structure at ITM coordinates 722072 724030. The hardstanding area adjacent to the building was heavily vegetated and was classified as recolonising bareground. A concrete underpass connected the two areas of Sector 4 on either side of the M50 motorway. This was classified as buildings and artificial surfaces.

3.3.97 Buildings and artificial surfaces are generally considered of negligible ecological value but can provide value to nesting birds and roosting bats. The recolonising bare ground is of limited ecological value although the sparse vegetation may provide limited opportunities for pollinating invertebrates. As such, this habitat was assessed as being of **negligible importance** and has been scoped out from further assessment.

3.3.98 Similar to Sector 3, spoil and bare ground and recolonising bare ground made up areas associated with the Cherrywood SDZ, including storage areas and construction sites. These areas were generally unvegetated and were of negligible ecological value.

Treelines (WL1)

3.3.99 Landscape planting young trees formed a treeline located north of the tilled land and also provided a buffer to the M50 comprised mostly of ash and silver birch. Treelines can support various native fauna, including birds, bats, and invertebrates. However, the proximity to the M50 is anticipated to limit its ecological value. Overall, this habitat has been assessed as important on a **local level**.

Hedgerow (WL2)

3.3.100 Hedegrows were present as internal field boundaries within the tilled land to the south of the M50 within Sector 4. These were heavily flailed and comprised a mixture of mostly blackthorn and bramble. Ditches ran parallel to the hedgerows linking to Laughanstown Stream. These were mostly dry, and only held shallow water in places at the time of the survey.

3.3.101 Hedgerows generally provide important linear habitats for a range of local fauna. However, it should be noted that the current heavily flailed status of these hedgerows limits their ecological value at present.

3.3.102 DLRCC CDP includes Policy GIB25, the protection of hedgerows (Annex 1). This policy objective is to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.

3.3.103 Furthermore, hedgerows comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.104 These habitats have been assessed as important on a **local level**.

Drainage ditches (FW4)

3.3.105 Drainage ditches ran parallel to the hedgerows detailed above, linking into a larger ditch, which has been identified as Laughanstown Stream in the Aquatic ecology report.

Sampling point A7 - Laughanstown Stream, Carrickmines Great

3.3.106 The stream averaged 1.5 m wide with a damp base and no standing water. The base was heavily vegetated with fool's watercress and brooklime *Veronica bECRabunga*. Land-based plants included abundant water figwort, buttercups and terrestrial grasses within the channel. The site was bordered by arable crops (BC1).

3.3.107 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

3.3.108 Overall, the aquatic ecological importance of site A7 was of **local level**.

Sector 5

Mixed broadleaved woodland (WD1)

3.3.109 Mixed broadleaved comprised inaccessible areas to the north of the proposed onshore ECR along this sector of the OES study area. Species included ash, hazel and cypress sp. with an understorey of buddleia, gorse, and bramble. Younger areas on the fringes of the woodland represented scrub made up of young trees including ash and silver birch, with other species including buddleia and gorse.

3.3.110 DLRCC CDP includes Objective GIB23, which aims to protect a county-wide ecological network. In addition, this habitat is anticipated to support a range of local fauna and has, therefore, been assessed as important on a **county level**.

Dry meadow and grassy verges (GS2)/Scrub (WS1)

3.3.111 Dry meadows and grassy verges comprised minor areas of grassland located on the roadside. This was bordered by scrub made up of gorse, sycamore, bramble, and other ruderal species. These habitats are limited in size and therefore, of limited ecological value overall.

3.3.112 However, they will still provide foraging opportunities for local fauna and these habitats have been assessed as being important on a **local level**.

Buildings and artificial surfaces (BL3)

3.3.113 The onshore ECR follows artificial surfaces of existing roads. Buildings and additional roads made up areas within the study area. These habitats are assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Sector 6

Depositing river/Treelines (WL1)

3.3.114 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'. The annexed habitat, 'rivers with muddy banks with *Chenopodion rubri* and *Bidention* vegetation (3270)' can occur in association with rivers but stands are typically small and fragmented in Ireland.

3.3.115 NPWS (2019), notes that only 1.32 km^2 of this Annex I habitat exists within Ireland, and it not known to be present within the O22 10 km^2 grid square associated with the proposed development (Annex 8). As such this was not considered Annex I habitat.

3.3.116 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and, where possible, to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

3.3.117 Mixed broadleaved woodland was located to the south of the proposed onshore ECR at Sector 6a. This habitat was made up of mostly semi-mature ash trees. Woodland and treelines bordered the depositing river habitat (Carrickmines Great), which extended from Sector 7.

3.3.118 The mixed treelines that run along this river are assessed as important on a **local level**.

Dry meadow and grassy verges (GS2)

3.3.119 A significant area of grassland was located within Sector 6, surrounded by treelines and bordered by a depositing river habitat to the north. The grassland was a medium sward of approximately 30 cm in height, with shorter areas and minor patches of bare ground present. No grazing was occurring at the time of the survey, and previous satellite imagers suggest that this land was previously ploughed/tilled. It is anticipated that little to no management occurs at present. Species composition was mostly grasses with ryegrass *Lolium perenne* and fescue most dominant. Forb species were limited and included mainly dandelions.

3.3.120 Flora diversity was low within this habitat. However, it is likely that it provides suitability for a range of local fauna and was assessed as being important on a **local level**.

3.3.121 This habitat also made-up areas of roadside verges and roundabouts. These were managed as a short sward and presented a low species diversity. These areas are unlikely to significantly support local fauna and, therefore, have been assessed as important on a **local level**.

Ornamental and non-native shrub (WS3)

3.3.122 Minor areas of ornamental shrub made up of non-native species, located adjacent to grassland and artificial surface. This habitat appeared unmanaged at the time of the field survey. These habitats were made up of mainly non-native flora and had limited ecological value. Although nesting birds may still use these areas. As such, this habitat has been assessed as important on a **local level**.

Buildings and artificial surfaces (BL3)

3.3.123 Artificial surfaces comprised asphalt surfaces, that comprised disused roads. This habitat was generally free from vegetation other than minor encroaching early successional flora such as mosses. This habitat is of **negligible importance** and has been scoped out from further assessment.

Sector 7

Depositing river

3.3.124 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'. The annexed habitat, 'rivers with muddy banks with *Chenopodion rubri* and *Bidention* vegetation (3270)' can occur in association with rivers but stands are typically small and fragmented in Ireland.

3.3.125 NPWS (2019), notes that only 1.32 km^2 of this Annex I habitat exists within Ireland, and it not known to be present within the O22 10 km^2 grid square associated with the proposed development (Annex 8). As such this was not considered Annex I habitat.

3.3.126 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

Sampling points A3, A4, A5 – Carrickmines Great

3.3.127 The aquatic ecology report (Annex 3) surveyed three sampling points along Sector 7 (A3, A4, and A5). These formed parts of Carrickmines Great.

3.3.128 All three sampling points were assessed as important on a **local level.**

Tilled land (BC3)/Improved agricultural grassland (GA1)

3.3.129 Sector 7 runs through two adjacent fields. One was freshly ploughed at the time of the survey and lacked vegetation. This was classified as tilled land. The second field to the east of the first contained short sward of grasses. These grasslands have re-seeded with a grass mix dominated by perennial ryegrass. The floral diversity of this habitat is very low, typically confined to clovers, with some additional ruderal species present along the field margins. Evidence of past ploughing was noted within this field with bareground and uneven terrain in places. These habitats were generally low in species diversity, although may still provide limited foraging opportunities to local fauna.

3.3.130 Therefore, they were assessed as important on a **local level**.

Treelines (WL2)

3.3.131 Treelines were made up of mature ash, bramble, blackthorn, dog rose, and holly. The likely provide suitable commuting corridors across the landscape far a range of local fauna. Furthermore, treelines comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.132 Therefore, this habitat has been assessed as being important on a **local level**.

OSS/grid connection study area

Depositing River (FW4)

3.3.133 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'. The annexed habitat, 'rivers with muddy banks with *Chenopodion rubri* and *Bidention* vegetation (3270)' can occur in association with rivers but stands are typically small and fragmented in Ireland.

3.3.134 NPWS (2019), notes that only 1.32 km^2 of this Annex I habitat exists within Ireland, and it not known to be present within the O22 10 km^2 grid square associated with the proposed development (Annex 8). As such this was not considered Annex I habitat.

3.3.135 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and, where possible, to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

Sampling point A2 Barnacullia River

3.3.136 The aquatic report undertook a sampling point at in this area (A2). The riparian zone supported scrub vegetation dominated by bramble with hogweed, cow parsley, iris *Iris pseudacorus*, spear thistle and scattered grey willow.

3.3.137 Overall, Site A4 was considered to be suitable for salmonids and was assessed as being important on a **local level**.

Other artificial lakes and ponds (FL8)

3.3.138 A rectangular artificial waterbody is located at Ballyogan Recycling Centre. This is used to filter surface run off from the recycling centre. This pond has been vegetated with dense areas of bulrush *Typha latifolia*, reeds *Phragmites* sp., and yellow flag-iris. Other emergent vegetation includes large amounts of encroaching young trees such osier willow *Sallix viminalis*, grey willow, alder and hazel. Floating vegetation include yellow waterlily and lesser duckweed *Lemna minor*. It was surveyed from a distance and the species composition was not recorded. However, it appeared that floating vegetation was present on the water surface.

3.3.139 This habitat is artificial, and its primary function was not for ecological purposes. Although it may still support notable aquatic invertebrates and fauna. As such, it has been assessed as being important on a **local level**.

Dry meadow and grassy verges (GS2)

3.3.140 The majority of the OSS/grid connection study area comprises dry meadow and grassy verges. This grassland was ungrazed and maintained at a sward height of approximately 20 cm. It is anticipated that it is likely occasionally mown. Species composition included a diverse range of forb species with Yorkshire fog, fescue, vetch, ribwort plantain, red clover, meadow buttercup, broadleaved dock, thistle, silverweed, cinquefoil, dandelion, primrose, butterbur, ragwort, coltsfoot *Tussilago farfara*, and chickweed *Stellaria media*. This habitat was assessed as important on a **local level**.

Buildings and artificial surfaces (BL3)

3.3.141 Buildings and artificial surfaces within the OSS/grid connection study area comprised two fenced-off buildings that make up electric infrastructure, as well as a disused building to the west of this area. Artificial surfaces included paths and roads. These habitats are of **negligible importance** and has been scoped out from further assessment.

Hedgerow (WL1)

3.3.142 Hedgerows bordered the grassland habitats and were composed mainly of willow. They did not appear overly managed or maintained and had a height of approximately 2 m. Hedgerows provide valuable linear habitats for commuting bats, nesting birds, mammals and invertebrates.

3.3.143 DLRCC CDP includes Policy GIB25, the protection of hedgerows (Annex 1). This policy objective is to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.

3.3.144 Furthermore, hedgerows comprise such a linear feature that would afford protection under Article 10 of the Habitats Directive.

3.3.145 Therefore, they have been assessed to be important at a **local level**.

OSS/grid connection study area

Depositing river (FW4)

3.3.146 Fossitt (2000) links this habitat with the Annex I habitat Clear unpolluted rivers can contain the annexed habitat, 'watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)'. The annexed habitat, 'rivers with muddy banks with *Chenopodion rubri* and *Bidention* vegetation (3270)' can occur in association with rivers but stands are typically small and fragmented in Ireland.

3.3.147 NPWS (2019), notes that only 1.32 km^2 of this Annex I habitat exists within Ireland, and it not known to be present within the O22 10 km^2 grid square associated with the proposed development (Annex 8). As such this was not considered Annex I habitat.

3.3.148 The DLRCC CDP includes Policy GIB24, which aims to protect the character and ecological value of the river and stream corridors in the County and, where possible, to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.

Sampling point A1 – Unnamed stream, Jamestown

3.3.149 The aquatic ecology undertook one sampling site within the OSS/grid connection study area(A1). The immediate riparian fringe however supported water figwort *Scrophularia umbrosa* and bittersweet *Solanum dulcamara* with the steep embankments supporting ruderal species including wild turnip *Brassica rapa*, great willowherb, nettle, cleavers, bramble and hogweed. Scattered semi-mature grey willow were also present along the riparian zone.

3.3.150 Overall, Site A1 was considered suitable for salmonids and was assessed as being important on a **local level**.

Immature woodland (WS2)/scrub (WS1)

3.3.151 The western extent of the proposed onshore ECR and the OSS/grid connection study area comprised immature woodland and dense scrub. This included species detailed above in the depositing river as well as ash, willow, bramble, gorse *Ulex europaeus*, bramble, rose. The immature woodland provides suitability for nesting birds, foraging and commuting bats and other mammals and invertebrates. As such, assessed as being important on a **local level**.

Buildings and artificial surfaces (BL3)

3.3.152 Existing roads and electrical infrastructure existed within the OSS/grid connection study area. Roads were asphalt. These habitats were assessed to be of **negligible importance**. This habitat has been scoped out from further assessment.

Hedgerow (WL1)

3.3.153 Hedgerows were considered to be important at a **local level**.

Leopardstown TCC

3.3.154 Leopardstown TCC had total area of 1.74 ha and was located at central ITM coordinates 721576 724330, approximately 55 m Northeast of the M50 motorway. There was an access point into TCC through a farm gate onto the adjacent road to the south. TCC comprised an unmanaged area that had since succeeded into the various habitats detailed below.

Dry meadows and grassy verges (GS2)

3.3.155 1.17 ha of TCC 1 was made up of dry meadows and grassy verges with various patches of scrub and recolonising bare ground interspersed within it. The substrate throughout most of this area was made up of a mixture of stone and gravel of various sizes and bare ground was present in various quantities throughout the grassland. The grassland was ungrazed and unmanaged, with a long sward-height of approximately 40 cm. Shorter areas present where grasses were less abundant and more forbs were present.

3.3.156 The grassland was fairly species-rich. Likely due to the poor substrate and nutrient content and included the following species: creeping buttercup, bird's-foot trefoil, cow parsley, red clover, ragwort, dandelion, yarrow, ribwort plantain, drooping sedge *Carex pendula*, perennial ryegrass, meadowgrass, Yorkshire-fog grass, creeping cinquefoil *Potentilla reptans*, coltsfoot, red fescue, pale flax *Linum bienne*, cock's-foot grass, tutsan, broadleaved dock, silverweed, hairy willow herb *Epilobium hirsutum*, teasel, curled dock *Rumex crispus*, vetch, lesser knapweed *Centaurea nigra*, glaucous sedge *Carex flacca*, horsetail *Equisetum arvense*, rough hawkbit *Leontodon hispidus*, common daisy, black medic *Medicago lupulina*, and creeping thistle *Cirsium arvense*. One stand of invasive alien species montbretia was also noted within this habitat at ITM 721586 724297.

3.3.157 Early-emerging scrub was abundant throughout the grassland and was mapped as dry meadows and grassy verges where the scrub species were young and the grassland was dominant. Species here consisted of gorse, hawthorn, buddleia, goat willow, bramble.

3.3.158 This habitat is likely of value to a range of invertebrates, including pollinating species. Additionally, it is likely of value to foraging birds, bats and other local fauna. It has been assessed as being important on a **local level**.

Scrub (WS1)

3.3.159 0.52 ha of scrub was present across several areas in various densities throughout the TCC, including within the central areas and along the boundaries the TCC. Species were fairly consistent throughout the different patches of scrub and included the following species: bramble, goat willow, buddleia, hawthorn, gorse, alder saplings (from adjacent offsite South immature woodland) and infrequent ash saplings. Tall herb species were also noted and included thistles and bindweed *Convolvulus arvensis*.

3.3.160 Scrub habitat provides semi-natural habitat and likely provides suitable foraging and nesting opportunities for local birds and foraging habitat for small mammals. This habitat has been assessed as important on a **local value**.

Recolonising bare ground (ED3)

3.3.161 0.03 ha of recolonising bare ground was present at the entrance (South) of the TCC. Vegetation was largely absent here other than some very early successional examples of grasses and forbs detailed in the dry meadows and grassy verges, detailed above.

3.3.162 Overall, this habitat has limited ecological value and has been evaluated as of **negligible importance**. It has been scoped out from further assessment.

Buildings and artificial surfaces (BL3)

3.3.163 A tarmac path bisected the grassland to the North of the TCC. This comprised an area of 0.02 ha and formed a pedestrian pathway through the TCC (although the area was out of public access at the time of the survey).

3.3.164 Vegetation was absent other than very minor encroachment of those noted within the dry meadows and grassy verges habitat, detailed above. This habitat has no ecological value and has been evaluated as of **negligible importance**. It has been scoped out from further assessment.

O&M Base

Sea inlets and bays (MW2)/Open marine water (MW1)

3.3.165 The marine habitat enclosed by the artificial coastal structures was classified as sea inlets and bays as it was sheltered by the coastal structures. The search area did extend beyond this point and included marine open water comprised the majority of the surrounding area of the harbour. These habitats were seen to support notable bird species including SPA qualifying interest birds such as tern *Sterna* sp. and cormorant, as well as black guillemot.

3.3.166 Annex I habitat is considered to be present here through 'Large shallow inlets and bays' 1160. This habitat type is considered present in the O22 10 km^2 grid square (Annex 8) and comprises 21,300 km^2 within Ireland (NPWS, 2019). It is estimated that 36.5 ha of this habitat was present within the study area.

3.3.167 This habitat is also considered to support foraging SPA qualifying birds such as tern and gulls and is also considered to comprise viable areas of Annex I habitat large shallow inlets and bays 1160. Therefore, they have been assessed as being important on a **national level**.

Sea walls, piers and jetties (CC1)

3.3.168 Coastal constructions through sea walls, piers and jetties were located within the surrounding area of the O&M Base used for the area's operation as afunctional harbour. These comprised artificial built structures that generally lacked vegetation. In isolation these habitats are of limited ecological value.

3.3.169 This habitat supports populations of locally uncommon and amber-listed nesting black guillemot. Therefore, it has been assessed as important on a potentially **county level**.

Buildings and artificial surfaces (BL3)

3.3.170 Much of the O&M Base comprised buildings and artificial surfaces, made up of structures used for the operation of a harbour as well as roads, car parking area, and pedestrian walkways. Vegetation was negligible within these areas, with only the occasional vegetation growing on peripheral areas.

3.3.171 This habitat is generally of negligible importance. However, it does support amber-listed nesting herring gull *Larus argentatus* and house martin *Delichon urbicum*. Therefore, these habitats were assessed as important on a **county level**.

Amenity grassland (GA2)

3.3.172 Limited areas of amenity grassland were present within the O&M Base, making up green open space between roads and pedestrian walkways. This habitat was dominated by grasses and managed to a short sward through regular mowing.

3.3.173 Amenity grasslands are typically heavily managed areas of limited ecological value. Whilst they can still provide foraging opportunities to local foraging birds, overall, this habitat was assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Ornamental non-native shrub (WS3)

3.3.174 Small patches of ornamental non-native shrub were located in peripheral areas of the O&M Base. These areas were made up of non-native species and are anticipated to be regularly managed through pruning. This habitat was comprised of non-native species and was, therefore, assessed as being of **negligible importance**. This habitat has been scoped out from further assessment.

Aquatic ecology survey sites

3.3.175 Reference should be made to the Aquatic Ecology Report (provided in Annex 3) for the full fisheries and aquatic ecology survey results including a drawing of where streams and rivers are located. A summary is provided below.

3.3.176 The DLRCC CDP includes Policy Objective GIB24, aims to maintain and protect the ecological value of river and stream corridors. This policy protection also extends to riparian habitats (refer to Annex 1).

3.3.177 The watercourses and aquatic survey sites in the vicinity of the proposed development included Barnacullia Stream and unnamed tributary, Jamestown Stream, Glenamuck North Stream and unnamed tributary, Carrickmines Stream, Laughanstown Stream, Shanganagh River and the Kill-O-The-Grange Stream. These had been historically deepened and straightened but retained a semi-natural profile of riffle, glide and localised pool sequences.

3.3.178 A total of 14 aquatic survey sites were surveyed. No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from 14 wetted riverine sites.

3.3.179 No rare or protected macrophytes or aquatic bryophytes were recorded at the 26 survey sites. Therefore, notable macrophytes and bryophytes can be reasonably assessed as absent.

3.3.180 Biological water quality was calculated as good for four sites (A1, A2, A8, and A9), moderate for two sites (A6 and A6b), poor for six sites (A4, A5, A7b, B1, B2, and B3). Two sites could not be assessed as a water quality sample could not be taken (A3, A7). The results are summarised in Table 7.

Table 7 Aquatic ecology survey sites, details and evaluation obtained from the Aquatic Ecology Report provided in Annex 3

Site ref.	Name	Alternative name	Q-sampling	Evaluation and importance
A1	Unnamed Stream, Jamestown	n/a	**Good status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A1 was of **local importance (higher value)** due to its suitability for salmonids and European eel, good water quality status.
A2	Barnacullia River, Jamestown	Ballyogan Stream	**Good status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A2 was of **local importance (higher value)** due to its suitability for salmonids and European eel, good water quality status.
A3	Jamestown Stream, Carrickmines Great	n/a	Given the ephemeral nature of the channel the watercourse was not of fisheries value and it was not possible to collect a biological water quality sample.	The aquatic evaluation of A3 was of **local importance (lower value**).
A4	Glenamuck North Stream, Carrickmines Great	Golf Stream	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A4 was of **local importance (lower value**).
A5	unnamed stream, Carrickmines Great	n/a	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A5 was of **local importance (lower value**).
A6	Carrickmines Stream, Carrickmines Little	n/a	**Moderate status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A6 was of **local importance (higher value**) due to positive salmonid and European eel eDNA records. This site is also utilised by otter.
A6b	Carrickmines Stream, Carrickmines Little	n/a	**Moderate status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A6b was of **local importance (higher value**) due to its suitability for salmonids and European eel.
A7	Laughanstown Stream, Carrickmines Great	n/a	Given the ephemeral nature of the channel, the site was not of fisheries value and as	The aquatic evaluation of A7 was of **local importance (lower value**).

Site ref.	Name	Alternative name	Q-sampling	Evaluation and importance
			the stream was dry at the time of the survey, it was not possible to collect a biological water quality sample.	
A7b	Laughanstown Stream, Carrickmines Great	n/a	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A7b was of **local importance (lower value**).
A8	Carrickmines Stream, Cherrywood Park	Loughlinstown River North	**Good status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A8 was of **local importance (higher value)** due to positive salmonid and European eel eDNA records. This site is also utilised by otter and has good water quality status.
A9	Shanganagh River, Shanganagh Wood	n/a	**Good status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of A9 was of **local importance (higher value)** due to positive salmonid, European eel and lamprey eDNA records. This site is also utilised by otter and has good water quality status.
B1	Kill-O-The-Grange River, R118 road culvert	Deansgrange River	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'. It should be noted that an invasive alien aquatic species was noted at this site.	The aquatic evaluation of B1 was of **local importance (higher value)** due to it being utilised by otter.
B2	Kill-O-The-Grange River, Glencar Lawn	Deansgrange River	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of B2 was of **local importance (higher value)** due to its suitability for salmonids and European eel.
B3	Kill-O-The-Grange River, Achill Road	Deansgrange River	**Poor status** with no macro-invertebrate species of conservation value greater than 'least concern'.	The aquatic evaluation of B3 was of **local importance (higher value)** due to positive salmonid and European eel eDNA records

Habitats summary

3.3.181 Table 8 provides a summary of the habitat areas/lengths noted within the OES study area and the O&M Base study area.

Table 8 Total areas (ha) & lengths (km) of each Fossitt habitats occurring throughout study areas

Habitats present	Fossitt code	Total area (ha)/length (km)
OES		
Arable crops	BC1	3.57 ha
Horticultural land	BC2	0.83 ha
Tilled land	BC3	11.31 ha
Sedimentary sea cliffs	CS3	0.34 km
Spoil and bareground	ED2	9.72 ha
Recolonizing bareground	ED3	0.75 ha
Other artificial lakes and ponds	FL8	0.34 ha
Depositing river	FW2	2.15 km
Drainage ditch	FW4	0.19 km
Improved agricultural grassland	GA1	0.99 ha
Amenity grassland	GA2	11.16 ha
Dry calcareous grassland	GS1	1.29 ha
Dry meadow and grassy verges	GS2	21.17 ha
Shingle and gravel shores	LS1	1.95 ha
Mixed broadleaved woodland	WD1	1.38 ha
Scattered trees and parkland	WD5	4.51 ha
Hedgerow	WL1	1.10 km
Treelines	WL2	3.71 km
Riparian woodland	WN5	0.78 ha
Scrub	WS1	4.52 ha
Immature woodland	WS2	5.52 ha
Ornamental non-native shrub	WS3	0.04 ha
Total area/length		**136.84 ha/14.16 km**
O&M Base		
Buildings and Artificial Surfaces	BL3	12.78
Sea walls, piers and jetties	CC1	6.12 ha
Amenity grassland	GA2	0.52 ha
Moderately Exposed Rocky Shores	LR2	0.32 ha

Habitats present	Fossitt code	Total area (ha)/length (km)
Open marine water	MW1	7.43 ha
Sea inlets and bays	MW2	59.80 ha
Ornamental non-native shrub	WS3	0.02 ha
Total area		**86.98 ha**

3.4 Fauna

Terrestrial invertebrates

OES

3.4.1 The data search returned records of invertebrates along the search area across the OES. These records are detailed in Table 9.

Table 9 Notable invertebrate records returned across the onshore ECR

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Grayling	*Hipparchia semele*	1	31/08/2010	Irish Butterfly Monitoring Scheme	Near threatened
Large red-tailed bumblebee	*Bombus (Melanobombus) lapidarius*	5	11/06/2023	Bees of Ireland	Near threatened
Moss carder-bee	*Bombus (Thoracombus) muscorum*	3	30/06/2015	Bees of Ireland	Near threatened
Small Heath	*Coenonympha pamphilus*	2	16/06/2010	Irish Butterfly Monitoring Scheme	Near threatened
Tawny mining bee	*Andrena (Andrena) fulva*	1	04/04/2021	Bees of Ireland	Regionally extinct
Wall	*Lasiommata megera*	1	24/05/2010	Irish Butterfly Monitoring Scheme	Endangered

3.4.2 Incidental sightings of common and widespread species such as peacock butterfly *Aglais io*, red admiral *Vanessa atalanta*, ringlet butterfly *Aphantopus hyperantus* were noted during the various surveys. Habitats along the onshore ECR including woodland, scrub, grassland, and the aquatic habitats will provide suitable conditions and support a range of invertebrate species cannot be discounted.

3.4.3 The invertebrate communities are associated to the specific habitats present across the OES study area. Therefore, they are assessed to be the same importance for each habitat type assessed earlier in this report.

O&M Base

3.4.4 The data search returned records of one notable invertebrates, comprising two counts of near threatened large red-tailed bumble bee in 2016.

3.4.5 No specific invertebrate surveys were conducted. The buildings and artificial surfaces that comprise much of the O&M Base are of negligible value for invertebrates, lacking the deadwood or pollinating species required for invertebrates. The marine habitats are likely to support aquatic invertebrates. Therefore, invertebrates are assessed as being of **negligible importance**.

Aquatic invertebrates

White-clawed crayfish

3.4.6 White-clawed crayfish is listed on Annex II and V of the Habitats Directive and afforded protection under the Wildlife Acts.

3.4.7 No white-clawed crayfish were identified across the survey sites. While there was some physical habitat suitability for crayfish in the boulder and cobble refugia of the Barnacullia Stream, Carrickmines Stream and Shanganagh River, the low alkalinity and igneous geology of the River Dargle sub-catchment made it unsuitable for the species (Demers et al., 2005; Lucy & McGarrigle, 1987), supporting the absence of records in the catchment (based on NPWS data). Therefore, this species can be reasonably discounted.

Amphibians

3.4.8 Common frog *Rana temporaria* are listed on Annex V of the Habitats Directive and afforded protection under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

3.4.9 Common frog are evenly distributed across Ireland, including within the study areas (NBDC, 2023a).

3.4.10 Smooth newt *Lissotriton vulgaris* are afforded protection under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts. This specie sis well distributed across Ireland, including the search area. Although significant gaps exist where no records have been found (NBDC, 2023b).

OES

3.4.11 Records of common frog cover almost all parts of Ireland, including the DLRCC area (NCDC, 2023a). The data search returned 14 records of common frog across 4 No. 1 x 1 grid squares (O2123, O2224, O2322, and O2622) the onshore ECR. The latest record was in 2020.

3.4.12 Only one artificial waterbody was located in close proximity to the proposed OSS (grid connection study area). This comprised a rectangular artificial waterbody at the Ballyogan Landfill Facility and Recycling Park and is used to filter surface run off from the recycling centre. Therefore, it was considered unlikely to support breeding amphibians. The only other waterbodies within the OES study area comprised flowing streams and rivers, which generally provide barriers to newts rather than potential breeding habitat (Langton et al., 2001), and are of lower value to breeding frogs, which will often prefer shallower, still and less accessible areas to spawn (NRA, n.d.). As such, breeding amphibians were scoped out and surveys were considered to be not required.

3.4.13 Suitable terrestrial habitats for these species were present throughout the proposed ECR through woodland, scrub, grasslands, treelines, and hedgerows. No incidental sightings of amphibians were noted during the field surveys along the proposed onshore ECR.

3.4.14 Therefore, it is possible that common frog and smooth newt are present within vegetated habitats along the onshore ECR, and these species populations have been assessed as important on a **local level.**

O&M Base

3.4.15 The data search returned 23 records of common frog *Rana temporaria* with the latest record being returned in 2006, within the search area around the O&M Base.

3.4.16 No incidental sightings of amphibians were noted on the O&M Base, and this area comprised mostly buildings and artificial surfaces and marine habitats, which are of negligible value for amphibians. Therefore, amphibians are assessed as likely absent from the O&M Base itself, and the records are anticipated to be limited to isolated vegetated habitats located outside the O&M Base.

Reptiles

3.4.17 Common lizards *Zootoca vivipara* are afforded protection under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts. This species is distributed throughout Ireland, including the DLRCC area.

OES

3.4.18 The data search returned one record of loggerhead turtle *Caretta caretta* within the O2623 1 x 1 km grid square. This record was from the sea east of the Onshore ECR in 2004. This record likely represents a lost individual that is not representative of any population of this species in Dublin Bay.

3.4.19 No specific common lizard surveys were conducted on the site. Furthermore, no incidental sightings of common lizard were noted throughout the onshore ECR during the various surveys. This species is considered widespread and can be found in a range of habitat types. However, common lizards are mostly associated with bog, heath and coastal habitats and the margins of coniferous woodlands. These habitats were not represented throughout the onshore ECR. Therefore, they can be reasonably be scoped out.

3.4.20 It should be noted that the onshore ECR is located mostly within developed and urban environments. Existing roads and buildings are anticipated to limit the potential dispersal of reptiles across the area. Suitable habitats such as habitat mosaics of woodland, scrub, grassland and bareground do exist along the onshore ECR and may provide suitability for reptiles. However, these are generally fragmented and relatively small. The presence of reptiles is considered unlikely along the onshore ECR and can be reasonably discounted due to the relatively limited level of habitat loss required to facilitate the proposed development.

O&M Base

3.4.21 The data search returned no records of reptiles within the search area around the O&M Base.

3.4.22 The habitats comprising the O&M Base were of negligible value for reptiles, offering no foraging opportunities or significant refugia or shelter from predators. The O&M Base is situated within a significantly urbanised area. As such, reptiles are considered absent have been scoped out.

Birds

OES

3.4.23 Table 10 details the notable bird records[6] returned in the search area along the OES. All nesting birds are protected under the Wildlife Act between 1st March and 31st August. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts, the Birds Directive and the Habitats Directive.

[6] As listed Nelson et al., 2019

Table 10 Bird records returned in the OES search area

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Barn owl	*Tyto alba*	1	10/05/2021	Birds of Ireland	BoCCI – Red List
Barn swallow	*Hirundo rustica*	38	21/12/2020	Birds of Ireland	BoCCI – Amber List
Black guillemot	*Cepphus grylle*	2	21/03/2010	Birds of Ireland	BoCCI – Amber List
Black-headed Gull	*Larus ridibundus*	48	16/02/2010	Birds of Ireland	BoCCI – Red List
Brambling	*Fringilla montifringilla*	4	13/01/2013	Birds of Ireland	BoCCI – Amber List
Brent goose	*Branta bernicla*	9	31/03/2023	Birds of Ireland	BoCCI – Amber List
Common guillemot	*Uria aalge*	6	10/06/2012	Birds of Ireland	BoCCI – Amber List
Kestrel	*Falco tinnunculus*	3	05/01/2006	Birds of Ireland	BoCCI – Amber List
Kingfisher	*Alcedo atthis*	4	04/09/2016	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Linnet	*Carduelis cannabina*	1	19/07/2011	Birds of Ireland	BoCCI – Amber List
Common pheasant	*Phasianus colchicus*	2	13/04/2010	Birds of Ireland	
Common sandpiper	*Actitis hypoleucos*	1	14/10/2011	Birds of Ireland	BoCCI – Amber List
Common snipe	*Gallinago gallinago*	6	26/12/2010	Birds of Ireland	BoCCI – Amber List
Fulmar	*Fulmarus glacialis*	5	19/03/2011	Birds of Ireland	BoCCI – Amber List
Goldcrest	*Regulus regulus*	66	13/01/2017	Birds of Ireland	BoCCI – Amber List
Greenfinch	*Carduelis chloris*	92	10/02/2018	Birds of Ireland	BoCCI – Amber List
Grey wagtail	*Motacilla cinerea*	75	16/02/2017	Birds of Ireland	BoCCI – Red List
Starling	*Sturnus vulgaris*	83	28/11/2020	Birds of Ireland	BoCCI – Amber List
Swift	*Apus apus*	36	06/07/2010	Birds of Ireland	BoCCI Amber List
Common tern	*Sterna hirundo*	1	09/09/2011	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Curlew	*Numenius arquata*	14	28/08/2019	Birds of Ireland	BoCCI – Red List
Oystercatcher	*Haematopus ostralegus*	10	01/02/2023	Birds of Ireland	BoCCI – Amber List
Redwing	*Turdus iliacus*	42	09/04/2012	Birds of Ireland	BoCCI – Red List
Reed warbler	*Acrocephalus scirpaceus*	1	28/05/2012	Birds of Ireland	BoCCI – Amber List
Tree sparrow	*Passer montanus*	1	05/02/1999	Birds of Ireland	BoCCI – Amber List
Turnstone	*Arenaria interpres*	7	05/01/2011		BoCCI – Amber List
Woodcock	*Scolopax rusticola*	1	26/12/2010	Birds of Ireland	BoCCI – Amber List
Golden plover	*Pluvialis apricaria*	94	05/12/2010	Birds of Ireland	EU Birds Directive Annex I BoCCI – Red List
Shag	*Phalacrocorax aristotelis*	8	10/06/2012	Birds of Ireland	BoCCI – Amber List
Greater black-backed gull	*Larus marinus*	10	10/06/2012	Birds of Ireland	BoCCI – Amber List
Cormorant	*Phalacrocorax carbo*	10	10/06/2012	Birds of Ireland	BoCCI – Amber List
Great crested grebe	*Podiceps cristatus*	2	17/01/2010	Birds of Ireland	BoCCI – Amber List
Herring gull	*Larus argentatus*	46	31/12/2019	Birds of Ireland	BoCCI – Red List
House martin	*Delichon urbicum*	38	06/09/2012	Birds of Ireland	BoCCI – Amber List
House sparrow	*Passer domesticus*	33	28/11/2020	Birds of Ireland	BoCCI – Amber List
Lesser black-backed gull	*Larus fuscus*	7	06/07/2018	Birds of Ireland	BoCCI – Amber List
Little egret	*Egretta garzetta*	5	08/01/2011	Birds of Ireland	EU Birds Directive Annex I Bird Species
Little gull	*Larus minutus*	1	03/01/2002	Birds of Ireland	EU Birds Directive Annex I Bird Species
Long-tailed duck	*Clangula hyemalis*	1	03/01/2002	Birds of Ireland	EU Birds Directive Annex II, Section II
Mallard	*Anas platyrhynchos*	21	23/02/2023	Birds of Ireland	N/A
Mediterranean Gull	*Larus melanocephalus*	1	07/12/2009	Birds of Ireland	EU Birds Directive Annex I BoCCI Amber List

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Common (Mew) Gull	*Larus canus*	1	16/02/2010	Birds of Ireland	BoCCI – Amber List
Mute swan	*Cygnus olor*	2	23/07/2012	Birds of Ireland	BoCCI – Amber List
Northern gannet	*Morus bassanus*	4	10/06/2012	Birds of Ireland	BoCCI – Amber List
Northern Lapwing	*Vanellus vanellus*	1	18/01/2011	Birds of Ireland	BoCCI – Red List
Peregrine	*Falco peregrinus*	1	30/10/2011	Birds of Ireland	EU Birds Directive Annex I
Razorbill	*Alca torda*	2	19/03/2011	Birds of Ireland	BoCCI – Amber List
Red-throated diver	*Gavia stellata*	7	19/03/2011	Birds of Ireland	EU Birds Directive Annex I Bird Species BoCCI- Amber List
Ringed plover	*Charadrius hiaticula*	4	05/12/2010	Birds of Ireland	BoCCI – Amber List
Rock pigeon	*Columba livia*	3	20/12/2020	Birds of Ireland	EU Birds Directive Annex II, Section I
Sand martin	*Riparia riparia*	43	05/09/2020	Birds of Ireland	BoCCI – Amber List
Sandwich tern	*Sterna sandvicensis*	1	10/05/2010	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Skylark	*Alauda arvensis*	4	24/09/2011	Birds of Ireland	BoCCI – Amber List
Water rail	*Rallus aquaticus*	1	07/12/2009	Birds of Ireland	BoCCI- Amber List
Willow warbler	*Phylloscopus trochilus*	22	08/08/2018	Bird Atlas 2007 – 2011	BoCCI – Amber list
Yellowhammer	*Emberiza citrinella*	1	03/12/2010	Birds of Ireland	BoCCI – Red List

3.4.24 No breeding bird, raptor, or inland wintering bird surveys have been conducted across the OES as the level of habitat loss required to facilitate the proposed development relatively limited. However, all bird species that were recorded during the various habitat surveys are provided below. A separate Appendix (Volume 4, Appendix 4.3.6-9) has been provided in this report detailing the results of coastal bird surveys for the proposed Landfall location.

3.4.25 Overall, the vegetated habitats along the OES including woodland, scrub, grassland, treelines and hedgerows will provide valuable nesting and foraging habitat to mostly passerine birds. The open fields and agricultural land may provide suitability for ground nesting birds and birds of prey.

3.4.26 Incidental sightings of common and widespread passerine birds were noted along the OES including magpie *Pica pica*, goldfinch *Carduelis carduelis*, great tit *Parus major*, blue tit *Cyanistes caeruleus*, blackbird *Turdus merula*. Incidental sightings of birds of prey were limited to buzzard *Buteo buteo*.

3.4.27 In summary, the OES supports a range of mostly common passerines, with areas also likely to support ground nesting birds and foraging birds of prey. Birds assemblage is assessed as important on a **local level**.

O&M Base

3.4.28 Table 11 details the bird records returned in the search area along the O&M Base.

Table 11 Notable bird records returned in the search area

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Bar-tailed godwit	*Limosa lapponica*	2	31/12/2011	Bird Atlas 2007 – 2011	EU Birds Directive Annex I BoCCI – Amber List
Barn swallow	*Hirundo rustica*	6	21/05/2016	Birds of Ireland	BoCCI – Amber List
Black guillemot	*Cepphus grylle*	32	07/03/2023	Birds of Ireland	BoCCI – Amber List
Black-headed gull	*Larus ridibundus*	36	05/03/2023	Birds of Ireland	BoCCI – Red List
Black-legged kitiwake	*Rissa tridactyla*	23	19/01/2017	ObSERVE	BoCCI – Red List
Black-necked grebe	*Podiceps nigricollis*	2	22/03/2012	Birds of Ireland	BoCCI – Red List
Black-tailed godwit	*Limosa limosa*	1	31/12/2011	Bird Atlas 2007 – 2011	BoCCI – Amber List
Brent goose	*Branta bernicla*	24	20/03/2023	Birds of Ireland	BoCCI – Amber List
Common guillemot	*Uria aalge*	29	27/03/2023	Birds of Ireland	BoCCI – Amber List
Linnet	*Carduelis cannabina*	9	11/07/2019	Birds of Ireland	BoCCI – Amber List
Common greenshank	*Tringa nebularia*	4	02/01/2017	Birds of Ireland	BoCCI – Amber List
Common redshank	*Tringa totanus*	25	22/12/2022	Birds of Ireland	BoCCI – Red List
Common sandpiper	*Actitis hypoleucos*	1	24/07/2012	Birds of Ireland	BoCCI – Amber List
Common scoter	*Melanitta nigra*	4	22/12/2010	Birds of Ireland	BoCCI – Red List

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Common snipe	*Gallinago gallinago*	1	08/01/2011	Birds of Ireland	BoCCI – Amber List
Common tern	*Sterna hirundo*	5	03/07/2019	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Starling	*Sturnus vulgaris*	14	23/01/2023	Birds of Ireland	BoCCI – Amber List
Swift	*Apus apus*	2	12/06/2023	Swifts of Ireland	BoCCI – Amber List
Dunlin	*Calidris alpina*	5	06/02/2015	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Curlew	*Numenius arquata*	12	29/10/2018	Birds of Ireland	BoCCI – Red List
Oystercatcher	*Haematopus ostralegus*	39	23/01/2023	Birds of Ireland	BoCCI – Amber List
Teal	*Anas crECRa*	1	17/01/2012	Birds of Ireland	BoCCI – Amber List
Greenfinch	*Carduelis chloris*	7	14/02/2012	Birds of Ireland	BoCCI – Amber List
Shag	*Phalacrocorax aristotelis*	47	13/01/2018	Birds of Ireland	BoCCI – Amber List
Greater black-backed gull	*Larus marinus*	37	14/02/2016	Birds of Ireland	BoCCI – Amber List
Cormorant	*Phalacrocorax carbo*	45	22/12/2022	Birds of Ireland	BoCCI – Amber List
Fulmar	*Fulmarus glacialis*	3	31/12/2011	Bird Atlas 2007 – 2011	BoCCI – Amber List
Great crested grebe	*Podiceps cristatus*	8	09/01/2016	Birds of Ireland	BoCCI – Amber List
Great northern diver	*Gavia immer*	9	28/12/2015	Birds of Ireland	EU Birds Directive Annex I
Grey wagtail	*Motacilla cinerea*	12	04/02/2012	Birds of Ireland	BoCCI – Red List
Herring gull	*Larus argentatus*	49	22/12/2022	Birds of Ireland	BoCCI – Red List
House sparrow	*Passer domesticus*	10	09/01/2016	Birds of Ireland & Bird Atlas 2007 – 2011	BoCCI – Amber List
Lesser black-backed gull	*Larus fuscus*	4	22/12/2022	Birds of Ireland	BoCCI – Amber List

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Little grebe	*Tachybaptus ruficollis*	6	06/02/2015	Birds of Ireland & Bird Atlas 2007 – 2011	BoCCI – Amber List
Little gull	*Larus minutus*	3	19/01/2017	ObSERVE & Bird Atlas 2007 – 2011	EU Birds Directive Annex I
Manx shearwater	*Puffinus puffinus*	1	21/06/1997	Birds of Ireland	BoCCI – Amber List
Mediterranean gull	*Larus melanocephalus*	80	22/12/2022	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Common gull	*Larus canus*	19	11/02/2012	Birds of Ireland & Bird Atlas 2007 – 2011	BoCCI – Amber List
Mute swan	*Cygnus olor*	1	06/04/2011	Birds of Ireland	Wildlife Acts BoCCI – Amber List
Northern gannet	*Morus bassanus*	9	24/04/2021	Birds of Ireland	Wildlife Acts BoCCI – Amber List
Northern lapwing	*Vanellus vanellus*	3	31/12/2011	Bird Atlas 2007 – 2011	BoCCI – Red List
Northern wheatear	*Oenanthe oenanthe*	3	27/03/2023	Birds of Ireland	BoCCI – Amber List
Peregrine falcon	*Falco peregrinus*	1	31/12/2011	Bird Atlas 2007 – 2011	EU Birds Directive Annex I
Purple sandpiper	*Calidris maritima*	15	14/01/2023	Birds of Ireland	BoCCI – Red List
Razorbill	*Alca torda*	18	27/03/2023	Birds of Ireland	BoCCI – Amber List
Red throated diver	*Gavia stellata*	11	14/02/2016	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Ringed plover	*Charadrius hiaticula*	4	07/01/2023	Birds of Ireland	BoCCI – Amber List
Roseate tern	*Sterna dougallii*	1	26/09/2011	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List

Species name	Scientific name	Record count	Date of last record	Dataset	Designation
Sandwich tern	*Sterna sandvicensis*	14	05/10/2017	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Skylark	*Alauda arvensis*	3	31/12/2011	Bird Atlas 2007 – 2011	BoCCI – Amber List
Arctic Tern	*Sterna paradisaea*	1	12/05/2001	Birds of Ireland	EU Birds Directive Annex I BoCCI – Amber List
Whooper swan	*Cygnus cygnus*	1	31/12/2011	Bird Atlas 2007 – 2011	EU Birds Directive Annex I BoCCI – Amber List
Willow warbler	*Phylloscopus trochilus*	2	31/12/2011	Bird Atlas 2007 – 2011	BoCCI – Amber List
Yellowhammer	*Emberiza citrinella*	1	08/07/2019	Birds of Ireland	BoCCI – Red List

3.4.29 Field surveys identified that the buildings comprising the O&M Base support nesting herring gull, house martin, and roosting starlings *Sturnus vulgaris*. Nesting black guillemots *Cepphus grylle* were assessed as likely nesting under the adjacent pier. Further seabird surveys were also conducted for Dún Laoghaire Harbour to confirm this, the results of these have been included in Volume 6, Appendix 9-5.2.2 Onshore Birds Technical Baseline Report. Other notable birds were recorded foraging on the marine habitats or flying over the area, including cormorant *Phalacrocorax* carbo, black-headed gull *Chroicocephalus ridibundus* and terns.

3.4.30 Several birds noted comprised SPA qualifying interest bird species including terns, black-headed gull, and herring gull. Herring gull were noted as breeding on the existing buildings and the other species likely use the search area for foraging. As such, under the precautionary principle, the bird assemblage has been assessed as important on an **international level**.

Bats

3.4.31 All bats are listed Annex IV of the Habitats Directive and afforded protection by the Wildlife Acts. Lesser horseshoe bats are also listed on Annex II of the habitats Directive. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts and Habitats Directive.

OES

3.4.32 The data search returned records six species of bats including one record of Natterer's bat *Myotis nattereri* and Daubenton's bat *Myotis daubentonii* in 2005; and seven records of brown long-eared bat *Plecotus auratus*, three records of Leisler's bat *Nyctalus leisleri*, six records of common pipistrelle *Pipistrellus pipistrellus*, and six records of soprano pipistrelle *Pipistrellus pygmaeus* as recent as 2012.

3.4.33 The bat landscape suitability index (Lundy et al., 2011) across all bat species showed that the mean score (out of 100) is detailed in Table 12. Two areas provided difference scores: the eastern part of the onshore ECR and the western part of the route. In summary, the landscapes scored highest for Leisler's bat, followed by common pipistrelle, soprano pipistrelle, whiskered bat, Natterer's bat, and brown long-eared bat. The landscape scores were lowest for lesser horseshoe, Nathusius' bat and Daubenton's bat.

Table 12 Bat landscape index scores across the onshore ECR

Species	Bat landscape index score	
	O22L	O22B
All bats	**32**	**26.56**
Nyctalus leisleri	50	40
Pipistrellus pipistrellus	49	45
Pipistrellus pygmaeus	48	40
Myotis mystacinus	38	19
Myotis nattereri	37	42
Plecotus auritus	34	31
Pipistrellus nathusii	10	3
Myotis daubentonii	22	19
Rhinolophus hipposideros	0	0

3.4.34 PRA identified trees/structures with bat roosting potential that were likely to be impacted by the proposed development. Reference should be made to Annex 5 for further details of the PRA. In summary, 15 trees were assessed as having moderate potential for roosting bats across the OES study area.

3.4.35 Trees located immediately adjacent to the proposed onshore ECR (i.e., within 25 m) underwent further presence/likely absence surveys for roosting bats following the Bat Conservation Trust (BCT) guidelines in 2023 and 2024.

3.4.36 The results of the bat surveys are detailed fully in Annex 6. In summary, no emerging bats were identified in any of the trees. The surveys recorded a total of five bat species in 2023, including common pipistrelle (472 passes), Leisler's bat (256 passes), soprano pipistrelle (80 passes), and a single (1) pass for Nathusius' pipistrelle and brown long-eared bat. Six bat species were recorded in 2024, including common pipistrelle (919), Leisler's bat (425), soprano pipistrelle (296), brown-long eared bat (5) and a single (1) pass for Natterer's bat and Whiskered bat. These were all recorded either commuting or foraging near the survey locations. Table 13 summarises the bat passes for each recorded bat species across all the surveys.

Table 13 Summary of the number of passes for each recorded bat species for each survey year (refer to Annex Table 24 and Annex Table 25 for further details)

Year	Numbers of bat recordings (passes)						
	Nyctalus leisleri	*Myotis nattereri*	*Myotis mystacinus*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus auritus*
2023	256	0	0	1	472	80	1
2024	425	1	1	27	919	296	5

3.4.37 Significantly more bats of all species were recorded in 2024 compared to 2023. This is likely due to the survey timing, with 2023 surveys conducted in September and October, whereas the 2024 surveys were conducted in late July and August, which is considered to be more optimal timing and generally better weather. Moreover, bats are typically mating and storing fat for winter in September. Swarming behaviour can also be recorded during this time. Bats are generally suckling their young in July and the young are starting to fly and feed in August. This likely accounts for the greater number of bats recorded in 2024.

3.4.38 Based on the results presented in Annex 6 and summarised in Table 13, it is assessed that the habitats present along the OES are mostly used by common pipistrelle and Leisler's bat, with soprano pipistrelle also frequent. These species are widespread across Ireland and are generally still present in urban and semi-urban areas compared to other more sensitive bat species.

3.4.39 Low numbers of brown long-eared bats were recorded in both 2023 (1) and 2024 (5). This could suggest that very low numbers of this species are present within the OES study area. However, care should be taken with this species as it has a much quieter call than other species and can go unrecorded as a result. Therefore, it is possible that the results for brown long-eared bat are under-represented in the data. Brown long-eared bats generally prefer closed canopy woodlands with dense understoreys. These habitats are generally small and isolated across the onshore ECR route.

3.4.40 Nathusius' pipistrelle was largely unrecorded in 2023, with only a single (1) pass recorded. 2024 recorded significantly more passes of this species. However, these were all limited to one survey location at T13. This location was within the lands south of Ballyogan Road, within a relatively unlit and undisturbed area with no public access and relatively unmanaged grassland and scrub habitats. An unnamed stream was situated adjacent to T13, providing good commuting and foraging habitat.

3.4.41 Two additional species were also recorded in 2024 relative to 2023 comprising Natterer's bat and whiskered bat. However, both comprised a single pass. Therefore, it is assessed that very low numbers of these species were likely present in both years but went unrecorded in 2023 by chance. Daubenton's bat, which is associated with watercourses such as rivers, for which they are heavily reliant for foraging, were not recorded. However, it is anticipated that small populations of this species are likely present on various areas of the river catchments that cross the onshore ECR.

3.4.42 Records of Nathusius' bat, whiskered bat and Natterer's bat are less common and more sporadic with large areas of potential absence across Ireland. However, caution must be taken as this may be due to a lack of records rather than confirmed absence. However, records of all these species are noted close to the proposed location of the OES.

3.4.43 Overall, the OES study area contained supported mostly common pipistrelle, Leisler's bat and soprano pipistrelle. Fewer records of brown-long eared bat, Nathusius' pipistrelle, whiskered bat, and Natterer's bat were observed. However, their populations are considered to be low. Lesser horseshoe bats were found to be absent from the onshore ECR and this species is limited mostly to the south and western areas of Ireland (NBDC, 2023c). Therefore, its absence can be reasonably concluded across the onshore ECR route and this species has been scoped out from further assessment.

3.4.44 It is assessed that with the exception of lesser horseshoe bats, all other species recorded are likely present and are likely to find roosting, foraging, and commuting value from the various habitats noted across the OES. The river, woodland, scrub, treelines and hedgerow habitats are anticipated to be of particular importance to these species. With linear features providing both foraging and potential commuting habitats. Woodland, treelines and scattered trees, as well as buildings, may provide roosting opportunities.

3.4.45 Important Annex IV species are present across the onshore ECR route. They use the habitats noted here for foraging, commuting and roosting. Therefore, bat assemblage across the OES is assessed as being important on a **county level**.

O&M Base

Desk Study

3.4.46 The data search returned records of three species of bats including three records of lesser noctule and two records of common pipistrelle, as recent as 2012.

3.4.47 The bat landscape suitability index (Lundy et al., 2011) across all bat species showed that the mean score (out of 100) is detailed in Table 14.

Table 14 Bat landscape index scores for the O&M Base (O22P)

Species	Bat landscape index score at O22P
All bats	**22.22**
Pipistrellus pygmaeus	39
Nyctalus leisleri	38
Pipistrellus pipistrellus	36
Plecotus auritus	29
Myotis mystacinus	19
Pipistrellus nathusii	16
Myotis nattereri	15
Myotis daubentonii	9
Rhinolophus hipposideros	0

Field Survey

3.4.48 The PRA identified that the buildings within the O&M Base are unlikely to support roosting bats and no further surveys were conducted. The site comprised mostly urban and built environment which was unlikely to support significant numbers of commuting and foraging bats. This area was also brightly lit, which further limits the suitability of the O&M Base study area for bats.

3.4.49 Negligible numbers of bats are anticipated to use the O&M Base due to its heavily urban nature. As such, bats have been reasonably scoped out from further consideration the O&M Base.

Badger

3.4.50 Badgers are protected under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

OES

Desk study

3.4.51 The data search returned a total of five records of badger within the search area along the onshore ECR. The most recent record was noted in 2015.

Field survey

3.4.52 The field surveys identified one potential badger sett (refer to Annex 7). The location of this sett has been omitted from this report due to historical persecution of this species. A confidential drawing showing the locations of the setts has been provided alongside this report.

3.4.53 The identified sett comprised an outlier sett with a single entrance. It was located within the 50 m buffer of the proposed onshore ECR and therefore was considered for further assessment. This sett appeared disused during the preliminary survey due to the lack of spoil, clear mammal paths, foraging activity and detritus within the sett entrance. A trail camera was positioned outside the sett for a period of seven days in line with the guidance of a minimum of five consecutive days monitoring (National Roads Authority (NRA), n.d.). The footage confirmed that the sett was not being used during this time.

3.4.54 Many of the habitats along the onshore ECR were suitable for badger sett creation and foraging, including the woodland, scrub, hedgerows, treelines, agricultural land, and grasslands. Furthermore, a live badger was identified during one of the nocturnal bat presence/absence surveys, confirming the presence of this species.

3.4.55 Therefore, badgers are confirmed present along much of the onshore ECR. They are likely to use many of the vegetated habitats for foraging and may create new setts and uptake existing disused setts.

3.4.56 No confirmed active setts are present in along the onshore ECR. Whilst the local badger population may use the habitats present for foraging opportunities, they are assessed as being important on a **local level.**

3.4.57 The following figures have been submitted confidentially alongside this report.

- Figure C1-C5 – Badger sett locations.

O&M Base

Desk study

3.4.58 The data search returned no records of badger within the search area for the O&M Base.

Field survey

3.4.59 The habitats comprising the O&M Base was mostly buildings and artificial surfaces, which are of negligible value for badger, offering no sett creating or foraging opportunities for this species. Isolated and relatively small areas of vegetated habitats, which may provide suitable habitats for this species, are limited to offsite areas.

3.4.60 As such, it is assessed that badgers are likely absent from the O&M Base and can be scoped out from further assessment for the O&M Base.

Hedgehog

3.4.61 Hedgehog are protected under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts. This species is well distributed across Ireland, including the search areas (NBDC, 2023d) and are afforded protection under the Wildlife Acts.

OES

3.4.62 The data search returned a total of 108 records hedgehog across the onshore ECR search area, with the most recent record being returned in 2022.

3.4.63 The field surveys recorded no incidental sighting for hedgehog. However, various habitats across the onshore OES including woodland, scrub, grasslands provide valuable foraging and refugia habitat for this species and it is anticipated that they are present. Hedgehog are assessed as important on a **local level** for the onshore ECR.

O&M Base

3.4.64 The data search returned five records of hedgehog within the search area of the O&M Base as recent as 2013.

3.4.65 The habitats comprising the O&M Base are considered of negligible value to hedgehog, with limited foraging and refugia opportunities for them. The area is heavily urbanised, and the risk of car collisions are high. Therefore, hedgehog are considered likely absent and they have been from further assessment for the O&M Base.

Otter

3.4.66 Otter are listed on Annex II and IV of the Habitats Directive and afforded protection by the Wildlife Acts. This species is well distributed across Ireland (NBDC, 2023e). In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts and Habitats Directive.

OES

3.4.67 The data search returned two records of otter within the search area along the OES. Both of these records were from 1980 by the Otter Survey of Ireland 1982.

3.4.68 Otter signs were recorded at a total of four riverine survey sites (A6b – spraint; A8 - spraint and anal jelly; and B1 – spraint; and A9 -spraint). Furthermore, a potential holt was identified at the Shanganagh WWTP (ITM 725712, 723223). This was located approximately c.120 m north-east of the proposed TCC at Clifton Park in Sector 1.

3.4.69 Overall, the Carrickmines Stream and Shanganagh River provide the best quality fisheries and otter habitat in the Study Area given lower levels of human disturbance and greater prey resources (Brazier & Macklin, 2020). Sites A6, A6b, A9, and B1 were considered to be utilised by otter.

3.4.70 Otter are an Annex II species under the Habitats Directive that are considered present along the watercourses that are situated throughout the onshore ECR route. Therefore, this species has been assessed as important on a **county level**.

O&M Base

3.4.71 The data search returned a total of four records of otter within the search area for the O&M Base, as recent as 2018.

3.4.72 An active holt was identified at Dún Laoghaire Harbour (ITM 724132, 728965), approximately 330m west of the proposed O&M Base, with spraint also noted near the entrance.

3.4.73 Considering an active holt was located 330 m to the proposed O&M Base, and otter are listed as an Annex II species under the Habitats Directive, this species is assessed as important on a **county level**.

Other mammals

OES

3.4.74 The data search returned records of the following mammals listed on the NPWS checklist (Nelson et al., 2019) within the search area along the onshore ECR route:

- Pygmy shrew *Sorex minutus* (2015);
- Red squirrel *Sciurus vulgaris* (2022);
- Irish hare *Lepus timidus* (2012);
- Irish stoat *Mustela erminea* (2013);

3.4.75 No incidental sightings of other mammals were noted across the various field surveys. However, the vegetated habitats along the onshore ECR route provide suitable habitats for a range of fauna, including the species listed above.

Pygmy shrew

3.4.76 Pygmy shrew is protected under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

3.4.77 This species well distributed across Ireland, with gaps in areas (NBDC, 2023f). However, this is likely from a lack of records rather than absence. This species was unconfirmed on the onshore ECR route. However, their presence should not be discounted, and they have been evaluated as important on a **local level**.

Red squirrel

3.4.78 Red squirrel is protected under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

3.4.79 Red squirrels are generally well distributed across Ireland (NBDC, 2023g), with records including the proposed onshore ECR location. This species was unconfirmed on the onshore ECR route. However, their presence should not be discounted, and they have been evaluated as important on a **local level**.

Irish hare

3.4.80 Irish hare is protected under the Wildlife Acts and is also listed on the All-Ireland Species Action Plan (NPWS, n.d.). In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

3.4.81 This species is widespread across Ireland although is thought to be in population decline. This species was unconfirmed on the Site. However, their presence should not be discounted, and they have been evaluated as important on a **local level**.

Irish stoat

3.4.82 Irish stoat is protected under the Wildlife Acts. In addition, the DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under the Wildlife Acts.

3.4.83 This species is distributed across Ireland with gaps in the records located mostly in central areas of the country. This is likely due to a lack of records rather than absence. This species was unconfirmed on the onshore ECR route. However, their presence should not be discounted, and they have been evaluated as important on a **local level**.

O&M Base

3.4.84 The data search returned records of the following other mammals within the search area for the O&M Base:

- Bottle-nose dolphin *Tursiops runcates* (2018), which is listed on Annex II and IV of the Habitats Directive and afforded protection under the Wildlife Acts and Policy GIB22;
- Common dolphin *Delphinus delphis* (2019), which is listed on Annex IV of the Habitats Directive and afforded protection under the Wildlife Acts and Policy GIB22;
- Common porpoise *Phocoena phocoena* (2020), which is listed on Annex II and IV of the Habitats Directive and afforded protection under the Wildlife Acts and Policy GIB22;
- Common seal *Phoca vitulina* (2018), which is listed on Annex II and IV of the Habitats Directive and afforded protection under the Wildlife Acts and Policy GIB22; and
- Grey seal *Halichoerus grypus* (2021), which is listed on Annex II and IV of the Habitats Directive and afforded protection under the Wildlife Acts and Policy GIB22.

3.4.85 The marine habitats surrounding the O&M Base are suitable for marine mammals. However, it is anticipated that they are more likely to use areas outside the search area over the harbour itself.

3.4.86 All marine mammals listed above are afforded European protection through the Habitats Directive and are likely form important populations of species that range potentially beyond Ireland. As such, the seals have been assessed as important on a **national level**. Dolphins have been assessed as important on an **international level**.

Fish

Salmonids

3.4.87 Atlantic salmon are listed on Annex II and V of the Habitats Directive (Nelson et al., 2019). The DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under Habitats Directive.

3.4.88 Atlantic salmon eDNA was detected at just one of the four sampling locations: site B3 (however, this result was considered likely to be a result of contamination). Sites A6, A8, and A9 tested negative (note that not all survey sites were surveyed. Refer to the Aquatic Survey Report for full details). Overall, Atlantic salmon are considered likely absent at or upstream of these sampling locations. Therefore, it has been reasonably discounted.

3.4.89 Brown trout is not afforded any legal protections (Nelson et al., 2019). Brown trout Edna was detected at all four sampling locations for Edna (A6, A8, A9, and B3). These results provided evidence that this species was present at or upstream of the sampling locations.

3.4.90 This species is afforded no legal protection. However, it still forms a valuable native species with high biodiversity value, with all salmonids being indicator species of water catchment health/quality. Therefore, brown trout has been assessed as important on a **local level**.

3.4.91 The Carrickmines Stream and Shanganagh River provided the best quality salmonid habitat (including brown trout) in the OES study area although hydro-morphological and water quality pressures notably reduced the value of spawning habitat. Of note is that the lower Shanganagh River is known to support anadromous sea trout (Triturus 2023 data); being unusual for an urban watercourse.

Lamprey

3.4.92 Brook lamprey *Lampetra planeri*, river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* are listed on Annex II of the Habitats Directive. In addition, river lamprey is also listed on Annex V of the Habitats Directive. The DLRCC CDP includes Policy Objective GIB22, which provides protection for species listed under Habitats Directive.

3.4.93 Lamprey *Lampetra* spp. eDNA was detected at one of the four eDNA sampling locations (A9). Sites A6, A8, and B3 tested negative. The exact species of lamprey was unknown. However, it was assessed that this was most likely to be brook lamprey.

3.4.94 Instream barriers, such as weirs and culverts, likely heavily restrict the passage of lamprey within the study area at present, in addition to siltation and water quality pressures. As such, these species are considered likely absent from the upper reaches of the rivers.

3.4.95 Likely brook lamprey eDNA was detected in the lower reaches of the Shanganagh River (A9) where suitable nursery and spawning habitat was present, in addition to a more natural river profile. Lamprey are also known from the Carrickmines Stream (Triturus 2023 data). It is unknown which lamprey species may be present.

3.4.96 These species are listed under the Habitats Directive and may breed in the lower reaches of the Shanganagh River. Therefore, they have been assessed as important on a **county level**.

European eel

3.4.97 European eel *Anguilla anguilla* are red-listed. The DLRCC CDP includes Policy Objective GIB22, which provides protection for rare species.

3.4.98 European eel Edna was detected at all four of the sampling location sites (A6, A8, A9, and B3). The Carrickmines Stream, Shanganagh River and Kill-O-The-Grange River supported European eel (Edna) although ingress of this (and other) migratory species into the Dargle_010 sub-catchment is likely restricted by numerous instream barriers. Although it should be noted that eel can often bypass such barriers by traversing on land.

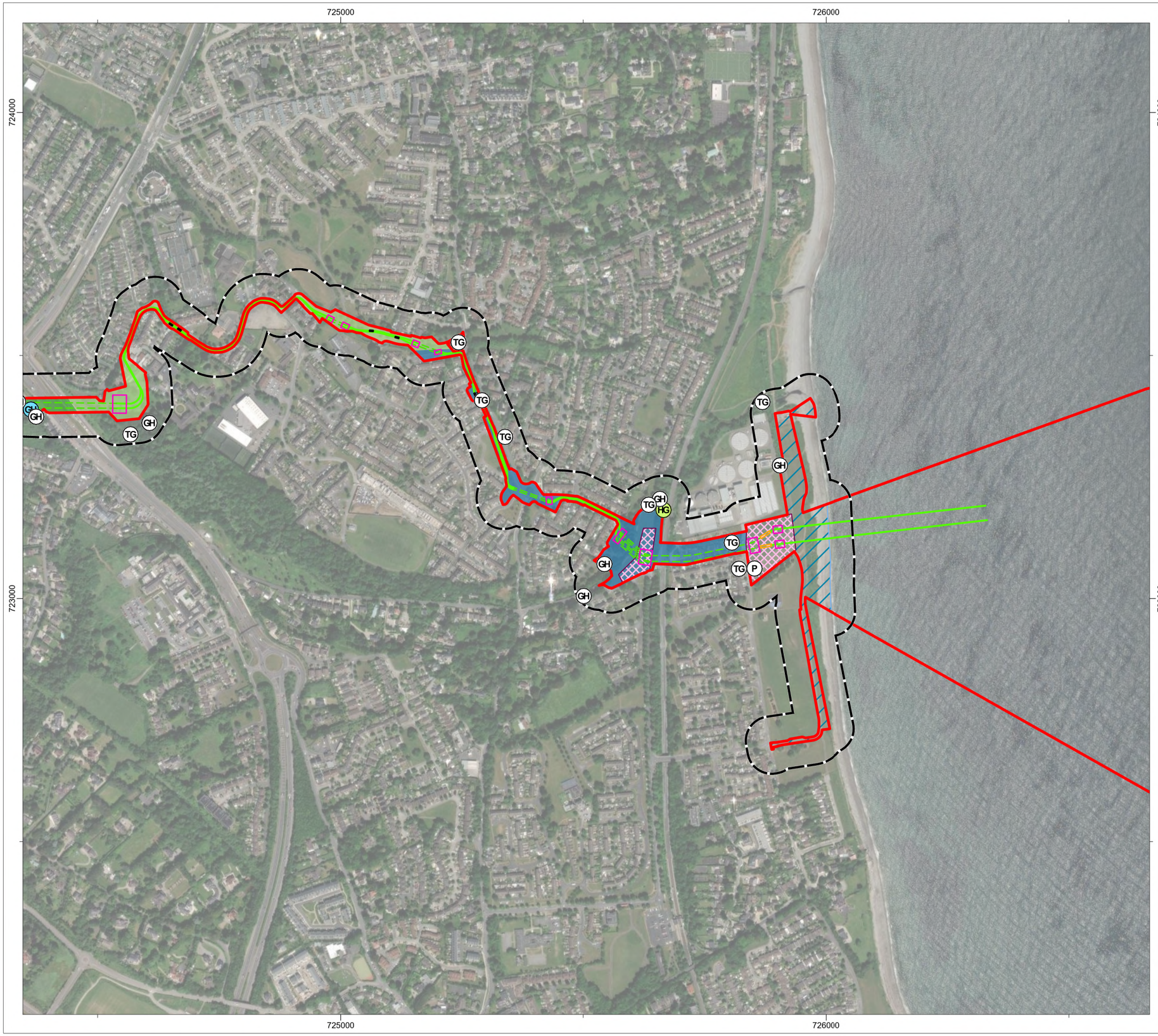
3.4.99 This species likely forms an important population within the county, limited to the river catchments. Therefore, it has been assessed as important on a **county level**.

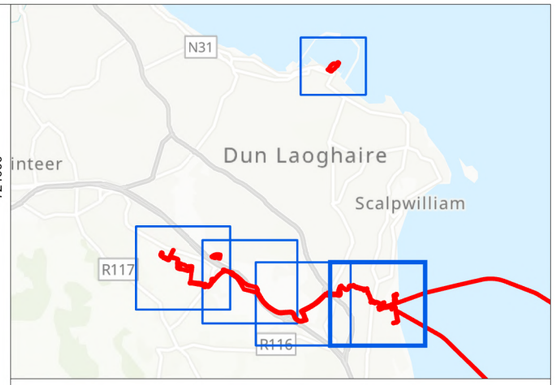
Invasive alien species

3.4.100 The DLRCC CDP includes Policy Objective GIB28 (Annex 1), which states the following:

> *"It is a Policy Objective to prepare an 'Invasive Alien Species Action Plan' for the County which will include actions in relation to Invasive Alien Species (IAS) surveys, management and treatment and to also ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicants will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477/2011)."*

3.4.101 Figure 16 to Figure 20 below show the invasive alien species (IAS) recorded within the search areas.





Application Site Bcundary

Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

- TJB
- Temporary Trenchless Crossing Compound
- Underground Joint Bay
- Onshore Export Cable Route (Trenchless)
- Onshore Export Cable Route (Trenched)
- Temporary Construction Compound (TCC)
- Landfall TJB Area

Electrical Cable Route (ECR) Sector

- Sector 1
- Sector 2
- Sector 3

Invasive Alien Species

- P — Parakeet
- GH — Giant Hogweed
- GH — Young Giant Hogweed
- HG — Giant Hogweed and Garlic
- TG — Three Cornered Garlic

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Invasive Alien Species

DRAWING NUMBER: **Figure 16**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-18	DRAFT	JK	SW	AE
02	2025-02-11	PUBLIC	JK	SP	CF

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:8,000 PLOT SIZE A3

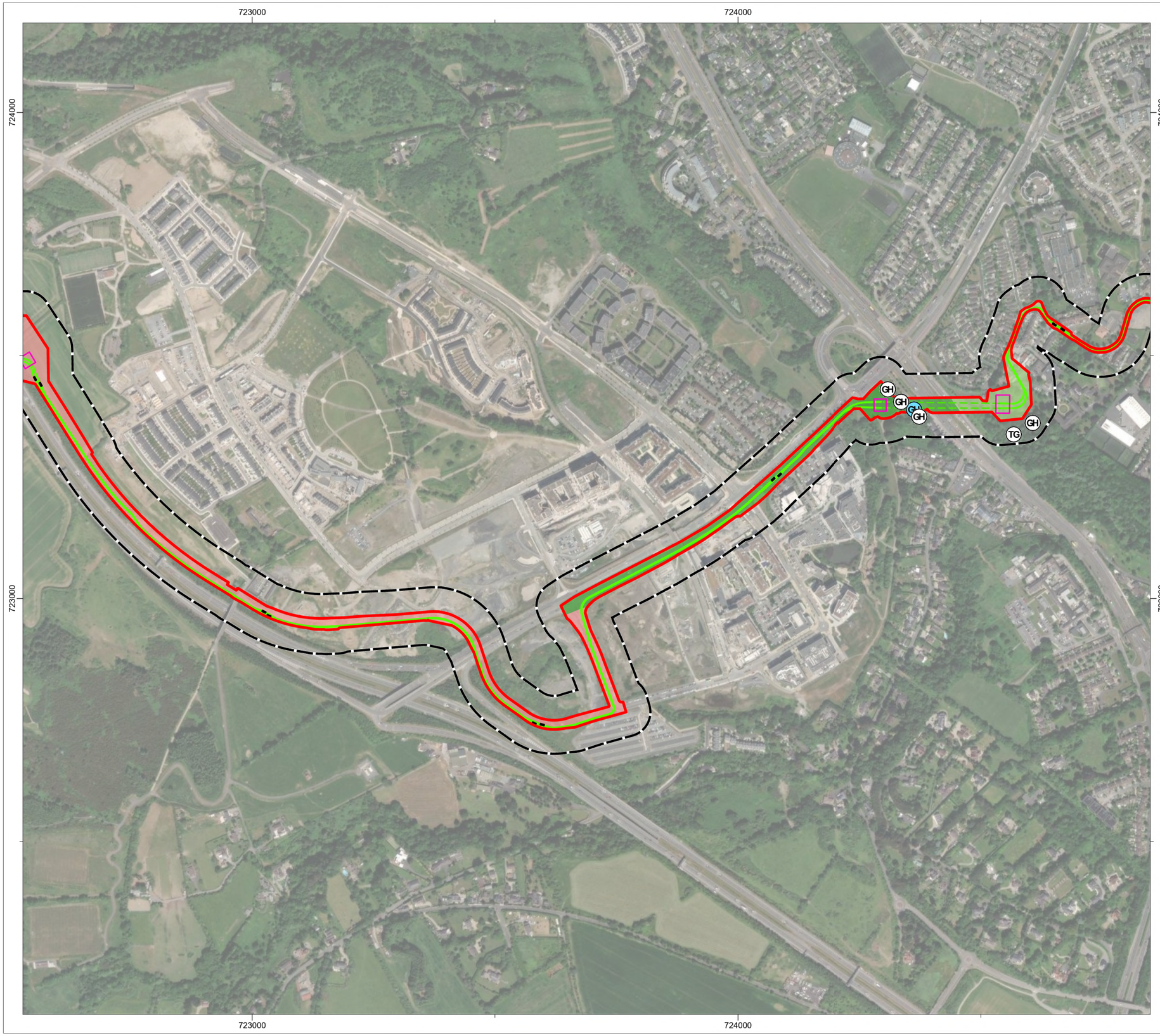
DATUM IRENET95 VERTICAL REF. ODN/LAT/MLLW

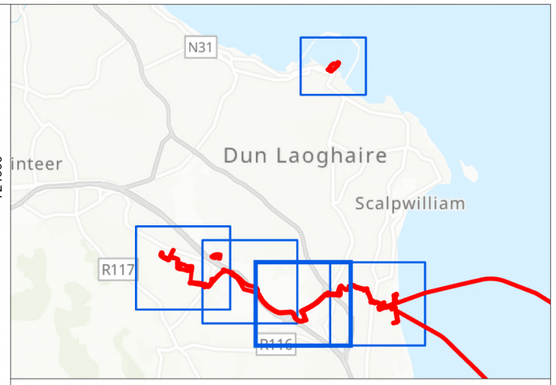
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Bcundary

Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

Temporary Trenchless Crossing Compound

Underground Joint Bay

Onshore Export Cable Route (Trenchless)

Onshore Export Cable Route (Trenched)

Electrical Cable Route (ECR) Sector

Sector 2

Sector 3

Sector 4

Invasive Alien Species

GH Giant Hogweed

GH Young Giant Hogweed

TG Three Cornered Garlic

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Invasive Alien Species

DRAWING NUMBER: **Figure 17**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-18	DRAFT	JK	SW	AE
02	2025-02-11	PUBLIC	JK	SP	CF

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:8,000 PLOT SIZE A3

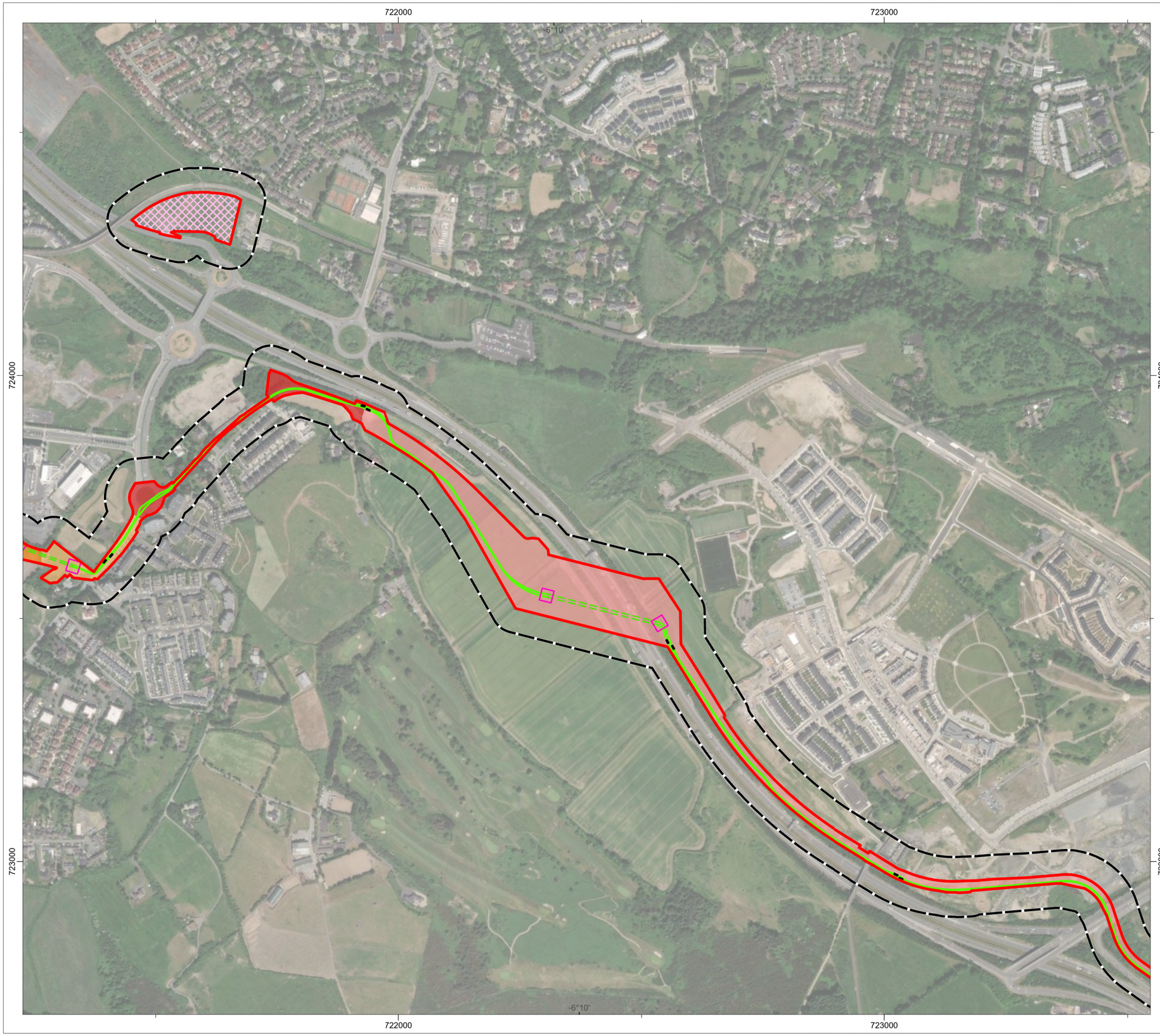
DATUM IRENET95 VERTICAL REF CDN/LAT/MLLW

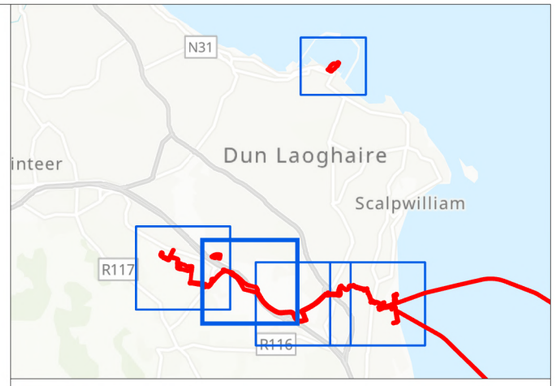
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Bcundary

Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

Temporary Trenchless Crossing Compound

Underground Joint Bay

Onshore Export Cable Route (Trenchless)

Onshore Export Cable Route (Trenched)

Temporary Construction Compound (TCC)

Electrical Cable Route (ECR) Sector

Sector 4

Sector 5

Sector 6

Sector 7

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MAP NOTES / DATA SOURCES:

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Invasive Alien Species

DRAWING NUMBER: **Figure 18**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-18	DRAFT	JK	SW	AE
02	2025-02-11	PUBLIC	JK	SP	CF

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:8,000 PLOT SIZE A3

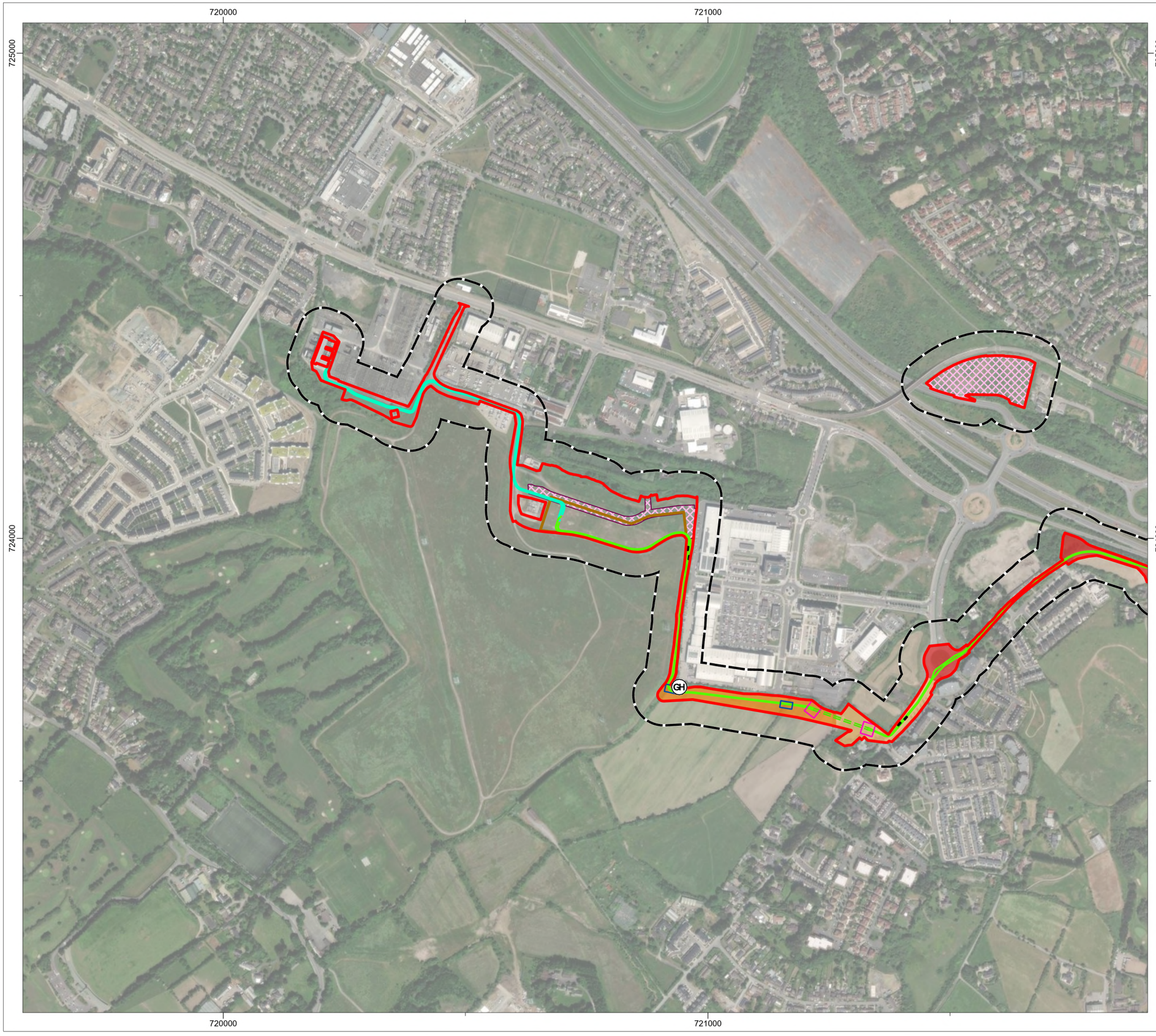
DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW

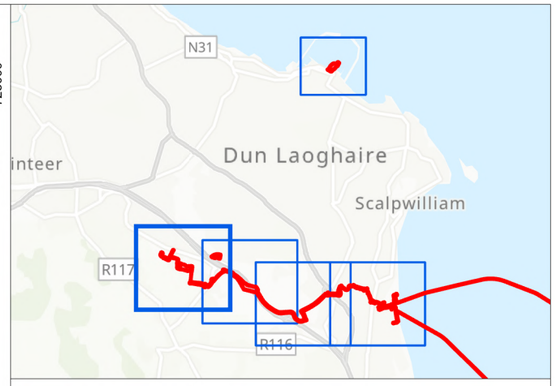
PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited





Application Site Bcundary

Onshore Electrical System (OES) 50 m Buffer

Onshore Electrical System (OES) Design

- Onshore ECR Watercourse Crossing (trenched)
- Temporary Trenchless Crossing Compound
- Underground Joint Bay
- Onshore Export Cable Route (Trenchless)
- Onshore Export Cable Route (Trenched)
- Grid Connection Cable
- Temporary Construction Compound (TCC)

Electrical Cable Route (ECR) Sector

- Sector 5
- Sector 6
- Sector 7
- Onshore Substation (OSS) Boundary

Invasive Alien Species

- GH Giant Hogweed

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

Maxar, Microsoft, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS ©Ordnance Survey Ireland 2023 © Tailte Eireann. (CYSL50270365) Not to be used for Navigation.

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Invasive Alien Species

DRAWING NUMBER: **Figure 19**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-18	DRAFT	JK	SW	AE
02	2025-02-11	PUBLIC	JK	SP	CF

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:8,000 PLOT SIZE A3

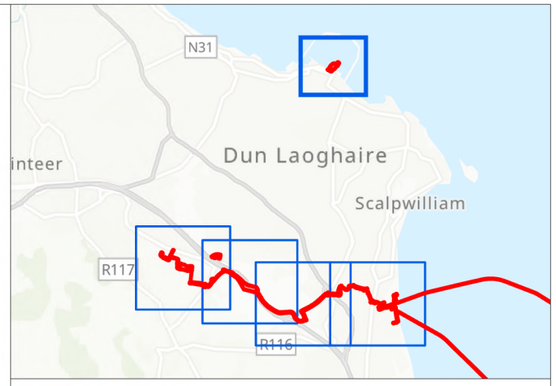
DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited



Application Site Bcundary

Operations and Maintenace Base (O&M Base) 500 m Buffer

DRAWING STATUS

PUBLIC

DISCLAIMER

MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Biodiversity: Invasive Alien Species

DRAWING NUMBER: **Figure 20**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2025-02-18	DRAFT	JK	SW	AE
02	2025-02-11	PUBLIC	JK	SP	CF

0 25 50 75 100 Meters

0 0.03 0.05 0.08 0.1 Miles

N GRID NORTH

SCALE 1:5,500 PLOT SIZE A3

DATUM IRENET95 VERTICAL REF ODN/LAT/MLLW

PRJ IRENET95 Irish Transverse Mercator

SLR

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

OES

Desktop study

3.4.102 Table 15 details records of the invasive alien species (IAS) returned in the data search.

Table 15 Records of invasive alien species along the onshore OES

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
Flora					
American Skunk-cabbage	*Lysichiton americanus*	3	01/05/2021	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact ▪ EU Regulation No. 1143/2014 ▪ Regulation S.I. 477 (Ireland)
Butterfly-bush	*Buddleja davidii*	7	14/05/2016	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact Invasive Species
Canadian Waterweed	*Elodea canadensis*	1	07/07/2009	River Biologists' Database (EPA)	▪ High Impact Invasive ▪ Regulation S.I. 477 (Ireland)
Cherry Laurel	*Prunus laurocerasus*	1	05/02/2015	Online Atlas of Vascular Plants 2012 Onwards	▪ High Impact Invasive Species
Giant Hogweed	*Heracleum mantegazzianum*	26	30/04/2009	National Invasive Species Database	▪ High Impact Invasive ▪ Regulation S.I. 477 (Ireland)
Himalayan Honeysuckle	*Leycesteria formosa*	1	27/08/2015	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact Invasive Species
Japanese Knotweed	*Reynoutria japonica*	7	27/08/2020	National Invasive Species	▪ High Impact Invasive

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
				Database & Online Atlas of Vascular Plants 2012 Onwards	▪ Regulation S.I. 477 (Ireland)
Least Duckweed	*Lemna minuta*	1	11/05/2013	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact Invasive Species
Nuttall's Waterweed	*Elodea nuttallii*	4	31/12/1992	National Invasive Species Database	▪ High Impact Invasive ▪ Regulation S.I. 477 (Ireland)
Sea-buckthorn	*Hippophae rhamnoides*	4	27/05/2023	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact ▪ Regulation S.I. 477 (Ireland)
Spanish Bluebell	*(Hyacinthoides hispanica)*	1	05/05/2022	Online Atlas of Vascular Plants 2012 Onwards	▪ Regulation S.I. 477 (Ireland)
Sycamore	*Acer pseudoplatanus*	7	27/05/2023	Online Atlas of Vascular Plants 2012 Onwards & River Biologists' atabase (EPA)	▪ Medium Impact Invasive Species
Three-cornered Garlic	*Allium triquetrum*	8	27/05/2023	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact ▪ Regulation S.I. 477 (Ireland)
Traveller's-joy	*Clematis vitalba*	2	27/08/2015	Online Atlas of Vascular Plants 2012 Onwards	▪ Medium Impact Invasive Species
Fauna					
Brown rat	*Rattus norvegicus*	11	27/03/2017	Atlas of Mammals in Ireland 2010-	▪ High Impact

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
				2015 & Mammals of Ireland 2016-2025	▪ Regulation S.I. 477 (Ireland)
Grey squirrel	*Sciurus carolinensis*	37	01/10/2022	Mammals of Ireland 2016-2025 & Atlas of Mammals in Ireland 2010-2015	▪ High Impact Invasive Species ▪ EU Regulation No. 1143/2014 ▪ Regulation S.I. 477 (Ireland)
European rabbit	*Oryctolagus cuniculus*	2	03/02/2007	Roadkill Survey	▪ Medium Impact Invasive Species
House mouse	*Mus musculus*	3	2015	Atlas of Mammals in Ireland 2010-2015	▪ High Impact Invasive Species
Sitka deer	*Cervus nippon*	1	2018	Mammals of Ireland 2016-2025	▪ High Impact Invasive Species ▪ Regulation S.I. 477 (Ireland) ▪ Wildlife Acts
Jenkins' spire snail	*Potamopyrgus antipodarum*	3	2018	Ireland's river network, 2007–2018 (EPA)	▪ Medium Impact Invasive Species

Field Survey

3.4.103 Invasive alien species were identified during the various surveys along the onshore ECR and detailed in Table 16.

Table 16 Invasive alien species identified during field surveys along the onshore OES

Species name	Scientific name	Location (ITM coordinates)	Sector no.	Designation
Giant hogweed	*Heracleum mantegazzianum*	725544 723070	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725905 723273	Landfall Site	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725376 722982	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725468 723001	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725501 723003	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725662 723188	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	725658 723203	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724607 723359	2	▪ High impact species

Species name	Scientific name	Location (ITM coordinates)	Sector no.	Designation
				▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724362 723387	3	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724371 723378	3	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724309 723428	3	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724336 723403	3	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	724325 723412	3	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Giant hogweed	*Heracleum mantegazzianum*	720941 723692	7	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Japanese knotweed	*Reynoutria japonica*	725350 723528	1	▪ High impact species ▪ Regulation S.I. 477 (Ireland)
Montbretia (Crocosmia x crocosmiiflora)	*Crocosmia x crocosmifolia*	724582 723566	2	▪ Low impact species

Species name	Scientific name	Location (ITM coordinates)	Sector no.	Designation
Montbretia (Crocosmia x crocosmiiflora)	*Crocosmia x crocosmifolia*	724634 723617	2	▪ Low impact species
Montbretia (Crocosmia x crocosmiiflora)	*Crocosmia x crocosmifolia*	721587 724297	Leoparstpwn TCC	▪ Low impact species
Nuttall's waterweed	*Elodea nuttallii*	Site B1		▪ High impact species
Ring-necked parakeet	*Psittacula krameri*	725852 723060[7]	Landfall Site	▪ High impact species
Three-cornered garlic	*Allium triquetrum*	725339 723330	1	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725243 723525	2	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725292 723407	1	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725869 723403	Landfall Site	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725820 723059	Landfall Site	▪ Medium impact species

[7] Where sighting was made. Unlike the invasive flora, this species is highly mobile.

Species name	Scientific name	Location (ITM coordinates)	Sector no.	Designation
				▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725806 723113	Landfall Site	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725796 722969	Landfall Site	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725662 723188	1	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	725634 723192	1	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	724568 723336	2	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)
Three-cornered garlic	*Allium triquetrum*	724593 723269	2	▪ Medium impact species ▪ Regulation S.I. 477 (Ireland)

3.4.104 As noted in Table 16, several species of invasive alien flora were noted across the onshore ECR, as well as one invasive alien fauna, comprising a ring-neck parakeet. Invasive flora included three-cornered garlic, giant hogweed *Heracleum mantegazzianum*, Japanese knotweed *Reynoutria japonica*, and montbretia *Crocosmia x crocosmifolia*. These were distributed heavily to the east of the onshore ECR, with the greatest abundance in Sectors 0 and 1.

O&M Base

3.4.105 Table 17 details the records of invasive alien species returned within the search area for the O&M Base.

Table 17 Records of invasive alien species at the O&M Base

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
Flora					
Butterfly-bush	*Buddleja davidii*	10	06/04/2023	Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Cherry laurel	*Prunus laurocerasus*	1	20/03/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species
Common broomrape	*Orobanche minor*	2	31/12/2010	BSBI tetrad data for Ireland	Medium Impact Invasive Species
Japanese Knotweed	*Reynoutria japonica*	7	25/05/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Regulation S.I. 477 (Ireland)
Sycamore	*Acer pseudoplatanus*	2	06/04/2023	Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Three-cornered garlic Traveller's-joy	*Allium triquetrum*	2	21/04/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Regulation S.I. 477 (Ireland)

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
Traveller's-joy	*Clematis vitalba*	2	01/12/2018	Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Wakame	*Undaria pinnatifida*	1	21/05/2017	National Invasive Species Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Wall Cotoneaster	*Cotoneaster horizontalis*	1	16/04/2023	Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Wireweed	*Sargassum muticum*	3	03/10/2019	Rocky Shore Macroalgae	High Impact Regulation S.I. 477 (Ireland)
Fauna					
Botrylloides violaceus		1	31/12/2022	National Invasive Species Database	Medium Impact Invasive Species
Brown Rat	*Rattus norvegicus*	5	22/09/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Budapest Slug	*Tandonia budapestensis*	2	04/05/2002	All Ireland Non-Marine Molluscan Database	Medium Impact Invasive Species
Common garden snail	*Cornu aspersum*	2	04/05/2002	All Ireland Non-Marine Molluscan Database	Medium Impact Invasive Species
Didemnum vexillum		1	31/12/2022	National Invasive Species Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)

Species name	Scientific name	Total no. of records	Date of last record	Dataset	Designation
Eastern Grey Squirrel	*Sciurus carolinensis*	14	24/02/2023	Mammals of Ireland 2016-2025	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477 (Ireland)
Elminius modestus		1	02/04/2023	Explore Your Shore	Medium Impact Invasive Species
Harlequin Ladybird	*Harmonia axyridis*	1	06/08/2023	Ladybirds of Ireland	High Impact Invasive Species Regulation S.I. 477 (Ireland)
House mouse	*Mus musculus*	3	19/07/2015	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species
Japanese skeleton shrimp	*Caprella mutica*	5	31/12/2022	National Invasive Species Database	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Leathery sea squirt	*Styela clava*	2	31/12/2022	National Invasive Species Database	High Impact Invasive Species Regulation S.I. 477 (Ireland)

3.4.106 No invasive alien species were identified during surveys within the O&M Base and they have been scoped out from further assessment.

4 Summary of important ecological features

4.1.1 Table 18 provides a summary of the ecological receptors and their assessed importance.

Table 18 Summary of important ecological features: features of negligible importance have been scoped out and omitted from this table.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
OES				
Internationally designated sites	Dublin Bay Biosphere	Associated with: ▪ North Dublin Bay SAC; ▪ Rockabill to Dalkey Island SAC; ▪ Howth Head SAC and SPA; ▪ North Bull Isalnd SPA; and ▪ South Dublin Bay and River Tolka Estuary SPA.	International	DLRCC policy protection: GIB10 and DCC policy protection GIB137 and GIB139.
European designated sites	Rockabill to Dalkey Island SAC [003000]	1.5 km from the onshore ECR	International	Policy protection: GIB22. Habitats Directive.
	Ballyman Glen SAC [000713]	3.9 km from the onshore ECR	International	
	Knocksink Wood SAC [000725]	4.4 km from the onshore ECR	International	

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	South Dublin Bay SAC [000210]	4.7 km from the onshore ECR		
	Bray Head SAC [000714]	5.1 km from the onshore ECR		
	Wicklow Mountains SAC [002122]	5.6 km from the onshore ECR		
	North Dublin Bay SAC [000206]	10.0 km from the onshore ECR		
	Glen of the Downs SAC [000719]	10.9 km from the onshore ECR		
	Glenasmole Valley SAC [001209]	10.5 km from the onshore ECR		
	Howth Head SAC [000202]	13.0 km from the onshore ECR		
	The The Wetlands SAC [002249	14.9 km from the onshore ECR		
	Dalkey Islands SPA [004172]	3.2 km from the onshore ECR		
	South Dublin Bay and River Tolka Estuary SPA [004024]	4.7 km from the onshore ECR		

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Wicklow Mountains SPA [004040]	5.9 km from the onshore ECR		
	North Bull Island SPA [004006]	10.0 km from the onshore ECR		
	Howth Head Coast SPA [004113]	13.5 km from the onshore ECR		
Nationally designated sites	Loughlinstown Woods pNHA [001211)	0.01 km from the onshore ECR	National	Policy protection: GIB18, GIB21, and GIB22. pNHA are listed on a non-statutory basis and have not been statutorily proposed or designated. Prior to statutory designation, pNHAs are subject to limited protection, in the form of several criteria, including recognition for its ecological value of pNHAs by Planning and Licensing Authorities.
	Dalky Coastal Zone and Killiney Hill pNHA [001206]	0.04 km from the onshore ECR	National	
	Dingle Glen pNHA [001207]	0.76 km from onshore ECR	National	
LIBS	Shanganagh River and area near SSWWTF	Within Landfall study area	County	DLRCC policy protection GIB18. DCC policy protection 136 and 139.
Habitats	Depositing river (FW2)	Landfall study area, Sectors 1, 2, 3, 4, 6, 7, grid connection study area	Local	Policy protection: GIB22. Comprises Annex I habitat: Floating River vegetation (3260).
	Drainage ditch (FW4)	Sector 4	Local	Does not comprise Annex I habitat.
	Dry calcareous grassland (GS1)	Landfall study area	Local	Does not comprise Annex I habitat.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Dry meadow and grassy verges (GS2)	Sectors 4, 5, 6, 8	Local	Does not comprise Annex I habitat.
	Hedgerow (WL1)	Sectors 1, 2, 3, 4, grid connection study area	Local	Policy protection: GIB25. Does not comprise Annex I habitat.
	Immature woodland	Sectors 3, 4, 9	Local	Does not comprise Annex I habitat.
	Improved agricultural grassland (GA1)	Sector 7	Local	Does not comprise Annex I habitat.
	Mixed broadleaved woodland (WD1)	Sector 5	County	Policy protection: GIB23. Does not comprise Annex I habitat.
	Other artificial lakes and ponds (FL8)	Grid connection study area	Local	Does not comprise Annex I habitat.
	Riparian woodland (WN5)	Sectors 1, 7	County	Policy protection: GIB22. Comprises Annex I habitat: Alluvial forests (91E0).
	Scattered trees and parkland (WD5)	Sector 2	County	Does not comprise Annex I habitat.
	Scrub (Ws1)	Landfall study area, Sectors 4, 5, 9	Local	Does not comprise Annex I habitat.
	Sedimentary sea cliffs (CS3)	Landfall study area	International	Policy protection: GIB22. Does comprise Annex I habitat: vegetated sea cliffs of the Atlantic and Baltic Coasts (code 1230).
	Shingle and gravel shores (LS1)	Landfall study area	County	Policy protection: GIB22.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
				Does comprise Annex I habitat: Perennial vegetation of stoney banks (1220).
	Treelines (WL2)	Landfall study area, 1, 2, 3, 4, 7	Local	Policy protection: GIB25. Does not comprise Annex I habitat.
	Wet grassland (GS4)	Sector 4	Local	Does not comprise Annex I habitat.
Flora and fauna	Amphibians – common frog	All	Local	Policy protection: GIB22. Listed on Annex V of the Habitats Directive. Protected under the Schedule Wildlife Act 1976 (and subsequent amendments). Suitable terrestrial habitat along onshore ECR route. Cannot be discounted as present along the onshore ECR route.
	Amphibians – smooth newt	All	Local	Policy protection: GIB22 Protected under the Schedule Wildlife Act 1976 (and subsequent amendments) Suitable terrestrial habitat along onshore ECR. Cannot be discounted as present along the onshore ECR
	Bird assemblage - general	All	Local	Policy protection: GIB22. All birds are protected under the Schedule Wildlife Act 1976 (and subsequent amendments) during the breeding bird season (i.e., 1st March to 31st August). Nesting birds considered present within vegetated habitats.
	Raptors			

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
				Birds of prey and ground-nesting birds likely present. Likely notable red and amber-listed species present.
	Bat assemblage	All	County	Policy protection: GIB22. All bats considered likely present are listed on Annex IV of the Habitats Directive and are protected under the Wildlife Act 1976 (and subsequent amendments). Bats likely to use the Site for foraging and commuting. Roosting bats unconfirmed but likely present along the onshore ECR route.
	Badger	All	County	Policy protection: GIB22. Protected under the Wildlife acts 1976 and subsequent amendments. Badgers confirmed present along the onshore ECR, with disused setts identified.
	Hedgehog	All	Local	Policy protection: GIB22. Protected under the Wildlife acts 1976 and subsequent amendments. Likely present along onshore ECR.
	Otter	All aquatic areas	County	Policy protection: GIB22. Protected under the Wildlife acts 1976 and subsequent amendments. Listed on Annex II and IV of the Habitats Directive.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Other mammals (pygmy shrew, Irish hare, Irish stoat, red squirrel)	All	Local	Policy protection: GIB22. Protected under the Schedule Wildlife Act 1976 (and subsequent amendments). Cannot be discounted.
	Fish – Brown trout	Aquatic survey sites A6, A8, A9, and B3	Local	No legal protection.
	Fish - Lamprey	Aquatic survey site A9	County	Policy protection: GIB22. Three lamprey species listed on Annex II of the Habitats Directive; river lamprey is listed on Annex V of the Habitats Directive.
	Fish – European eel	Aquatic survey sites A6, A8, A9, and B3	County	Policy protection: GIB22. Red-listed species.
	Invertebrates	All	Linked to the habitat importance that they are associated with.	Policy protection: GIB22. Notable invertebrates are protected under the Wildlife (Amendment) Act, 2000. Notable species considered present, with valuable woodland and aquatic habitats located along onshore ECR.
	Invasive alien species	Landfall study area, Sectors 1, 7	N/A	Covered under Policy Objective GIB28. Risk of spreading invasive species across the local area.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
O&M Base				
Internationally designated sites	Dublin Bay Biosphere	Associated with: ▪ North Dublin Bay SAC; ▪ Rockabill to Dalkey Island SAC; ▪ Howth Head SAC and SPA; ▪ North Bull Isalnd SPA; ▪ South Dublin Bay and River Tolka Estuary SPA; and ▪ Ireland's Eye SAC and SPA	International	DLRCC policy protection: GIB10 and DCC policy protection GIB137 and GIB139.
European designated sites	South Dublin Bay SAC [000210]	1.4 km from O&M Base	International	Policy protection GIB22. Habitats Directive.
	Rockabill to Dalkey Island SAC [003000]	2.7 km from O&M Base	International	
	North Dublin Bay SAC [000206]	5.5 km from O&M Base	International	Policy protection GIB22. Protected under the Birds and the Habitats Directives.
	Howth Head SAC [000202]	7.8 km from O&M Base		

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Ballyman Glen SAC [000713]	10.2 km from O&M Base		
	Knocksink Wood SAC [000725]	10.6 km from O&M Base		
	Baldoyle Bay SAC [000199]	10.6 km from O&M Base		
	Bray Head SAC [000714]	11.5 km from O&M Base		
	Wicklow Mountains SAC [002122]	11.8 km from O&M Base		
	Ireland's Eye SAC [002193]	12.3 km from O&M Base		
	South Dublin Bay and River Tolka Estuary SPA (004024).	0.7 km from O&M Base		
	North Bull Island SPA [004006]	5.4 km from O&M Base		
	Howth Head Coast SPA [004113]	8.8 km from O&M Base		
	Baldoyle Bay SPA [004016]	10.6 km from O&M Base		

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Ireland's Eye SPA [004117]	11.9 km from O&M Base		
	Wicklow Mountains SPA [004040]	12.2 km from O&M Base		
Nationally designated sites	Dalkey Coastal Zone and Killiney Hill pNHA (002106)	0.44 km from O&M Base	National	Policy protection: GIB18, GIB 21, and GIB22. pNHA are listed on a non-statutory basis and have not been statutorily proposed or designated. Prior to statutory designation, pNHAs are subject to limited protection, in the form of several criteria, including recognition for its ecological value of pNHAs by Planning and Licensing Authorities.
	Dalkey Coastal Zone and Killiney Hill pNHA (002106)	0.86 km from O&M Base	National	
Habitats	Open marine water (MW1)	O&M Base	National	Policy protection: GIB22. Comprises Annex I habitat: Large shallow inlets and bays (1160).
	Sea inlets and bays (MW2)	O&M Base	National	Policy protection: GIB22. Comprises Annex I habitat: Large shallow inlets and bays (1160).
	Sea walls, piers and jetties (CC1)	O&M Base	county	Does not comprise Annex I habitat.
Flora and fauna	Bird assemblage – SPA qualifying interest	O&M Base	International	Policy protection: GIB22. SPA qualifying species present within the search area. Likely use the surrounding marine habitats for foraging. EU Directive - Annex I listed species.

Ecological receptor		Relevant Sector(s)/distance from OES	Assessment of importance	Details
	Bird assemblage – amber-listed birds	O&M Base	County	Amber-listed black guillemots considered likely nesting within search area.
	Otter	O&M Base	County	Policy protection: GIB22. Protected under the Wildlife acts 1976 and subsequent amendments. Listed on Annex II and IV of the Habitats Directive.
	Marine mammals – dolphins/porpoise	O&M Base	International	Policy protection: GIB22. Populations of European protected marine mammals cannot be discounted from the search area. Protected under EU Habitats Directive.
	Marine mammals – seals	O&M Base	National	Policy protection: GIB22. Protected under EU Habitats Directive.

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Annex 1 Relevant legislation and planning policy

EIA Directive 2014/52/EU

The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997, Directive 2003/35/EC of 26 May 2003 and Directive 2009/31/EC of 23 April 2009, now codified in Directive 2011/92/EU of 13 December 2011 and amended in Directive 2014/52/EU of 16 April 2014, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to project consent being given.

The EIA Directive was first transposed into Irish law by the European Communities (EIA) Regulations, 1989 (S.I. No. 349 of 1989) which amended the Local Government (Planning and Project) Act, 1963 (and other legislation) to provide for EIA. The European Union (Planning and Project) (EIA) Regulations 2018 (S.I. No. 296 of 2018) transpose the requirements of Directive 2014/52/EU, Amending previous Directive 2011/52/EU, on the assessment of the effects of certain public and private projects on the environment (the EIA Directive) into Irish planning law.

Habitats and birds directive

The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora was adopted in 1992 and aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging projects. The Natura 2000 network of protected areas is known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community. The requirements of the Habitats Directive have been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477/2011]. This legislation affords protection to both Special Protection Areas and Special Areas of Conservation. Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC (Habitats Directive) which is transposed into Irish law by the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Special Protection Areas (SPA) are classified under the Birds Directive (2009/147/EC on the Conservation of Wild Birds). Article 6(3) of the Habitats Directive requires an ‘appropriate assessment’ to be undertaken for any plan or project that is likely to have a significant effect on the conservation objectives of a European site. An ‘appropriate assessment’ is an evaluation of the potential impacts of a plan or project on the integrity of a European site, and the incorporation, where necessary, of measures to mitigate or avoid negative effects.

National legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts 1976 to 2018 and the Floral (Protection) Order 2015. Natural Heritage Areas (NHA) are areas that are considered to be important for the habitats present or for the species of plants and animals supported by those habitats. Under the Wildlife Amendment Act 2000, NHAs are legally protected from damage from the date they were formally proposed for designation. Section 19(1) of the Act states that 'Where there is a subsisting natural heritage area order in respect of any land, no person shall carry out, or cause or permit to be carried out, on that land any works specified in the order or any works which are liable to destroy or to significantly alter, damage or interfere with the features by reason of which the designation order was made'. In addition, a list of proposed NHAs (pNHAs) was published in 1995 but to date these have not had their status confirmed. Prior to statutory designation, pNHAs are subject to limited protection under various agri-environment and forestry schemes and under local authority planning strategies such as County Project Plans.

Relevant planning policy

The planning policy and legislation that is relevant to the proposed project is set out in the following section.

Dún Laoghaire-Rathdown County Development Plan 2022-2028

The DLR County Development Plan 2022 - 2028[8] (DLRCC CDP) is the relevant document for policies relating to biodiversity for the DLR area.

Planning policy at the local level is provided by the DLRCC CDP came into effect on 21st April 2022. This plan contains a number of policies relevant to ecology and nature conservation that are summarised in Annex Table 19.

Annex Table 19 Relevant policies

Policy	Objective
	It is a Policy Objective to continue to protect, manage and plan to conserve, maintain or enhance the distinctive characteristics of the County's landscapes, townscapes and seascapes in accordance with the recommended strategies as originally outlined in the Landscape Character Assessment (2002 and since updated), in accordance with the 'Draft Guidelines for Landscape and Landscape Assessment' (2000) as issued by the Department of Environment and Local Government, in accordance with the European Landscape Convention (Florence Convention) and in accordance with 'A National Landscape Strategy for Ireland – 2015-2025'. The Council shall implement any relevant recommendations contained in the Department of Arts, Heritage, and the Gaeltacht's National Landscape Strategy for Ireland, 2015 – 2025.

[8] DLRCC (2022a), County Development Plan 2022 – 2028. Available from: https://www.dlrcoco.ie/sites/default/files/atoms/files/written_statement.pdf. [Accessed: November 2023].

Policy	Objective
	It is a Policy Objective to protect and conserve the environment including, in particular, the natural heritage of the County and to conserve and manage Nationally and Internationally important and EU designated sites - such as Special Protection Areas (SPAs), Special Areas of Conservations (SACs), proposed Natural Heritage Areas (pNHAs) and Ramsar sites (wetlands) - as well as non-designated areas of high nature conservation value known as locally important areas which also serve as 'Stepping Stones' for the purposes of Article 10 of the Habitats Directive.
	It is a Policy Objective to ensure the protection of natural heritage and biodiversity, including European Sites that form part of the Natura 2000 network, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines.
	It is a Policy Objective to support the provisions of the forthcoming DLR County Biodiversity Action Plan, 2021 – 2026.
	It is a Policy Objective to protect and preserve areas designated as proposed Natural Heritage Areas, Special Areas of Conservation, and Special Protection Areas. It is Council policy to promote the maintenance and as appropriate, delivery of 'favourable' conservation status of habitats and species within these areas.
	It is a Policy Objective to protect and promote the conservation of biodiversity in areas of natural heritage importance outside Designated Areas and to ensure that notable sites, habitats and features of biodiversity importance - including species protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979, the Habitats Directive 1992, Flora (Protection) Order, 2015, Annex I habitats, local important areas, wildlife corridors and rare species - are adequately protected. Ecological assessments will be carried out for all developments in areas that support, or have potential to support, features of biodiversity importance or rare and protected species and appropriate mitigation/avoidance measures will be implemented. In implementing this policy, regard shall be had to the Ecological Network, including the forthcoming DLR Wildlife Corridor Plan, and the recommendations and objectives of the Green City Guidelines (2008) and 'Ecological Guidance Notes for Local Authorities and Developers' (DLR Version 2014).
	It is a Policy Objective to protect the Ecological Network which will be integrated into the updated Green Infrastructure Strategy and will align with the DLR County Biodiversity Action Plan. Creating this network throughout the County will also improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive. The network will also include non-designated sites.
	It is a Policy Objective to maintain and protect the natural character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat and nature-based solutions that incorporate biodiversity features. It is also policy (subject to the sensitivity of the riverside habitat), to provide public access to riparian corridors, to promote improved passive recreational activities.
	It is a Policy Objective to retain and protect hedgerows in the County from development, which would impact adversely upon them. The Council will promote the County's

Policy	Objective
	hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance.
	It is a Policy Objective to protect, promote and preserve sites of Geological and Geomorphological importance, in particular the proposed Natural Heritage Areas (NHAs), and any County Geological Sites (CGS), that become designated during the lifetime of the Plan.
	It is a Policy Objective to prepare an 'Invasive Alien Species Action Plan' for the County which will include actions in relation to Invasive Alien Species (IAS) surveys, management and treatment and to also ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicants will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477/2011).
	It is a Policy Objective to increase the use of Nature Based Solutions (NBS) within the County, and to promote and apply adaption and mitigation actions that favour NBS, which can have multiple benefits to the environment and communities. NBS has a role not only to meet certain infrastructure related needs (e.g., flooding management), and development needs, but also to maintain or benefit the quality of ecosystems, habitats, and species.

The DLR Biodiversity Plan (2021 – 2025) will set out how we understand, manage, connect, and collaborate to protect and enhance the variety of plant and animal life in DLR over the next five years.

The DLR County Biodiversity Action Plan 2021-2025 (DLCC, 2021) provides a framework to fully integrate biodiversity considerations and includes various objectives, target and actions relating to biodiversity.

The new DLR Biodiversity Action Plan 2021-2025, the second Plan for the County, builds on the aims of the first Plan and continues to move us towards our overall EU and National Vision for Biodiversity. It is Government policy for the Local Authorities to take the lead role in the production of Local Biodiversity Action Plans. This Plan demonstrates DLR's continuing commitment to achieving our obligations to protect our biodiversity for the benefit of future generations. This is achieved through a series of targeted actions provided in this Plan. The biodiversity objectives are within the DLR Biodiversity Action Plan 2021 – 2025 are detailed in Annex Table 20.

Annex Table 20 DLR Biodiversity Action Plan 2021 – 2025 biodiversity objectives

Objective	Details
Objective 1	Strengthen the knowledge base for conservation, management, and sustainable use of biodiversity.
Objective 2	Mainstream biodiversity into decision-making and improve the management of this valuable resource.
Objective 3	Conserve and restore biodiversity and ecosystems and support ecosystem services in DLR, including coastal and marine.
Objective 4	Increase awareness, training and appreciation of biodiversity, ecosystems and ecosystem services.
Objective 5	Strengthen the effectiveness of collaboration between all stakeholders for the conservation of biodiversity, including with Local Authority Biodiversity Officers, Local Authority Waters Programme (LAWPRO), the National Biodiversity Data Centre, BirdWatch Ireland, NPWS and other State Bodies.

Annex 2 Survey metadata

Annex Table 21 Metadata for field surveys undertaken.

Date	Surveyor(s)	Survey(s) undertaken	Weather details	
June 2019	Elaine Dromey	Scoping field survey	Information not available	
Aug 2020	Elaine Dromey, Owen Twomey	Terrestrial baseline survey	Information not available	
Nov 2020	Owen Twomey and Ross Macklin	Fisheries surveys at proposed water crossing points	Information not available	
02/11/2022	Jake Matthews	Terrestrial baseline survey of sectors 5 – 7 and OSS	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	9 - 14 5 8/8 Heavy
24/04/2023	Jake Matthews & Alice Magee	Terrestrial baseline survey of sectors 6, 7 and OSS	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	5 – 8 2 5/8 None
25/04/2023	Jake Matthews	Terrestrial baseline survey of sector 5	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	8 - 11 3 - 4 4/8 None
26/04/2023	Jake Matthews & Alice Magee	Terrestrial baseline survey of sectors 3 and 4	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	9 - 12 4 6/8 None
27/04/2023	Jake Matthews & Hugo Brooks	Terrestrial baseline survey of O&M Base and Sector 2	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	5- 12 4 3/8 None

Date	Surveyor(s)	Survey(s) undertaken	Weather details	
28/04/2023	Jake Matthews & Hugo Brooks	Terrestrial baseline survey of Landfall Site and onshore ECR sector 1	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	10 - 17 4 7/8 None
08/07/2023	Jake Matthews	Black guillemot bird survey at O&M Base	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	14 1 - 3 6/8 None
01/08/2023	Jake Matthews	Terrestrial baseline survey of alternative routes near of sectors 5 & 6	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	15 - 18 3 - 4 5/8 None
02/08/2023	Jake Matthews	Terrestrial baseline survey of alternative routes near of sectors 5 & 6	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	11 – 14 2 – 3 4/8 None
Start: 05/10/2023 End: 12/10/2023	Jake Matthews & Hugo Brooks	Badger monitoring & Static bat detector deployment for Eurofound land (edge of Sector 2)	Temp. (°C) Wind speed (BFT) Cloud cover (oktas) Precipitation	2 - 21 2 - 6 N/A None

Annex Table 22 Metadata for bat emergence/potential absence surveys undertaken.

Date	Surveyor(s)	Tree ref.	Weather details	Start	End
05/09/2023	Hugo Brooks	T1	Temp. (°C)	18	18
			Wind speed (BFT)	1	1
	Michael James	T2	Cloud cover (oktas)	2/8	1
			Precipitation	None	None
06/09/2023	Jake Matthews	T5 & T6	Temp. (oC)	19	17
	Hugo Brooks	T3 & T4	Wind speed (BFT)	2	1
	Michael James	T7 – T9	Cloud cover (oktas)	4/8	4/8
			Precipitation	None	None
07/09/2023	Hugo Brooks	T10	Temp. (°C)	20	18
			Wind speed (BFT)	2	1
	Michael James	T11	Cloud cover (oktas)	6/8	1/8
			Precipitation	None	None
13/09/2023	Jake Matthews	T12	Temp. (°C)	15	12
			Wind speed (BFT)	4	5
	Alice Magee		Cloud cover (oktas)	8/8	7/8
			Precipitation	Light showers	Drizzle
14/09/2023	Jake Matthews	T13	Temp. (°C)	15	14
			Wind speed (BFT)	1	1
	Alice Magee		Cloud cover (oktas)	8/8	8/8
			Precipitation	Light showers	Light showers
26/10/2023	Jake Matthews	T15	Temp. (°C)	10	9
			Wind speed (BFT)	3	1
	Brogan Costello	T14	Cloud cover (oktas)	8/8	6/8
			Precipitation	Light showers	None
30/07/2024	Jake Matthews	T10	Temp. (°C)	14	14
			Wind speed (BFT)	1	1
	Michael James	T11	Cloud cover (oktas)	2/8	2/8
			Precipitation	None	None
31/07/2024	Jake Matthews	T2	Temp. (°C)	22	18
			Wind speed (BFT)	1	1

Date	Surveyor(s)	Tree ref.	Weather details	Start	End
	Hugo Brooks	T1	Cloud cover (oktas) Precipitation	3/8 None	3/8 None
01/08/2024	Jake Matthews	T7 & T8	Temp. (°C) Wind speed (BFT)	20 1	16 1
	Hugo Brooks	T3 & T4	Cloud cover (oktas) Precipitation	2/8 None	2/8 None
06/08/2024	Jake Matthews	T6	Temp. (°C) Wind speed (BFT)	16 2	15 1
	Alice Magee	T5	Cloud cover (oktas) Precipitation	2/8 None	2/8 None
12/08/2024	Jake Matthews	T9	Temp. (°C) Wind speed (BFT)	17 2	15 3
	Alice Magee		Cloud cover (oktas) Precipitation	2/8 None	2/8 None
13/08/2024	Jake Matthews	T12	Temp. (°C) Wind speed (BFT)	18 3	16 4
	Alice Magee		Cloud cover (oktas) Precipitation	4/8 None	6/8 None
14/08/2024	Jake Matthews	T13	Temp. (°C) Wind speed (BFT)	20 1	19 1
	Alice Magee		Cloud cover (oktas) Precipitation	4/8 None	4/8 None

Annex 3 Aquatic ecology report

Dublin Array Offshore Wind Farm

Volume 6, Technical Appendix 6.5.2-1, – Biodiversity Technical Baseline
Annex 3: Aquatic Baseline Report for Dublin Array Offshore Wind Farm

Explanatory Note

Date: Febuary2025

Appendix cover note

1.1 Background

1.1.1 The application for development permission for the Dublin Array project is being submitted under section 291 – Part XXI of the PDA, Chapter III. The EIA provisions in Part X of the PDA shall apply to the application[1]. The project description chapter (Volume 2, Chapter 6) should be referred to for the final project details for which this application for development consent is being submitted.

1.1.2 The purpose of this appendix cover note is as follows:

- (a) to acknowledge that in the years preceding the preparation of the planning application, a series of technical studies were commissioned by the Applicant to establish the relevant baseline scenario and inform the ultimate design of the proposed development; and
- (b) to identify and explain why certain, limited, references remain in the technical studies appended to the planning application albeit the references are no longer relevant to the proposed development.

1.1.3 The *main reasons* the references changed over time are (i) project evolution and (ii) developments in law and procedure that occurred in the intervening period between the carrying out of technical studies and the finalisation of the planning application. The *specific reasons* relevant to each reference are set out in the table below. The reader of the relevant appendix should take this table into account in their review of the technical study.

1.1.4 For the avoidance of doubt, we confirm that where any refinement to the project during this period was deemed to require substantive amendments to any technical study, those amendments were made and the study up-dated accordingly. The only circumstance in which it was deemed not necessary to substantively amend the study was where the amendment required would not undermine the methodology, accuracy or conclusions of the technical study, insofar as the study is relevant to the EIAR, and where the study was originally prepared on a basis that was sufficiently precautionary to capture the change in circumstances, such that the conclusions remain equally valid today in the context of the relevant EIAR chapter. In this scenario, it was considered appropriate to capture the amendment within a table, explain it within a cover note, and append this to the relevant study.

[1] Section 317(1) of the PDA provides that Part X (environmental impact assessment) shall apply to proposed development to which Chapter III of Part XXI applies.

Terminology changes

Referred to within Annex 3	Revised terminology	Comment
Grid Connection Route (GCR)	Onshore Export Cable Route (ECR)	The term Grid Connection Route (GCR) was changed to Export Cable Route (ECR). All references to GCR should be read to mean ECR.

Project detail changes

1.1.5 Note that the below table is not an exhaustive list of every single project detail that evolved between project iteration and finalisation, however it captures all of the pertinent project details that have evolved

Referred to within Annex 3	Revised terminology	Comment
Two potential GCR options	N/A	The report refers to and shows two potential ECR route options. There is now only one ECR route option being taken forwards within the EIAR, and it has been altered since the writing of the Aquatic Baseline Report. Volume 2, Chapter 6 should be referred to for current and accurate project details.
Study area	N/A	Where the term 'study area' is used, please note that it refers to the area utilised to inform the technical appendices, and not those which are used throughout the respective EIAR chapters. The study area referred to in the Aquatic Baseline encompasses areas subsequently refined through more detailed design iterations, and are wider than those which inform the EIAR. For example, a possible ECR route containing survey sites A1 and A2, is not an option in the EIAR.

Referred to within Annex 3	Revised terminology	Comment
Figures depicting two potential ECR options.	N/A	The Figures within the Aquatic Baseline all depict two potential 'GCR' options. There is now only one ECR route option being taken forwards within the EIAR, and it has been altered since the writing of the Aquatic Baseline Report. Volume 2, Chapter 6 should be referred to for current and accurate project details.

1.1.6 Figures within some of the older technical appendices and annexes do not depict the refined project details i.e. the redline including the refined ECR, but rather the wider study area that encompassed all options prior to the design iteration and refinement.

1.1.7 Notwithstanding the above, the information and analyses provided within the technical appendices are still considered accurate (and conservative) with respect to the refined project description, design options etc.

Aquatic baseline report for the proposed Dublin Array Offshore Wind Farm

Prepared by Triturus Environmental Ltd. for SLR Consulting Ireland

November 2023

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by SLR Consulting Ireland to conduct baseline aquatic surveys and otter surveys at riverine sites crossed by the proposed grid connection route (GCR) for the Dublin Array Offshore Wind Farm (**Figure 2.1**). In addition to the GCR crossings otter (*Lutra lutra*) surveys were also undertaken along the footprint of the proposed landfall and operations and maintenance (O&M) locations (**Figure 2.1**).

Undertaken on a catchment-wide scale, this report provides a baseline assessment of the aquatic ecology including fisheries, biological water quality, protected species and habitats in the study area. Aquatic surveys were undertaken in May and July 2023.

1.2 Project description

A full description of the proposed wind farm will be provided in any Environmental Impact Assessment Report (EIAR) used to support consenting applications.

2. Methodology

2.1 Selection of watercourses for assessment

All freshwater watercourses crossed by the proposed GCR (preferred option) were considered as part of the current assessment. Thus, a total of 14 no. riverine sites were selected for detailed aquatic assessment (see **Table 2.1, Figure 2.1** below). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) mapping. Furthermore, a dedicated otter survey was undertaken at the proposed GCR crossings. The otter survey was also conducted in the vicinity of the landfall location east of the Shanganagh-Bray WWTP and the O&M location at Dún Laoghaire Harbour in July 2023 (**Figure 2.1**).

Riverine survey sites were present on the Barnacullia River (EPA code: 10B99) and unnamed tributary, Jamestown Stream (10J01), Glenamuck North Stream (10G19) and unnamed tributary, Carrickmines Stream (10C04), Laughanstown Stream (10L07), Shanganagh River (10S01) and the Kill-O-The-Grange River (10K02) (**Table 2.1**). The riverine survey sites were in the Dargle_SC_010 river sub-catchment within hydrometric area 10 (Avoca/Varty). The survey areas were not located within a European site.

Please note this aquatic report should be read in conjunction with the final Environmental Impact Assessment Report (EIAR) prepared for the proposed wind farm.

2.2 Aquatic site surveys

Aquatic surveys of the watercourses crossed by the proposed GCR were conducted on the 31st May 2023 and 12th July 2023. Survey effort focused on both instream and riparian habitats at each riverine site and included a fisheries habitat appraisal, white-clawed crayfish survey, otter survey (within 150m radius), macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling) (**Figure 2.1**). This holistic approach informed the overall aquatic ecological evaluation of each site in context of the proposed wind farm and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

In addition to the ecological characteristics of the site, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form) including associated evidence of historical drainage
- Substrate type and relative condition, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition and bordering land use practices

Table 2.1 Location of *n*=14 aquatic survey sites in the vicinity of the proposed Dublin Array GCR

Site no.	Watercourse	EPA code	Location	Alternative name	X (ITM)	Y (ITM)
A1	Unnamed stream	n/a	Jamestown		720615	724202
A2	Barnacullia River	10B99	Jamestown	Ballyogan Stream	720891	724089
A3	Jamestown Stream	10J01	Carrickmines Great		720922	723686
A4	Glenamuck North Stream	10G19	Carrickmines Great	Golf Stream	721167	723658
A5	Unnamed stream	n/a	Carrickmines Great		721259	723629
A6*	Carrickmines Stream	10C04	Carrickmines Little		721772	724212
A6b	Carrickmines Stream	10C04	Carrickmines Park & Ride		722200	724024
A7	Laughanstown Stream	10L07	Carrickmines Great		722386	723149
A7b	Laughanstown Stream	10L07	Carrickmines Great		722481	723921
A8*	Carrickmines Stream	10C04	Cherrywood Park	Loughlinstown River North	724338	723387
A9*	Shanganagh River	10S01	Shanganagh Wood		725587	723085
B1	Kill-O-The-Grange River	10K02	R118 road culvert	Deansgrange River	724617	723919
B2	Kill-O-The-Grange River	10K02	Glencar Lawn	Deansgrange River	724998	723617
B3*	Kill-O-The-Grange River	10K02	Achill Road	Deansgrange River	725167	723512

* eDNA sampling for Atlantic salmon, brown/sea trout, European eel & Lamprey (*Lampetra* sp.)

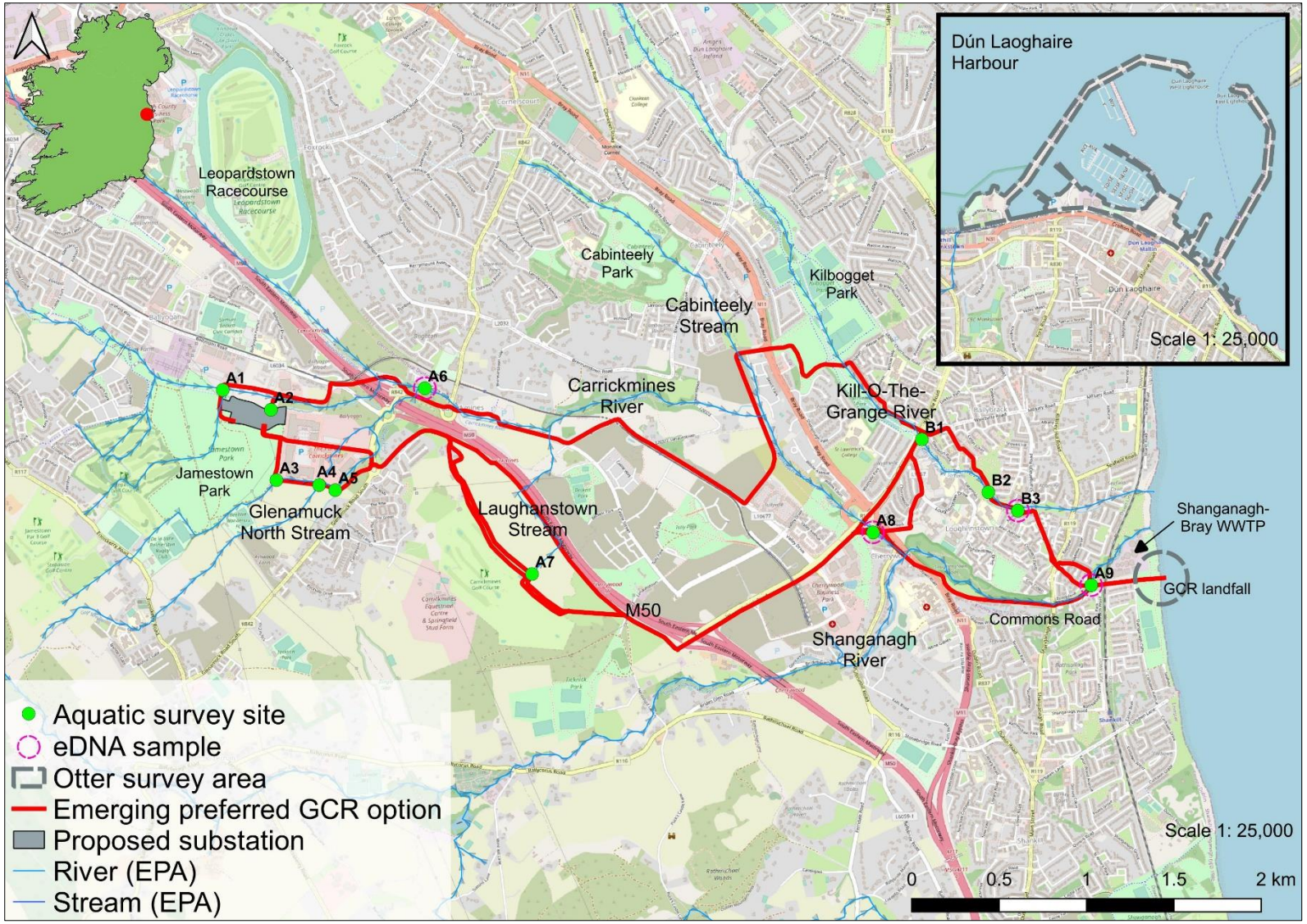

Figure 2.1 Overview of the aquatic survey and otter survey areas in the vicinity of the proposed Dublin Array GCR

2.3 Fisheries habitat appraisal

A fisheries habitat appraisal of 14 no. riverine survey sites was undertaken to establish the importance of the supporting habitats as nursery, spawning and or holding habitats for salmonids and lamprey species but also considered European eel (*Anguilla anguilla*) and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O'Grady (2006), Hendry et al. (2003), Armstrong et al. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the riverine sites (i.e., channel profiles, substrata etc.).

2.4 White-clawed crayfish survey

White-clawed crayfish (*Austropotamobius pallipes*) surveys were undertaken at the aquatic survey sites in May and July 2023 under a National Parks and Wildlife (NPWS) open national licence (no. C24/2023), as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the crayfish sampling started at the uppermost site(s) of the catchment/sub-catchments in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds et al. (2010). An appraisal of white-clawed crayfish habitat at each site was conducted based on physical habitat attributes, water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of crayfish records within the wider survey area was completed.

2.5 eDNA analysis

To validate site surveys and to detect potentially cryptically-low populations of selected aquatic species within the study area, composite water samples were collected from the Carrickmines Stream (A6 & A8), Shanganagh River (A9) and Kill-O-The-Grange River (B3) in May 2023 and analysed for Atlantic salmon (*Salmo salar*), brown trout, lamprey (*Lampetra* sp.) and European eel environmental DNA (eDNA). The sampling sites were strategically chosen to maximise longitudinal (instream) coverage within the catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of n=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix C** for full eDNA laboratory analysis methodology.

2.6 Biological water quality (Q-sampling)

The 14 no. riverine survey sites were assessed for biological water quality through Q-sampling in May 2023 and July 2023 (**Table 2.1**). All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per Environmental Protection Authority (EPA) methodology (Feeley et al., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley et al., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner et al. (2005) and assigned to WFD status classes (**Table 2.2**). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley et al., 2020) and other relevant taxa (i.e. Byrne et al., 2009; Nelson et al., 2011).

Table 2.2 Reference categories for EPA Q-ratings (Q1 to Q5) (Toner et al., 2005)

Q value	WFD status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.7 Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the survey sites, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the Flora (Protection) Order, 2022 and or Irish Red list for vascular plants (Wyse-Jackson et al., 2016) or habitats corresponding to the Annex I habitats, e.g., 'Water courses of plain to montane levels, with submerged or floating vegetation of the *Ranunculion fluitantis* and *Callitricho-Batrachion* (low water level during summer) or aquatic mosses [3260]' (more commonly referred to as 'floating river vegetation').

2.8 Otter sign surveys

Walkover otter surveys of the 14 no. riverine sites were undertaken in May 2023 and July 2023. Furthermore, a dedicated coastal otter survey was undertaken in the vicinity of the landfall location east of the Shanganagh-Bray WWTP (150m radius) and the O&M location at Dún Laoghaire Harbour (**Figure 2.2**).

The survey broadly followed the best practice survey methodology for otter as recommended by Lenton et al. (1980), Chanin (2003) and Bailey & Rochford (2006). The survey was completed during dry, mild, bright and settled conditions, which ensured that a good representation of habitat marked by otter could be recorded in the field, including territorial marking or marking of feeding and potential

breeding areas. The absence of recent heavy rainfall and cold temperatures helped preserve spraint providing for optimal otter survey conditions. Each otter sign was logged by type, location (handheld GPS), condition and approximate age for later interpretation to distinguish differences in habitat use and activity. Spraints were subjectively assessed as either fresh (recent), mixed-age (recent and older spraints, typically indicative of a regular sprainting site) or old (spraint not recently deposited and degrading). Furthermore, indicative counts of spraint (i.e. number of individual spraints) and the number of sprainting sites (often separate clusters in one area) were noted. This helped indicate the frequency of otter marking, which can clarify levels of activity in particular areas, inclusive of breeding (holt) and resting (couch) areas.

2.9 Aquatic ecological evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Wind farms' (NRA, 2009).

2.10 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Care was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Furthermore, staff did not undertake any work in a known crayfish plague catchment for a period of <72hrs in advance of the survey. Where feasible, equipment was also thoroughly dried (through UV exposure) between survey areas. Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

3. Desktop review

3.1 Fisheries asset of the survey area

The Dublin Array Offshore Wind Farm GCR was proposed to cross several watercourses, namely the Barnacullia Stream and unnamed tributary, Jamestown Stream, Glenamuck North Stream and unnamed tributary, Carrickmines Stream, Laughanstown Stream, Shanganagh River and the Kill-O-The-Grange Stream (**Table 2.1; Figure 2.1**).

The Barnacullia (aka Ballyogan) Stream is a heavily modified watercourse known to support three-spined stickleback (*Gasterosteus aculeatus*) (Triturus, 2020). The status of salmonids in the stream is uncertain given water quality pressures and the presence of numerous significant instream barriers along the watercourse which impede fish migration (Roisin O'Callaghan, Inland Fisheries Ireland, pers. comm.).

The Laughanstown Stream (a Barnacullia tributary) is considered of value only to three-spined stickleback due to limited flows and a highly modified channel (Triturus, 2020).

The Shanganagh River is recognised by Inland Fisheries Ireland (IFI) as a regionally important salmonid system, which supports both brown trout and anadromous sea trout (both *Salmo trutta*), in addition to European eel (*Anguilla anguilla*), lamprey (*Lampetra* sp.) and flounder (*Platichthys flesus*) (Triturus 2023 data).

The Carrickmines Stream supports brown trout, European eel, lamprey (*Lampetra* sp.) and three-spined stickleback (Triturus 2023 data; Triturus, 2020; Dún Laoghaire-Rathdown County Development Plan 2016-2022).

The Kill-O-The-Grange River is not a recognised salmonid watercourse (according to IFI) with multiple impassable instream barriers in its lower reaches. However, brown trout and three-spined stickleback have been observed from the stream historically (Triturus pers. obs.).

Fisheries data for other survey watercourses was not available prior to this survey.

4. Results of aquatic surveys

The following section summarises each of the 14 no. survey sites in terms of aquatic habitats, physical characteristics and overall value for fish, white-clawed crayfish and macrophyte/aquatic bryophyte communities. Biological water quality (Q-sample) results are also summarised for each riverine sampling site and in **Appendix A**. Habitat codes are according to Fossitt (2000). Scientific names are provided at first mention only. Sites were surveyed in May and July 2023. A summary of the aquatic species and habitats of high conservation concern recorded during the surveys is provided in **Table 4.2**. An evaluation of the aquatic ecological importance of each survey site based on these aquatic surveys is provided and summarised in **Table 4.3**.

4.1 Aquatic survey sites

4.1.1 Site A1 – Unnamed stream, Jamestown

Site A1 was located on an unnamed tributary (no EPA code) of the Barnacullia Stream at a proposed GCR crossing. The lower energy upland eroding river (FW1; Fossitt, 2000) had been historically deepened and straightened but retained a semi-natural profile of riffle, glide and localised pool sequences. However, much of the watercourse had been culverted underground upstream of the survey point. The stream was 2m wide and 0.15m deep with swift flowing water. The substrata comprised small boulder, cobble and mixed gravels with sand accumulations. The substrata were however heavily bedded and siltation was moderate to high with silt in the interstitial spaces and silt plumes underfoot. Given heavy tunnelling and the compacted bed, macrophytes and aquatic bryophytes were not present. The immediate riparian fringe however supported water figwort (*Scrophularia umbrosa*) and bittersweet (*Solanum dulcamara*) with the steep embankments supporting ruderal species including wild turnip (*Brassica rapa*), great willowherb (*Epilobium hirsutum*), nettle (*Urtica dioica*), cleavers (*Galium aparine*), bramble (*Rubus fruticosus* agg.) and hogweed (*Heracleum sphondylium*). Scattered semi-mature grey willow (*Salix cinerea* sp. *oleifolia*) were also present along the riparian zone.

Site A1 was considered of moderate suitability for salmonids given its semi-natural profile, swift flows and the availability of spawning substrata (albeit degraded in quality). However, there was no suitability for lamprey given bed compaction and the absence of suitable nursery areas (i.e. soft sediment burial substrata). Suitability for European eel was moderate being reduced given the shallow nature of the stream, although localised instream refugia were present with some deeper pool pockets downstream on meanders. Downstream barriers (e.g. N11 crossing) however, likely restricted eel migration within the watercourse. Despite some low physical suitability, no white-clawed crayfish were recorded and the species is not known from the catchment. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for salmonids and the presence of Q4 (good status) water quality, the aquatic ecological evaluation of site A1 was of **local importance (higher value) (Table 4.5).**

Plate 4.1 Representative image of an unnamed stream at site A1 on an unnamed Barnacullia Stream tributary, May 2023

4.1.2 Site A2 – Barnacullia River, Jamestown

Site A2 was located on the Barnacullia River (10B99) at a proposed GCR crossing. The low energy upland eroding river (FW1) had been deepened, straightened and realigned historically. Despite historical modifications, the channel exhibited good recovery with moderate channel sinuosity due to natural erosion (i.e. regeneration of meanders). The swift flowing river was 2m wide and 0.2m deep within a deeply incised channel (2m bank heights). The profile was riffle and glide-dominated with a paucity of pool areas. The substrata comprised of cobble and coarse gravels that were heavily silted (frequent bank slumping). Soft sediment accumulations were frequent instream. Given high shading of the narrow channel, macrophytes were not recorded. However, small boulder and cobble supported small patches of the moss *Rhynchostegium riparioides*. The riparian zone supported scrub vegetation dominated by bramble with hogweed, cow parsley (*Anthriscus sylvestris*), iris (*Iris pseudacorus*), spear thistle (*Cirsium vulgare*) and scattered grey willow.

Site A2 was of moderate value for salmonids although evident water quality pressures (eutrophication and siltation) reduced the value of the river at this location. However the river had characteristics that would support a brown trout population given semi-natural character and strong flows. There was poor suitability for European eel due to limited refugia and poor fish passage downstream (e.g. N11 crossing). Overall the site was considered of too high energy for lamprey given the bed was very compacted for lamprey ammocoete burial apart from very localised superficial soft sediment patches. Despite some low physical suitability, no white-clawed crayfish were recorded and the species is not known from the catchment. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for salmonids and the presence of Q4 (good status) water quality, the aquatic ecological evaluation of site A2 was of **local importance (higher value) (Table 4.5).**

Plate 4.2 Representative image of site A2 on the Barnacullia River, May 2023

4.1.3 Site A3 – Jamestown Stream, Carrickmines Great

Site A3 was located on the Jamestown Stream (10J01) at a proposed GCR crossing adjacent to the Park retail centre. The stream was representative of a heavily modified drainage channel and was dry at the time of survey. The stream was 0.5m wide with a dry mud base and likely only conveys water following heavy rainfall events. The channel was heavily tunnelled by a stock-proof hedgerow supporting mature ash (*Fraxinus excelsior*), bramble, blackthorn (*Prunus spinosa*), dog rose (*Rosa canina)* and holly (*Ilex aquifolium*). The site was bordered by tillage (BC3) and buildings and artificial surfaces (BL3).

Given the ephemeral nature of the channel the watercourse was not of fisheries value and it was not possible to collect a biological water quality sample.

Given the seasonality of the channel and the absence of species or habitats of high conservation value, the aquatic ecological evaluation was of **local importance (lower value) (Table 4.5).**

Plate 4.3 Representative image of site A3 on the Jamestown Stream, May 2023 (dry channel in hedgerow)

4.1.4 Site A4 – Glenamuck North Stream, Carrickmines Great

Site A4 was located on the Glenamuck North Stream (10G19) at a proposed GCR crossing in agricultural land. The heavily modified lowland stream (FW2) had been historically deepened (U-shaped profile) and straightened as part of agricultural improvement. The channel was 0.75m wide and 0.05m deep with very slow flowing water that comprised exclusively of shallow glide. The substrata were dominated by mixed gravels with coarse sand and silt. The bed had heavy siltation and soft sediment deposits were visible throughout. Due to the compacted bed and heavy tunnelling, macrophytes and aquatic bryophytes were not present. The site was bordered by a stock-proof, mature hedgerow of grey willow, hawthorn, ash and sycamore (*Acer pseudoplatanus*). The river was bordered by tillage (BC3).

Apart from three-spined stickleback (*Gasterosteus aculeatus*) (observed during the site visit), site A4 was not of fisheries value given low flows, poor hydromorphology and significant siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix B**). However, it should be noted that this was a tentative rating given an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A4 was of **local importance (lower value) (Table 4.5).**

Plate 4.4 Representative image of site A4 on the Glenamuck North Stream, May 2023

4.1.5 Site A5 – unnamed stream, Carrickmines Great

Site A5 was located on an unnamed Glenamuck North Stream tributary at a proposed GCR crossing. The small stream (FW1) had been historically deepened (trapezoidal profile) and straightened locally as part of agricultural improvement. The channel was 1m wide and 0.05m deep with the profile comprised entirely of slow flowing riffle. The substrata were dominated by small boulder, cobble and mixed gravels with sand and silt. The substrata were however heavily bedded and siltation was very high with silt deposits visible throughout the stream bed that covered c.50% of the hard substrata. Due to the compacted bed and heavy tunnelling, macrophytes and aquatic bryophytes were not present. The riparian zone had been recently cleared but supported grey willow, holly and alder (*Alnus glutinosa*) downstream. The site was bordered by dry meadow habitat (GS2) and tillage (BC3).

Site A4 was not of fisheries value given low flows, poor hydromorphology and significant siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A5 was of **local importance (lower value) (Table 4.5).**

Plate 4.5 Representative image of site A5 on an unnamed tributary of the Glenamuck North Stream, May 2023

4.1.6 Site A6 – Carrickmines Stream, Carrickmines Little

Site A6 was located on the Carrickmines Stream (10C04) at a proposed GCR crossing adjacent to the R482 road. The swift flowing stream (FW1) had been historically deepened and straightened but retained a semi-natural profile of riffle, glide and localised pool sequences. The stream was 2m wide and 0.15m deep. The substrata comprised small boulder, cobble and mixed gravels with sand and silt accumulations. The substrata were however heavily bedded and siltation was moderate to high with silt in the interstitial spaces and silt plumes underfoot. Calcification of the bed (cyanobacterial crusts) was evident. Due to the compacted bed and heavy tunnelling, macrophytes were not present. However, small boulder and cobble supported small patches of *Rhynchostegium riparioides*. Cover of filamentous algae (*Cladophora glomerata*) was high (10%), indicating eutrophication pressures. The stream was lined by very dense scrub (WS1) dominated by bramble with scattered mature ash, sycamore, grey willow and non-native buddleja (*Buddleja davidii*).

Site A6 was of moderate value for salmonids, with the value being reduced due to hydromorphological and water quality pressures. However, suitability for European eel was poor and the site was not of value for lamprey species due to the absence of lamprey ammocoetes burial habitat. Despite some physical suitability in the alkaline channel, no white-clawed crayfish were recorded and the species is not known from the catchment. No otter signs were recorded in vicinity of the site although the species is known to forage in the watercourse (Triturus data).

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for salmonids and known utilisation of the stream by otter in vicinity of the survey site, the aquatic ecological evaluation of site A6 was of **local importance (higher value) (Table 4.5).**

Plate 4.6 Representative image of site A6 on the Carrickmines Stream, May 2023

4.1.7 Site A6b – Carrickmines Stream, Carrickmines Little

Site A6b was located on the Carrickmines Stream (10C04) adjacent to the Carrickmines Park and Ride, approximately 500m downstream of site A6. The swift-flowing river (FW1) had been extensively straightened and deepened historically, with modified banks (revetment) present throughout (up to 2m in height). The watercourse was 4-5m wide and between 0.2-0.5m, flowing over a moderate gradient. The profile was dominated by riffle and swift shallow glide with a paucity of pool areas. Typical of a high energy site, the substrata were dominated by compacted cobble and boulder, with localised small pockets of fine to medium interstitial gravels. These were moderately to heavily silted, despite high flow rates. Sand was present locally along marginal slacks and in pools but was compacted into coarse substrata due to high flow rates. Given high riparian shading and a compacted bed, macrophyte growth was limited to very occasional water mint (*Mentha aquatica*) along the channel margins. However, aquatic bryophyte coverage was high with abundant *Fontinalis antipyretica* and more occasional *Fissidens* sp. The liverwort species *Pellia epiphylla* and *Conocephalum conicum* were frequent on large boulder and the banks. The site was heavily shaded by dense riparian treelines of ash, hawthorn, wych elm (*Ulmus glabra*), oak (*Quercus robur*), blackthorn, sycamore and grey willow with abundant bramble-dominated scrub. The banks also supported abundant ivy (*Hedera* sp.) with pendulous sedge (*Carex pendula*), hogweed, broad-leaved dock (*Rumex obtusifolius*), nettle and great willowherb. The site was bordered by dry meadows (GS2) and artificial surfaces (BL3).

Site A6b was of moderate value for salmonids given evident water quality pressures and historical modifications. The site was a moderate quality salmonid nursery given the presence of abundant riffle and fast glide habitat with ample boulder and cobble refugia. However, the site provided poor opportunities for salmonid and lamprey spawning given siltation pressures and the dominance of larger substrata. The high energy site was unsuitable for lamprey ammocoetes given an absence of soft sediment areas. Suitability for European eel was moderate although substrata compaction and a paucity of deeper areas reduced the potential for the species. No white-clawed crayfish were recorded and the species is not known from the catchment. An otter spraint was recorded on a mid-channel boulder (ITM 722248, 724008).

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for salmonids and utilisation by otter, the aquatic ecological evaluation of site A6b was of **local importance (higher value) (Table 4.5).**

Plate 4.7 Representative image of site A6b on the Carrickmines Stream, July 2023

4.1.8 Site A7 – Laughanstown Stream, Carrickmines Great

Site A7 was located on the Laughanstown Stream (10L07) at a proposed GCR crossing immediately upstream of the M50 corridor. The small stream (FW1) had been extensively straightened and deepened historically resulting in a trapezoidal channel with poor hydromorphology. The stream fell over a moderate gradient upstream of the motorway and did not support flowing water at the time of survey, i.e. ephemeral channel. The stream averaged 1.5m wide with a damp base and no standing water. The base was heavily vegetated with fool's watercress (*Apium nodiflorum*) and brooklime

(*Veronica beccabunga*). Terrestrial encroachment was high with abundant water figwort, buttercups and terrestrial grasses within the channel. The site was bordered by arable crops (BC1).

Given the ephemeral nature of the channel, the site was not of fisheries value and as the stream was dry at the time of the survey, it was not possible to collect a biological water quality sample.

Given the seasonality of the channel and the absence of aquatic habitats or species of high conservation value, the aquatic ecological evaluation of site A7 was of **local importance (lower value) (Table 4.5).**

Plate 4.8 Representative image of site A7 on the Laughanstown Stream, July 2023

4.1.9 Site A7b – Laughanstown Stream, Carrickmines Great

Site A7b was located on the lowermost reaches of the Laughanstown Stream (10L07) at a proposed GCR crossing immediately upstream of the Carrickmines Stream confluence. The lowland depositing stream (FW2) had been extensively straightened and deepened throughout, resulting in a heavily tunnelled, narrow channel. The deep U-shaped channel (2m high banks) was 2m wide and <0.15m deep, with occasional deeper areas to 0.3m associated with frequent instream debris dams. The stream suffered from low flows at the time of survey (and was dry upstream at site A7). The substrata were dominated by abundant soft sediment deposits with sands with very limited larger substrata. Localised pockets of fine gravels were present but these were grossly silted. Due to high shading, macrophytes were limited to highly localised fool's watercress at the Carrickmines Stream confluence with the Laughanstown Stream. Aquatic bryophytes were not present although *Pellia epiphylla* was present on exposed muddy banks. The channel was very heavily tunnelled by dense (impenetrable) bramble scrub with ash, hawthorn, willow and ivy. The site was bordered by dry meadows (GS2), dense scrub (WS1), sycamore-dominated treelines and a small block of pine woodland (WD3).

Site A7b was not of fisheries value due to significant siltation pressures, poor hydromorphology and poor flows. Some limited salmonid and European eel habitat was present at the Carrickmines Stream confluence (despite being comprised by siltation and eutrophication pressures). Whilst soft sediment accumulations were abundant (dominant) in the lower reaches of the Laughanstown Stream, the site was not considered of value to lamprey due to an absence of suitable spawning habitat and water quality and flow issues. No otter signs were recorded in the vicinity of the site, despite ample marking opportunities on the downstream-connecting Carrickmines Stream.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix B**). However, it should be noted that this was a tentative rating given an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A7b was of **local importance (lower value) (Table 4.5).**

Plate 4.9 Representative image of site A7b on the Laughanstown Stream, July 2023

4.1.10 Site A8 – Carrickmines Stream, Cherrywood Park

Site A8 was located on the Carrickmines Stream (10C04) at a footbridge in Cherrywood Park. The semi-natural stream (FW1) had been modified historically with retaining walls and revetment present along both banks. However, some good instream recovery was evident. The swift stream flowed over a moderate gradient and averaged 3-4m wide and 0.2-0.5m deep, with localised deeper pool to 1.1m. The site featured a good diversity of flow types with riffle-glide-pool sequences. Given high energy, the substrata were dominated by boulder and cobble. However, areas of glide and pool tailings supported uncompacted mixed gravels and sands. Siltation was moderate overall, despite high flow rates. Calcification of the substrata (cyanobacterial crusts on stable substrata) was present and added

to the levels of beddedness. Soft sediment accumulations were flocculent, where present along channel margins although some depositional sands were present near the footbridge. Due to high riparian shading and flow rates, macrophytes were not recorded. However, coverage of aquatic bryophytes was relatively high with frequent *Rhynchostegium riparioides* on more stable substrata, in addition to occasional *Fontinalis antipyretica*. Filamentous algal cover was moderate (20%) despite shading, indicating significant enrichment. Exposed areas of bank (e.g. scoured areas) supported the liverworts *Conocephalum conicum* (check pics) and *Pellia* sp. The site was heavily scrubbed with sycamore, alder, elder, willow, horse chestnut (*Aesculus hippocastanum*), hawthorn and beech (*Fagus sylvatica*) with pendulous sedge, ivy and abundant bramble scrub. Non-native buddleja (*Buddleja davidii*) was also present. The site was bordered by parkland (WD5) and buildings (BL3).

Site A8 was of good value for salmonids, with nursery and localised spawning habitat present in addition to deeper holding areas for adults. However, the value of spawning habitat for both salmonids and lamprey was reduced due to siltation and enrichment pressures. The site was not suitable for lamprey ammocoetes given high flow rates and a paucity of suitable depositional sediment (sands only). Suitability for European eel was good due to an abundance of suitable instream refugia (e.g. boulders, scoured banks). However, migration barriers in the catchment reduced the potential for the species (**Figure 5.1**). Brown trout and European eel, but not *Lampetra* sp. or Atlantic salmon, were detected via eDNA sampling at site A8 (**Table 4.1**). Despite some physical suitability, no white-clawed crayfish were recorded via hand searching of instream refugia. An otter spraint site was recorded under the footbridge (ITM 724335, 723385). A second spraint site was identified downstream at the entrance to the N11 road culvert (ITM 724407, 723339)

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and Red-listed European eel (detected via eDNA sampling), the presence of Q4 (good status) water quality and utilisation by otter, the aquatic ecological evaluation of site A8 was of **local importance (higher value (Table 4.5).**

Plate 4.10 Representative image of site A8 on the Carrickmines Stream, May 2023

4.1.11 Site A9 – Shanganagh River, Shanganagh Wood

Site A9 was located on the lower reaches of the Shanganagh River (10S01) at a proposed GCR crossing, immediately downstream of a storm drain confluence. The semi-natural high energy river (FW1) flowed over a moderate gradient in an incised channel (3-4m banks) and was 6-8m wide and between 0.2-0.5m deep. Localised modifications had been made historically (retaining walls etc.) but overall the site had good hydromorphology. The site featured a high diversity of instream habitats, with riffle, glide and frequent pool (to 1.4m) associated with meanders and instream boulders. The substrata were dominated by compacted boulder and cobble with abundant sands & finer gravels. Mixed gravels were present locally but rare overall. Sand accumulations were frequent along channel margins (e.g. on meanders), with some featuring a higher proportion of silt. Large woody debris was frequent instream and contributed to the high habitat heterogeneity. Given the high energy and high riparian shading, macrophytes were not recorded. However, *Fontinalis antipyretica* was frequent on larger substrata with very occasional *Rhynchostegium riparioides*. Filamentous algae cover was relatively high considering the levels of shading, indicating significant enrichment (both upstream and downstream of stormwater outfall). The mature riparian zone supported treelines of alder, ash, beech, sycamore and willow (including crack willow) with abundant bramble scrub. The site was bordered by amenity grassland (GA2) and scattered trees & parkland (WD5).

Site A9 was of high value for salmonids given a high habitat heterogeneity. Whilst suitable spawning areas were highly localised, the site was of most value as a nursery and holding habitat for adults. Given proximity and good connectivity to the sea (500m downstream), holding habitat (deep pools) for sea trout was also present, in addition to abundant refugia for European eel (boulders, scours, tree roots etc.). The site was of moderate value for lamprey spawning with soft sediment accumulations sub-optimal for larvae (but some suitability, nonetheless). Brown trout and European eel, but not *Lampetra* sp. or Atlantic salmon, were detected via eDNA sampling at site A9 supporting these

observations (**Table 4.1**). There was no suitability for white-clawed crayfish. A regular otter spraint site was recorded approx. 30m downstream of the proposed GCR crossing, on a crack willow root system (ITM 725608, 723101). A potential holt was identified near the fence line for the Shanganagh-Bray WWTP (ITM 725712, 723223), despite no signs of recent usage.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and Red-listed European eel (detected via eDNA sampling), the presence of Q4 (good status) water quality and utilisation by otter, the aquatic ecological evaluation of site A9 was of **local importance (higher value (Table 4.5).**

Plate 4.11 Representative image of site A9 on the lower reaches of the Shanganagh River, May 2023

4.1.12 Site B1 – Kill-O-The-Grange River, R118 road culvert

Site B1 was located on the Kill-O-The-Grange River (10K02) at the Wyattville Road (R118) culvert. The artificial drainage channel[1] was 6-8m wide and 0.1-0.2m deep with very few deeper areas. Shallow, swift-flowing glide and riffle predominated. The bed in vicinity of the culvert was rendered although this supported some superficial mixed gravels and occasional boulder. Likewise, downstream of the rendered bed, boulder and cobble became more common with localised mixed gravels. However, the substrata were very heavily silted. Given the artificial bed and higher riparian shading downstream, macrophyte growth was sparse overall although localised stands of curled pondweed (*Potamogeton crispus*), water starwort (*Callitriche* sp.) and invasive Nuttall's pondweed (*Elodea nuttallii*) were present. Blue water speedwell (*Veronica anagallis-aquatica*) was present but rare. Small

[1] Constructed in the 1960s as part of the South County Dublin Main Drainage Scheme, the channel's primary role was to act as an arterial collection channel for surface water run-off

cobble/gravel islands had formed downstream of the culvert and these supported reed canary grass (*Phalaris arundinacea*), watercress and fool's watercress. Cover of filamentous algae was extremely high, covering >75% of the bed, indicating significant enrichment. The heavily modified riparian zone supported a low diversity of nitrophilous species such as nettle, hogweed, cow parsley (*Anthriscus sylvestris*) and non-native buddleja. The south bank featured a mature treeline dominated by ash and sycamore with abundant bramble and cherry laurel (*Prunus laurocerasus*). The site was bordered by parkland (WD5) and residential areas (BL3/GA2).

Site B1 was of poor fisheries value given very significant siltation and enrichment pressures, albeit the river is known to support localised brown trout (Brazier & Macklin, 2020; **Table 4.1**). Salmonid habitat was poor overall with only localised spawning and nursery habitat present, improving downstream where hydromorphology improved. Whilst localised gravels with some suitability for lamprey spawning were present, these were heavily silted and the species is not known from the watercourse (nor where they detected downstream via eDNA at site B3; **Table 4.1**). Lamprey nursery habitat was absent (flocculent silts only). Suitability for European eel was poor given the shallow nature of the stream and paucity of suitable instream refugia. Despite some low physical suitability, no white-clawed crayfish were recorded and the species is not known from the catchment. A known regular otter spraint site was recorded on an instream boulder at the downstream end of the road culvert (ITM 724618, 723914). This contained abundant crab remains.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the utilisation by otter and the known presence of a small brown trout population, the aquatic ecological evaluation of site B1 was of **local importance (higher value) (Table 4.5).**

Plate 4.12 Representative image of site B1 on the Kill-O-The-Grange River, May 2023

4.1.13 Site B2 – Kill-O-The-Grange River, Glencar Lawn

Site B2 was located on the Kill-O-The-Grange River (10K02) at a footbridge and proposed GCR crossing in Loughlinstown Linear Park. The heavily modified stream (FW2) was 3m wide and between 0.2-0.4m deep. Swift glide and riffle predominated with localised small pool (typically on meanders of instream enhancement areas). Boulder revetment was present throughout along the steep trapezoidal channel. The substrata were dominated by bedded boulder and cobble although mixed gravels and coarse sands were present locally. These were very heavily silted, despite reasonable flow rates. Macrophyte cover was sparse with occasional fool's watercress and blue water speedwell instream. Aquatic bryophytes were limited to occasional *Rhynchostegium riparioides* on larger boulder. Cover of filamentous algae (*Vaucheria* sp.) was extremely high, covering >90% of the bed. The steep slopes featured a narrow riparian fringe of reed canary grass, nettle, cleavers, hogweed, willowherbs, cow parsley, buttercups and rank grasses. The non-native wall barley (*Hordeum murinum*) was present adjacent to the footbridge. The site was bordered by parkland (WD5), residential areas and amenity grassland (GA2)

Site B2 was of poor fisheries value given very significant siltation and enrichment pressures, in addition to poor hydromorphology (although some instream enhancement had been undertaken historically). Salmonid habitat was poor, although some limited spawning and nursery habitat was present locally. Whilst localised gravels with some suitability for lamprey spawning were present, these were heavily silted and the species is not known from the watercourse. Lamprey nursery habitat was absent (flocculent silts only). Suitability for European eel was relatively poor given the shallow nature of the stream although instream refugia were more frequent than upstream areas. Despite some low physical suitability, no white-clawed crayfish were recorded and the species is not known from the catchment. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for salmonids and Red-listed European eel (known within the watercourse, **Table 4.1**), the aquatic ecological evaluation of site B2 was of **local importance (higher value) (Table 4.5).**

Plate 4.13 Representative image of site B2 on the Kill-O-The-Grange River, May 2023

4.1.14 Site B3 – Kill-O-The-Grange River, Achill Road

Site B3 was located on the Kill-O-The-Grange River (10K02) at a local footbridge and proposed GCR crossing, approx. 250m downstream of site B2. The stream flowed in a trapezoidal channel (2-2.5m bank heights) and was dominated by rifle with occasional glide and rare (shallow) pool. The stream was 3-4m wide and between 0.2-0.3m deep. The heavily modified channel (FW2) had been enhanced in the recent past with the installation of cobble and mixed gravels. The gravels were loose and uncompacted but had moderate siltation. Given the mobile substrata, macrophytes were limited to marginal growth of fool's watercress. Aquatic bryophytes were almost entirely absent although some *Rhynchostegium riparioides* was present on submerged tree roots and more stable boulder. The sloping banks featured a narrow (unmaintained) riparian zone supporting abundant hogweed, nettle and cow parsley with water figwort (*Scrophularia umbrosa*), buttercups, cleavers, willowherbs (*Epilobium* spp.), reed canary grass, vetches (*Vicia* spp.), scattered alder and sycamore.

Site B3 was of poor fisheries value given a shallow death, paucity of deeper pools, low thermal shading and poor habitat heterogeneity, in addition to significant siltation and enrichment pressures. Salmonid habitat was poor (albeit improved over upstream sites), although some moderate quality spawning and nursery habitat was present (in enhanced areas). Suitability for lamprey was poor given silted gravels and a paucity of soft sediment areas. Suitability for European eel was relatively poor given the shallow nature of the stream and limited refugia. Brown trout and European eel, but not *Lampetra* sp., were detected via eDNA sampling at site B3 (**Table 4.1**). While Atlantic salmon were detected the result is suspected to be a false positive. Despite some low physical suitability, no white-clawed crayfish were recorded and the species is not known from the catchment. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and Red-listed European eel within the watercourse (**Table 4.1**), the aquatic ecological evaluation of site B3 was of **local importance (higher value) (Table 4.5).**

Plate 4.14 Representative image of site B3 on the Kill-O-The-Grange River, May 2023

4.2 eDNA analysis

Brown trout and Red-listed European eel eDNA was detected in composite water samples collected from all 4 no. sampling locations on the Carrickmines Stream (A6 & A8), Shanganagh River (A9) and Kill-O-The-Grange River (B3) (**Table 4.1; Appendix C**). These results were considered as evidence of the species' presence at and or upstream of the sampling locations.

Lamprey (*Lampetra* sp.) eDNA was detected from a single site, namely the Shanganagh River at site A9 (12 positive qPCR replicates out of 12) (**Table 4.1; Appendix C**).

Atlantic salmon eDNA was detected at site B3 on the Kill-O-The-Grange River (1 positive qPCR replicates out of 12) (**Table 4.1; Appendix C**). However, this result was considered likely to be a result of contamination (i.e. false positive, refer to discussion).

Table 4.1 eDNA results in the vicinity of the proposed N6 GCRR (positive qPCR replicates out of 12 in parentheses)

Site	Watercourse	Atlantic salmon	Brown/sea trout	*Lampetra* sp.	European eel
A6	Carrickmines Stream	Negative (0/12)	**Positive (12/12)**	Negative (0/12)	**Positive (7/12)**
A8	Carrickmines Stream	Negative (0/12)	**Positive (2/12)**	Negative (0/12)	**Positive (1/12)**
A9	Shanganagh River	Negative (0/12)	**Positive (12/12)**	**Positive (12/12)**	**Positive (12/12)**
B3	Kill-O-The-Grange River	**Positive (1/12)**[2]	**Positive (3/12)**	Negative (0/12)	**Positive (12/12)**

4.3 Biological water quality (macro-invertebrates)

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a total of 10 no. wetted riverine sites in May 2023 (**Appendix B**).

A total of 4 no. sites on the Barnacullia Stream (A2) and unnamed tributary (A1), Carrickmines Stream (A8) and Shanganagh River (A9) achieved **Q4 (good status)** water quality. This was based on the presence of the EPA group A (most pollution sensitive) mayfly species *Rhithrogena semicolorata* in numbers ≥5% of the total sample abundance (**Appendix B**). Therefore, these were the only survey sites to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**).

Site A6 on the Carrickmines Stream achieved Q3-4 (moderate status) given the presence of an EPA group A species (*Rhithrogena semicolorata*) in numbers <5% of the sample abundance (**Appendix B**).

The remaining 5 no. sites on the Glenamuck North Stream (A4) and unnamed tributary (A5) and Kill-O-The-Grange River (B1, B2 & B3) achieved **Q2-3 or Q3 (poor status)** given an absence of group A species, a paucity of group B species and a dominance of pollution tolerant group C species such as the mayfly *Baetis* rhodani, blackfly larvae (Simuliidae) and freshwater shrimp (*Gammarus duebeni*) (**Appendix B**). It should be noted that the rating for site A4 (**Q2-3**) was tentative given poor flows and an absence of suitable riffle areas for sampling (as per Toner et al., 2005).

Sites A3 on the Jamestown Stream and A7 on the Laughanstown Stream were dry at the time of survey and thus it was not possible to collect a biological water quality sample.

[2] The result is considered a false positive given potential contamination of the sample and also based on unsuitable supporting characteristics for the species at the survey area.

4.4 Otter signs

4.4.1 Riverine sites

Otter signs were recorded at a total of 4 no. riverine survey sites (**Figure 4.2; Appendix C**). Spraint sites were identified in the vicinity of survey sites on the Carrickmines Stream (A6b & A8), Shanganagh River (A9) and Kill-O-The-Grange River (B1). An otter holt was identified near the fence line for the Shanganagh-Bray WWTP (ITM 725712, 723223). Further otter records along the coastal boundary are discussed below under section 4.4.2.

4.4.2 GCR landfall and O&M locations

The otter survey of Dún Laoghaire Harbour (O&M area) recorded a low number of signs. Notably, an active holt was identified on boulder revetment along 'The Green', between Commissioners of Irish Lights and the Royal Irish Yacht Club) (ITM 724132, 728965) (**Figure 4.2; Appendix C**). The holt was considered active based on the high intensity of highly regular marking (spraint) near at least two entrances. Two other spraint sites were also recorded in the vicinity of the holt area (ITM 724130, 728968 & 724153, 728960).

No otter signs were recorded within 150m radius of the proposed GCR landfall location (although spraint sites and a potential holt were identified along the Shanganagh River – **Appendix C**).

Plate 4.15 Highly regular spraint site under the N11 culvert on the Carrickmines Stream, May 2023

Plate 4.16 Boulder revetment supporting an active otter holt at Dún Laoghaire Harbour (holt location in centre of image)

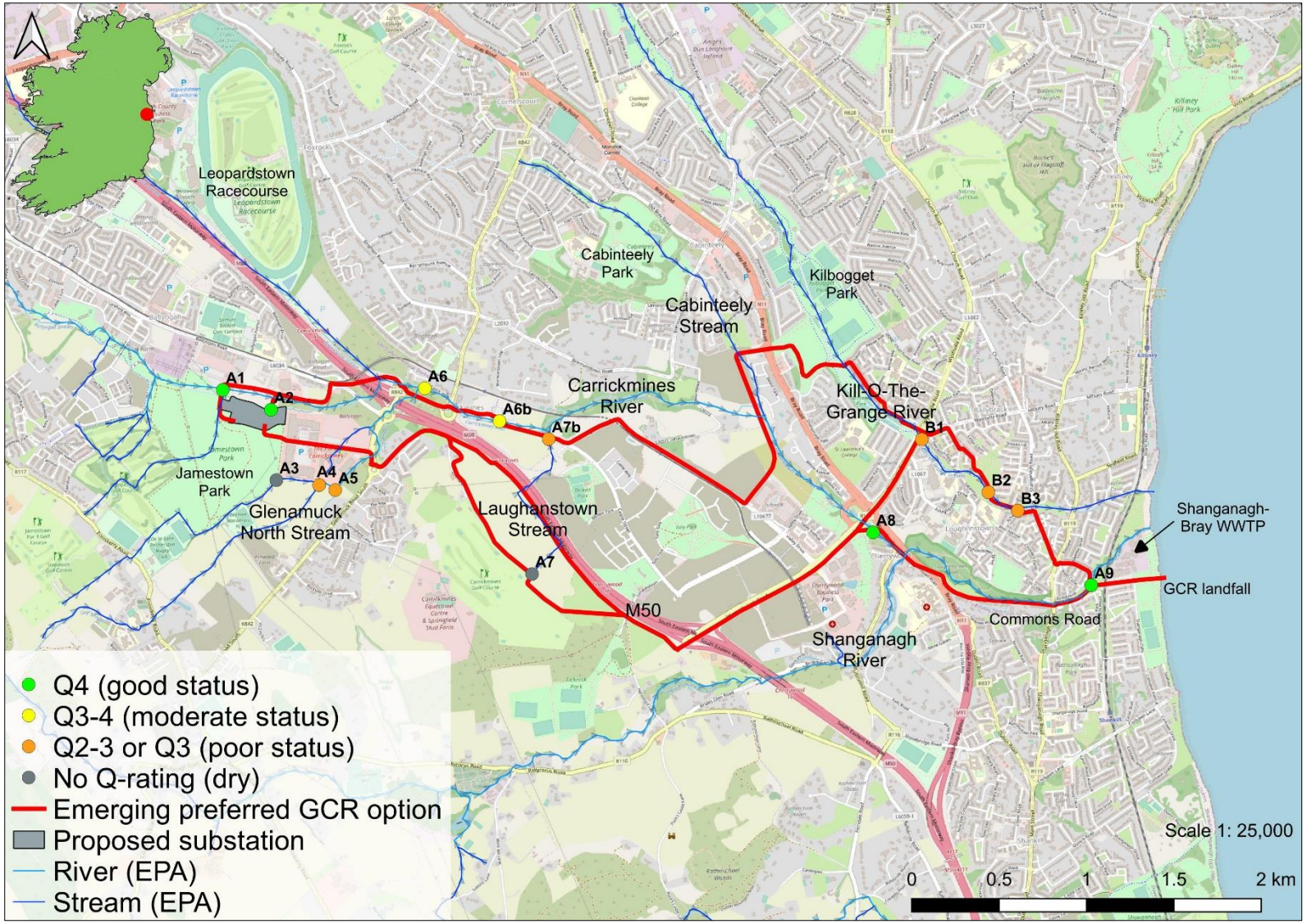

Figure 4.1 Overview of the biological water quality status in the vicinity of the proposed Dublin Array GCR, May 2023

Figure 4.2 Overview of the otter signs recorded in the vicinity of the proposed Dublin Array, May & July 2023

Table 4.2 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of the proposed N11 BPIS, May 2023

Site	Watercourse	White-clawed crayfish	Otter signs [2]	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
A1	Unnamed stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A2	Barnacullia River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A3	Jamestown Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A4	Glenamuck North Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A5	Unnamed stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A6	Carrickmines Stream	None recorded	None recorded	Not present	None recorded	None recorded	**Brown Trout & European eel (eDNA)**
A6b	Carrickmines Stream	None recorded	Spraint site	Not present	None recorded	None recorded	None recorded
A7	Laughanstown Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A7b	Laughanstown Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A8	Carrickmines Stream	None recorded	Spraint site	Not present	None recorded	None recorded	**Brown Trout & European eel (eDNA)**
A9	Shanganagh River	None recorded	Spraint site & potential holt	Not present	None recorded	None recorded	**Brown Trout, European eel & *Lampetra* sp. (eDNA)**
B1	Kill-O-The-Grange River	None recorded	Spraint site	Not present	None recorded	None recorded	None recorded
B2	Kill-O-The-Grange River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
B3	Kill-O-The-Grange River	None recorded	None recorded	Not present	None recorded	None recorded	**Brown Trout & European eel (eDNA); Atlantic salmon (false positive eDNA)**

Conservation value: White-clawed crayfish (*Austropotamobius pallipes*) and Eurasian otter (*Lutra lutra*) are listed under Annex II of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive') and are protected under the Irish Wildlife Acts 1976-2023. White-clawed crayfish (Füreder et al., 2010) are also listed as 'Endangered' according to the IUCN Red List. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

[2] Signs within 150m radius of survey site

Table 4.3 Aquatic ecological evaluation summary of the N11 BPIS survey sites according to NRA (2009) criteria

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
A1	Unnamed stream	n/a	**Local importance (higher value)**	Suitability for salmonids & European eel; Q4 (good status) water quality
A2	Barnacullia River	10B99	**Local importance (higher value)**	Suitability for salmonids & European eel; Q4 (good status) water quality
A3	Jamestown Stream	10J01	Local importance (lower value)	Absence of aquatic habitats (dry channel)
A4	Glenamuck North Stream	10G19	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2-3 (poor status) water quality (tentative rating)
A5	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2-3 (poor status) water quality
A6	Carrickmines Stream	10C04	**Local importance (higher value)**	Salmonids & European eel recorded (eDNA); site utilised by otter
A6b	Carrickmines Stream	10C04	**Local importance (higher value)**	Suitability for salmonids & European eel; site utilised by otter
A7	Laughanstown Stream	10L07	Local importance (lower value)	Absence of aquatic habitats (dry channel)
A7b	Laughanstown Stream	10L07	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2-3 (poor status) water quality
A8	Carrickmines Stream	10C04	**Local importance (higher value)**	Salmonids & European eel recorded (eDNA); site utilised by otter; Q4 (good status) water quality
A9	Shanganagh River	10S01	**Local importance (higher value)**	Salmonids, European eel & *Lampetra* sp. recorded (eDNA); site utilised by otter; Q4 (good status) water quality
B1	Kill-O-The-Grange River	10K02	**Local importance (higher value)**	Site utilised by otter
B2	Kill-O-The-Grange River	10K02	**Local importance (higher value)**	Suitability for salmonids & European eel
B3	Kill-O-The-Grange River	10K02	**Local importance (higher value)**	Salmonids & European eel recorded (eDNA)

Conservation value: Eurasian otter (*Lutra lutra*) are listed under Annex II of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive') and are protected under the Irish Wildlife Acts 1976-2023. Atlantic salmon (*Salmo salar*) are also listed under Annex II of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). Atlantic salmon and sea trout are protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations. Apart from the Fisheries Acts 1959 to 2019, non-anadromous brown trout have no legal protection in Ireland. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

5. Discussion

The watercourses in the vicinity of the proposed Dublin Array Offshore Wind Farm and associated land-based infrastructure (GCR) were typically small, heavily modified watercourses exposed to considerable hydromorphological and water quality pressures, often resulting in poor quality fisheries and aquatic habitats. However, despite this, most survey sites (A1, A2, A6, A6b, A8, A9, B1, B2 & B3) were evaluated as **local importance (higher value)** in terms of their aquatic ecology given the known presence or habitat suitability for fish of high conservation value and or otter, in addition to Q4 (good status water quality) (sites A1, A2, A8 & A9) (**Table 4.3)**.

A total of 5 no. sites on the Jamestown Stream (A3), Glenamuck Stream (A4) and unnamed tributary (A5), and the Laughanstown Stream (A7 & A7b) were evaluated as **local importance (lower value)** given an absence of aquatic species or habitats of high conservation value. Sites A3 and A7 were dry at the time of survey (i.e. ephemeral channels) and did not support any aquatic habitats.

In lieu of electro-fishing data, eDNA sampling detected the presence of brown trout in the Carrickmines Stream (A6 & A8), Shanganagh River (A9) and the Kill-O-The-Grange River (B3) (**Table 4.1; Appendix C**). The Carrickmines Stream and Shanganagh River provided the best quality salmonid habitat in the survey area although hydromorphological and water quality pressures notably reduced the value of spawning habitat. Of note is that the lower Shanganagh River is known to support anadromous sea trout (Triturus 2023 data); being unusual for an urban watercourse[3].

The detection of low amounts of Atlantic salmon eDNA in the Kill-O-The-Grange River at site B1 (1 positive qPCR replicates out of 12; **Table 4.1**) was considered a result of sampling-independent contamination caused by human activities (e.g. fish processing, food waste) or natural vectors such as otters or predatory birds foraging in marine habitats (Rishan et al., 2023; Burian et al., 2021; Darling et al., 2021; Ficetola et al., 2016; Merkes et al., 2014) rather than a true positive result (i.e. Atlantic salmon present in the watercourse). This was considered due to evident habitat unsuitability because of significant water quality issues (including siltation) and very poor hydromorphology in the artificial channel with the species not detected in other samples. Whilst the river appears to support a small brown trout population (based on eDNA results & site observations), the presence of multiple significant instream barriers (**Figure 5.1**), including a pipe culvert effectively blocking access for migratory salmonids from Dublin Bay (pers. obs.), is considered sufficient to explain the absence of Atlantic salmon from the watercourse. No Atlantic salmon eDNA was detected in the Carrickmines Stream, Shanganagh River and Kill-O-The-Grange River, in keeping with existing data on fish populations in the catchment.

The Carrickmines Stream, Shanganagh River and Kill-O-The-Grange River supported Red-listed European eel[4] (eDNA) although ingress of this (and other) migratory species into the Dargle_010 sub-catchment is likely restricted by numerous significant instream barriers (**Figure 5.1**). Similarly, instream barriers, such as weirs and culverts, would heavily restrict the passage of lamprey species within the survey area, in addition to siltation and water quality pressures. Nonetheless, *Lampetra* sp.

[3] The semi-natural profile, strong flows, short catchment distance to the sea, resident brown trout population & an absence of migratory barriers downstream of the N11 facilitates the species' presence

[4] European eel are Red-listed in Ireland (King et al., 2011) and are classed as 'critically endangered' on a global scale (Pike et al., 2020)

eDNA (likely brook lamprey, *Lampetra planeri*) was detected in the lower reaches of the Shanganagh River (A9) where suitable nursery and spawning habitat was present, in addition to a more natural river profile. *Lampetra* sp. are also known from the Carrickmines Stream (Triturus 2023 data).

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the survey. While there was some physical habitat suitability for crayfish in the boulder and cobble refugia of the Barnacullia Stream, Carrickmines Stream and Shanganagh River, the low alkalinity and igneous geology of the River Dargle sub-catchment made it unsuitable for the species (Demers et al., 2005; Lucy & McGarrigle, 1987), supporting the absence of records in the catchment (based on NPWS data).

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the samples taken from 10 no. riverine sites (**Appendix B**). Apart from 4 no. sites on the Barnacullia Stream (A2) and unnamed tributary (A1), Carrickmines Stream (A8) and Shanganagh River (A9) achieved **Q4 (good status)** water quality, all sites failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**). Significant hydromorphological modifications and water quality pressures (including storm drainage and eutrophication) were noted during the surveys and are known to be the primary threats to water quality in the Dargle sub-catchment (EPA, 2019).

In support of previous surveys (Brazier & Macklin, 2020; Macklin et al., 2019), several otter signs were recorded from the Carrickmines Stream and Shanganagh River, in addition to a single regular spraint site on the Kill-O-The-Grange River (**Figure 4.2**). A potential holt was identified near the Shanganagh-Bray WWTP (and would require further investigations given limited signs of activity). The Carrickmines Stream and Shanganagh River provide the best quality fisheries and otter habitat in the survey area given lower levels of human disturbance and greater prey resources (Brazier & Macklin, 2020). An active[5] holt was identified in a poorly accessible section of boulder revetment in Dún Laoghaire Harbour (O&M area; **Plate 4.16**). This same disturbance-related trend regarding the location of holts has been repeatedly observed across the wider Dublin area in previous studies (Macklin et al., 2019; Brazier & Macklin, 2020). Otter breeding areas (holts) are especially sensitive to direct human disturbance (Mason & Macdonald, 2009), with otter reproductive success known to be higher in less disturbed habitats; hence their preferential fidelity for low-disturbance areas (Scorpio et al., 2016; Ruiz-Olmo et al., 2011; Loy et at., 2009; Kruuk, 2006). It is unclear if this was the same location where a holt was identified previously in Dún Laoghaire Harbour (NPWS data).

[5] considered active based on the high intensity of highly regular marking (spraint) near at least two entrances

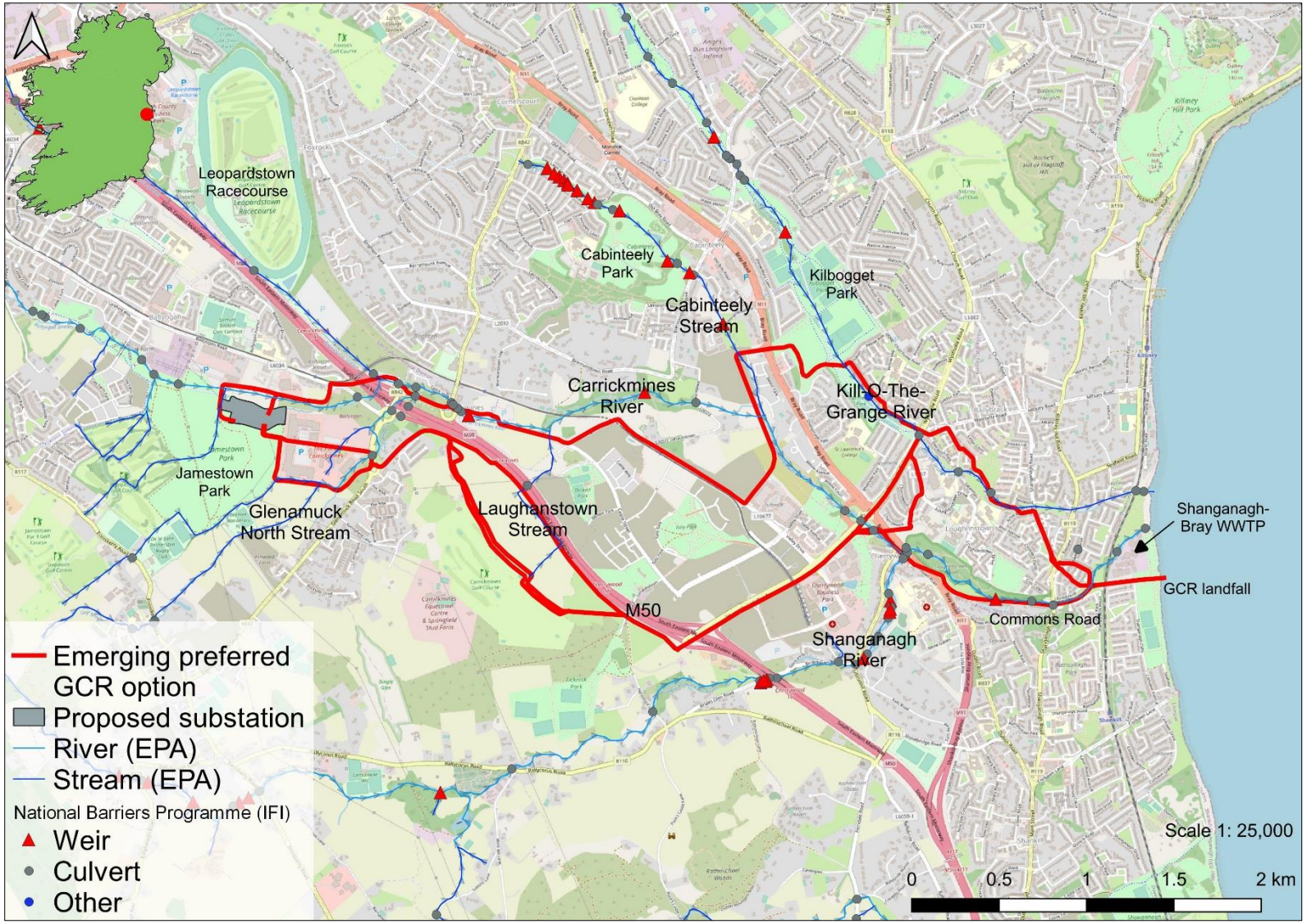

Figure 5.1 Overview of the mapped instream barriers in the vicinity of the proposed Dublin Array (source: IFI's National Barriers Programme dataset)

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7. Appendix A – Macro-invertebrates (biological water quality)

Table 7.1 Macro-invertebrate Q-sampling results for sites A1-A9 and B1-B3, May 2023

Group	Family	Species	A1	A2	A4	A5	A6	A6b	A7b	A8	A9	B1	B2	B3	EPA class
Ephemeroptera	Heptageniidae	*Rhithrogena semicolorata*	23	66			4	1		52	15				A
Ephemeroptera	Baetidae	*Alainites muticus*								10	1				B
Trichoptera	Glossosomatidae	*Agapetus fuscipes*	7				1							58	B
Trichoptera	Glossosomatidae	sp. indet. (pupa)									1				B
Trichoptera	Limnephilidae	*Drusus annulatus*									1				B
Trichoptera	Limnephilidae	*Halesus digitatus*		1											B
Trichoptera	Limnephilidae	*Limnephilus lunatus*									1				B
Trichoptera	Limnephilidae	*Potamophylax cingulatus*	1							5	2				B
Trichoptera	Limnephilidae	sp. indet. (pupa)								1					B
Trichoptera	Odontoceridae	*Odontocerum albicorne*									1				B
Trichoptera	Sericostomatidae	*Sericostoma personatum*					3	6	5		6				B
Ephemeroptera	Baetidae	*Baetis rhodani*	9	51	2		33	48		7	51	74	82	55	C
Ephemeroptera	Ephemerellidae	*Serratella ignita*		32			24	42		5	47				C
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*					1	5		5	8				C
Trichoptera	Hydropsychidae	*Hydropsyche siltalai*					9	24			8				C
Trichoptera	Polycentropodidae	*Plectrocnemia geniculata*						3							C
Trichoptera	Rhyacophilidae	*Rhyacophila dorsalis*					6	10							C
Trichoptera	Rhyacophilidae	*Rhyacophila munda*									4				C
Crustacea	Gammaridae	*Gammarus duebeni*	34	126	5	41	68	92	21	62	7	161	41	526	C
Gastropoda	Planorbidae	*Planorbis planorbis*										1		1	C
Gastropoda	Tateidae	*Potamopyrgus antipodarum*					4	12	6			56	85	6	C
Gastropoda	Physidae	*Physella acuta*										1		2	C
Coleoptera	Elmidae	*Elmis aenea*	3	4			14	24		3	13				C
Coleoptera	Elmidae	*Limnius volckmari*	8	2	1	2	10	6		15	1				C
Diptera	Chironomidae	Non-*Chironomus* spp.		1	3	4						123	201		C

Group	Family	Species	A1	A2	A4	A5	A6	A6b	A7b	A8	A9	B1	B2	B3	EPA class
Diptera	Simuliidae	sp. indet.			31	61				57	24	36	24		C
Diptera	Limoniidae	sp. indet.							4	1					C
Diptera	Limoniidae	*Antocha* sp.									1				C
Platyhelminthes	Planaria	sp. indet.					1					9			C
Crustacea	Asellidae	*Asellus aquaticus*			11	7					2	2	41		D
Gastropoda	Lymnaeidae	*Ampullacaena balthica*									2	1			D
Gastropoda	Sphaeriidae	sp. indet.		1								2		2	D
Hirudinidae	Glossiphoniidae	sp. indet.		1			1					2	4		D
Hirudinidae	Erpobdellidae	sp. indet.						1							D
Diptera	Chironomidae	*Chironomus* spp.							16						E
Annelidae	Oligochaeta	sp. indet.		1			3	1		2	1	2	2		n/a
Abundance			**85**	**286**	**53**	**115**	**182**	**275**	**52**	**225**	**197**	**470**	**480**	**650**	
Q-rating			Q4	Q4	*Q2-3	Q3	Q3-4	Q3-4	*Q2-3	Q4	Q4	Q3	Q3	Q3	
WFD status			Good	Good	Poor	Poor	Mod	Mod	Poor	Good	Good	Poor	Poor	Poor	

*tentative rating due to poor flows and or an absence of suitable riffle areas for sampling (as per Toner et al., 2005)

8. Appendix B – eDNA analysis lab reports

SureScreen Scientifics

Folio No: E18023
Report No: 1
Client: Triturus Environmental Ltd
Contact: Ross Macklin

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN WATER FOR AQUATIC SPECIES DETECTION

SUMMARY

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

RESULTS

Date sample received in laboratory: 14/06/2023
Date results reported: 27/06/2023
Matters affecting result: None

TARGET SPECIES: European Eel *(Anguilla anguilla)*

Lab ID	Site Name	OS Reference	SIC	DC	IC	Result	Positive Replicates
FK921	A6	-	Pass	Pass	Pass	Positive	7/12
FK1133	B3	-	Pass	Pass	Pass	Positive	12/12
FK1134	A8	-	Pass	Pass	Pass	Positive	1/12
FK1135	A9	-	Pass	Pass	Pass	Positive	12/12

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TARGET SPECIES: Atlantic Salmon *(Salmo salar)*

Lab ID	Site Name	OS Reference	SIC	DC	IC	Result	Positive Replicates
FK921	A6	-	Pass	Pass	Pass	Negative	0/12
FK1133	B3	-	Pass	Pass	Pass	Positive	1/12
FK1134	A8	-	Pass	Pass	Pass	Negative	0/12
FK1135	A9	-	Pass	Pass	Pass	Negative	0/12

TARGET SPECIES: Brown (Sea) Trout *(Salmo trutta)*

Lab ID	Site Name	OS Reference	SIC	DC	IC	Result	Positive Replicates
FK921	A6	-	Pass	Pass	Pass	Positive	12/12
FK1133	B3	-	Pass	Pass	Pass	Positive	3/12
FK1134	A8	-	Pass	Pass	Pass	Positive	2/12
FK1135	A9	-	Pass	Pass	Pass	Positive	12/12

TARGET SPECIES: Brook Lamprey *(Lampetra planeri)*

Lab ID	Site Name	OS Reference	SIC	DC	IC	Result	Positive Replicates
FK921	A6	-	Pass	Pass	Pass	Negative	0/12
FK1133	B3	-	Pass	Pass	Pass	Negative	0/12
FK1134	A8	-	Pass	Pass	Pass	Negative	0/12
FK1135	A9	-	Pass	Pass	Pass	Positive	12/12

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If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: **Chris Troth** Approved by: **Jennifer Higginbottom**

METHODOLOGY

The samples detailed above have been analysed for the presence of target species eDNA following scientifically published eDNA assays and protocols which have been thoroughly tested, developed and verified for use by SureScreen Scientifics.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified.

If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target species DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

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INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of eDNA** [Positive/Negative/Inconclusive]

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

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9. Appendix C – otter signs database

Table 9.1 Database of otter signs recorded in the vicinity of the Dublin Array GCR watercourse crossings & landfall and O&M locations, 2023

Sign ID	Watercourse	Survey site/location	Sign	No. spraint sites (no. spraints)	Sign age	Marking feature	ITM x	ITM y	Date	Notes
DublinArray_01	Carrickmines Stream	A6b	Spraint	1 (1)	Old	Boulder	722226	724014	12/07/2023	Old spraint on marginal boulder
DublinArray_02	Carrickmines Stream	A8	Spraint	1 (2)	Mixed	Bridge	724335	723385	31/05/2023	Mixed age spraint on ledge under footbridge, south bank
DublinArray_03	Carrickmines Stream	A8	Anal jelly		Old	Bridge	724407	723339	12/07/2023	Anal jelly on rock under old concrete clear span bridge
DublinArray_04	Carrickmines Stream	A8 (N11 culvert)	Spraint	3 (10+)	Mixed	Bridge	724441	723312	12/07/2023	Very regular spraint site on upstream side of N11 culvert, north bank along bare muddy bank with boulders
DublinArray_05	Kill-O-the-Grange River	B1	Spraint	1 (3)	Mixed	Boulder	724619	723917	31/05/2023	Crab remains on mid-channel boulder at downstream end of road culvert (spraint site previously recorded for DLR otter survey)
DublinArray_06	Shanganagh River	A9	Spraint	1 (2)	Mixed	Tree roots	725608	723101	31/05/2023	30m downstream of the proposed crossing, on a crack willow root system
DublinArray_07	Shanganagh River	A9	Spraint	1 (1)	Fresh	Bridge	724339	723393	12/07/2023	Fresh spraint & anal jelly on bridge ledge, south bank
DublinArray_08	**Shanganagh River**	**A9**	**Holt (potential)**				**725712**	**723223**	**12/07/2023**	**2 entrance sett/den in bramble scrub under sycamore tree immediately adjacent to rail line. No spraint or signs of recent use but potential holt**
DublinArray_09	Dún Laoghaire Harbour	The Green	Spraint	1 (3)	Mixed	Boulder	724130	728968	12/07/2023	Spraint on boulder mid-way up 'Green'
DublinArray_10	**Dún Laoghaire Harbour**	**The Green**	**Holt (active)**	**4 (15+)**	**Mixed**	**Boulder**	**724132**	**728965**	**12/07/2023**	**Hole in revetment at top of revetment between small elder and small sycamore. Spraint trails leading to water. Mostly old. Midden at entrance.**
DublinArray_11	Dún Laoghaire Harbour	The Green	Spraint	1 (3)	Mixed	Boulder	724153	728960	12/07/2023	Crab remains on revetment at elder tree
DublinArray_12	Dún Laoghaire Harbour	The Green	Spraint	1 (2)	Mixed	Boulder	724140	728967	12/07/2023	Mixed age spraint near holt
DublinArray_13	Dún Laoghaire Harbour	The Green	Spraint	1 (3)	Mixed	Boulder	724133	728966	12/07/2023	Mixed age spraint near holt

Triturus Environmental Ltd.

42 Norwood Court,

Rochestown,

Co. Cork,

T12 ECF3.

Annex 4 Site photographs

Landfall Site

Photograph 1: Landfall SIte - Shingle Gravel Shore (LS1)

Photograph 2: Landfall Site - Sedimentary sea cliffs (CS3)

Photograph 3: Landfall Site – Scrub and dry calcareous grassland

Photograph 4: Landfall Site – amenity grassland and treelines

Photograph 5: Landfall Site - Community gardens comprising horticultural land BS2

Photograph 6: Landfall Site - Depositing lowland rive:

Sector 1

Photograph 7: Sector 1 – Riparian woodland

Photograph 8: Sector 1 – Amenity grassland

Photograph 9: Sector 1 - Buildings and artificial surfaces

Photograph 10: Sector 1 – Treeline

Sector 2

Photograph 11: Sector 2 – Kill-O-The-Grange Stream depositing river

Photograph 12: Sector 2 - Parkland and scattered trees

Photograph 13: Sector 2 – Amenity grassland

Photograph 14: Sector 2 – buildings and artificial surfaces

Photograph 15: Sector 2 – Treelines

Photograph 16: Sector 2 - Hedgerow

Sector 3

Photograph 17: Sector 3 – Amenity grassland and grassy verges

Photograph 18: Sector 3 – Immature woodland strip

Photograph 19: Sector 3 – Immature woodland

Photograph 20: Sector 3 – Buildings and artificial surfaces

Photograph 21: Sector 3 – spoil and bareground

Photograph 22: Sector 3 – recolonising bareground

Photograph 23: Sector 3 – arable crops with boundary immature woodland and internal hedgerows

Sector 4

Photograph 24: Sector 4 – Dry calcareous and neutral grassland

Photograph 25: Sector 4 - Building

Photograph 26: Sector 4 – Recolonising bareground

Photograph 27: Sector 4 – immature woodland

Photograph 28: sector 4 - scrub

Photograph 29: Sector 4 – buildings and artificial surfaces

Photograph 30: Sector 4 – hedgerow habitat (with ditch).

Photograph 31: Sector 4 - treeline

Sector 5

Photograph 32: Sector 5 - dry meadow and grassy verges and scrub

Sector 6/7

Photograph 33: Sector 6 - ornamental non-native shrub

Photograph 34: Sector 6 – dry meadow and grassy verges

Photograph 35: Sector 6 - buildings and artificial surfaces

Photograph 36: Sector 6/7 - depositing river

Photograph 37: Sector 6/7 - treelines along river habitat

OSS and grid connection study area

Photograph 38: Grid connection study area – dry meadow and grassy verges

Photograph 39: Grid connection study area – depositing river

OSS and grid connection study area

Photograph 40: Grid connection study area- hedgerow

Photograph 41: Grid connection study area – other artificial lakes and ponds

Photograph 42: Grid connection study area – dry meadow and grassy verges

Leopordstown TCC

Photograph 43: Dry meadows and grassy verges within TCC

Photograph 44: Scrub habitat within TCC

Photograph 45: Recolonising bare ground habitat within TCC

Photograph 46: Artificial surface within TCC

O&M Base

Photograph 47: O&M Base – Sea walls, piers and jetties

Photograph 48: O&M Base - Buildings

Photograph 49: O&M Base – Amenity grassland

Photograph 50: O&M Base – Sea inlets and bays/open marine water

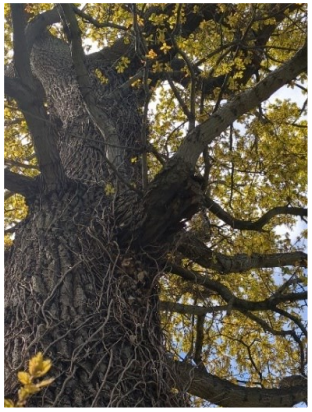
Invasive alien species

Photograph 51: Three cornered garlic

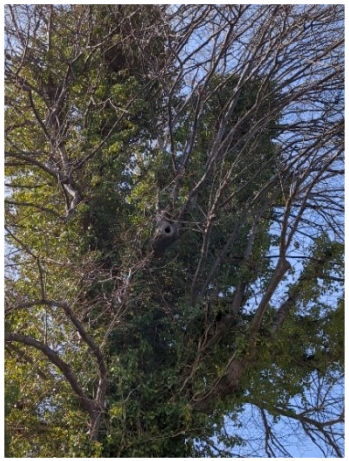
Photograph 52: Japanese knotweed

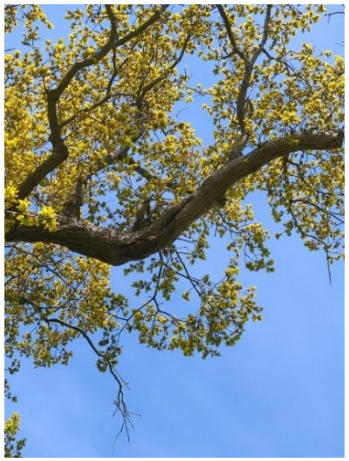
Annex 5 Preliminary roost assessment

Annex Table 23 Trees and structures identified for further bat surveys

Tree/structure reference	Location (ITM)	Details	Photograph
T1	724373 723402	Standing deadwood/stump with deep crevices and peeling bark. **Overall assessment: Moderate potential for roosting bats**	
T2	724345 723390	Mature oak with minor deadwood offering limited crevices for low numbers of bats. Potentially greater bat suitability at the very top of tree with deadwood. **Overall assessment: Moderate potential for roosting bats**	

Tree/structure reference	Location (ITM)	Details	Photograph
T3	725096 723538	Semi-mature ash with an entry point at the base of stem that may lead upwards into cavity. A second minor PRF was noted with an entry on top of horizontal branch, located approximately 2.5 m high. **Overall assessment: Moderate potential for roosting bats**	 

Tree/structure reference	Location (ITM)	Details	Photograph
T4	725096 723538	A mature unidentified tree that was almost completely covered in dense ivy. A potential entry point leading into branch was noted approximately 12 m high. **Overall assessment: Moderate potential for roosting bats**	
T5	724976 723687	Mature beech with an entry point into the main stem, located approximately 1.5 m from the ground, that leads upwards. It was difficult to see how far it reaches into the stem. **Overall assessment: Moderate potential for roosting bats**	

Tree/structure reference	Location (ITM)	Details	Photograph
T6	724976 723687	Mature oak with an entry point through a linear crack located on the underside of an upper limb. **Overall assessment: Moderate potential for roosting bats**	
T7	725058 723557	Semi-mature ash with a vertical crevice located approximately 3m high. It appeared shallow from ground level but was difficult to fully assess whether it leads further into the stem. **Overall assessment: Moderate potential for roosting bats**	

Tree/structure reference	Location (ITM)	Details	Photograph
T8 & T9	725058 723557	T8 and T9 comprised adjacent semi-mature ash trees located within parkland. Residential dwellings were also located nearby and surrounded the parkland. T8 had an entry point into stem at very base and may lead upwards into cavity. **Overall assessment: Moderate potential for roosting bats** T9 had a significant entry point, leading upwards into stem cavity, approximately 1 m high. **Overall assessment: Moderate potential for roosting bats**	 

Tree/structure reference	Location (ITM)	Details	Photograph
T10	725567 723069	A semi-mature and fallen ash with deadwood near the base and a large cavity that may lead further upwards into the tree. **Overall assessment: Moderate potential for roosting bats**	
T11	725569 723100	A semi-mature poplar with an entry point at base of stem. **Overall assessment: Moderate potential for roosting bats**	

Tree/structure reference	Location (ITM)	Details	Photograph
T12	721167 723658	Mature ash with dense ivy covering the main stem. No specific PRF were noted but there was potentially deadwood present being the ivy. **Overall assessment: Moderate potential for roosting bats**	No photograph available
T13	720740 724109	Semi-mature ash with no obvious PRF present but dense ivy covered the entire tree, and damaged limbs were noted indicating that further damage may be obscured. **Overall assessment: Moderate potential for roosting bats**	

Tree/structure reference	Location (ITM)	Details	Photograph
T14	724560 723425	Semi-mature sycamore with minor tear on central stem approximately 15 m high and potential entry hole into secondary stem approximately 4 m high. **Overall assessment: Moderate potential for roosting bats**	
T15	724529 723384	Mature sycamore with dead heart wood exposed with cavities and crevices. **Overall assessment: Moderate potential for roosting bats**	

Annex 6 Bat survey results

2023 Bat survey results

Annex Table 24 Bat survey results 2023: number of passes per species per survey

Tree (T) ref.	Location (ITM)	Date of survey	Surveyor	Emergence recorded	Numbers of bat recordings (passes)				
					Nyctalus leisleri	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus auritus*
T1	724373 723402	05/09/2023	Hugo Brooks	No	11	0	1	0	0
T2	724345 723390	05/09/2023	Michael James	No	15	0	9	1	0
T3 & T4	725096 723538	06/09/2023	Hugo Brooks	No	34	0	63	2	1
T5 & T6	724976 723687	06/09/2023	Jake Matthews	No	53	0	157	3	0
T7, T8, T9	725058 723557	06/09/2023	Michael James	No	62	0	134	8	0
T10	725567 723069	07/09/2023	Hugo Brooks	No	53	0	29	23	0

Tree (T) ref.	Location (ITM)	Date of survey	Surveyor	Emergence recorded	Numbers of bat recordings (passes)				
T11	725569 723100	07/09/2023	Michael James	No	25	0	28	31	0
T12	721167 723658	13/09/2023	Alice Magee	No	1	0	2	0	0
			Jake Matthews	No	2	0	2	0	0
T13	720740 724109	14/09/2023	Alice Magee	No	0	0	14	1	0
			Jake Matthews	No	1	0	28	9	0
T14*	724560 723425	26/10/2023	Brogan Costello	No	0	0	0	0	0
T15*	724529 723384	26/10/2023	Jake Matthews	No	0				
**Supplemented with static bat detector data between 26/09/2023 – 05/10/2023*					*57*	*0*	*237*	*410*	*7*
Total passes (not including the static data)					**256**	**1**	**472**	**80**	**1**

2024 Bat survey Results

Annex Table 25: Bat survey results 2004: – number of passes per species per survey

Tree (T) ref.	Location (ITM)	Date of survey	Surveyor	Emergence recorded	Numbers of bat recordings (passes)						
					Nyctalus leisleri	*Myotis nattereri*	*Myotis mystacinus*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus auritus*
T1	724373 723402	31/07/2024	Hugo Brooks	No	27	0	0	0	12	2	0
T2	724345 723390	31/07/2024	Jake Matthews	No	23	1	0	0	29	11	0
T3 & T4	725096 723538	01/08/2024	Hugo Brooks	No	22	0	0	0	46	8	1
T5	724976 723687	06/08/2024	Alice Magee	No	39	0	0	0	133	7	0
T6	724979 723675	06/08/2024	Jake Matthews	No	33	0	0	0	188	17	0
T7 & T8	725058 723557	01/08/2024	Jake Matthews	No	18	0	0	0	255	9	0
T9	725058 723557	12/08/2024	Jake Matthews	No	33	0	0	0	61	48	0
			Alice Magee	No							

Tree (T) ref.	Location (ITM)	Date of survey	Surveyor	Emergence recorded	Numbers of bat recordings (passes)						
					Nyctalus leisleri	*Myotis nattereri*	*Myotis mystacinus*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus auritus*
T10	725567 723069	30/07/2024	Jake Matthews	No	141	0	0	0	29	29	1
T11	725569 723100	30/07/2024	Michael James	No	74	0	0	0	65	28	0
T12	721167 723658	13/08/2024	Jake Matthews	No	0	0	1	0	34	69	0
			Alice Magee	No							
T13	720740 724109	14/08/2024	Jake Matthews	No	15	0	0	27	67	68	3
			Alice Magee	No							
T14*	724560 723425	No survey*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T15*	724529 723384	No survey*	N/A	N/A	N/A	N/A	N/A				
Total passes											

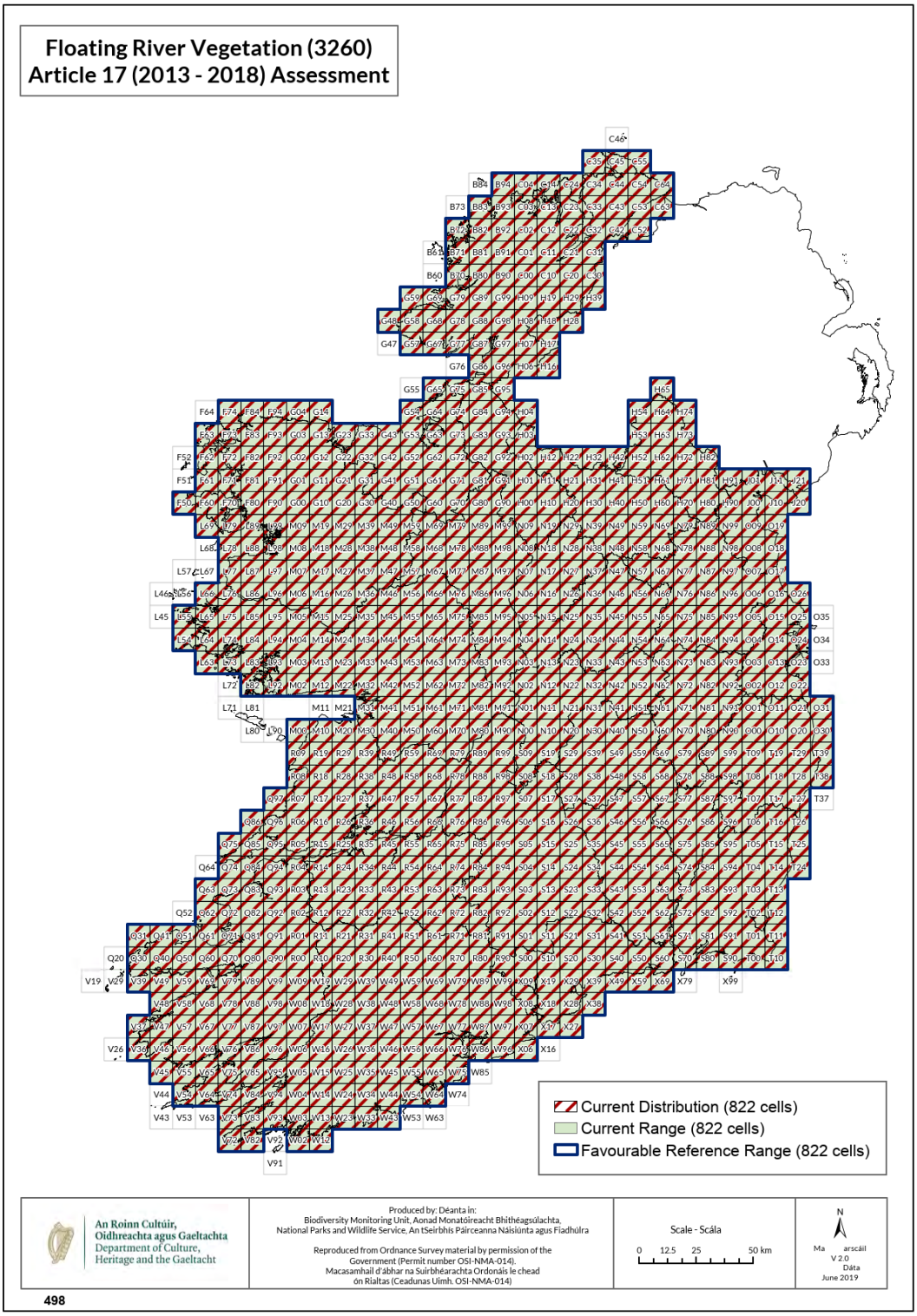
*No access to site. Refer to Limitations for further details

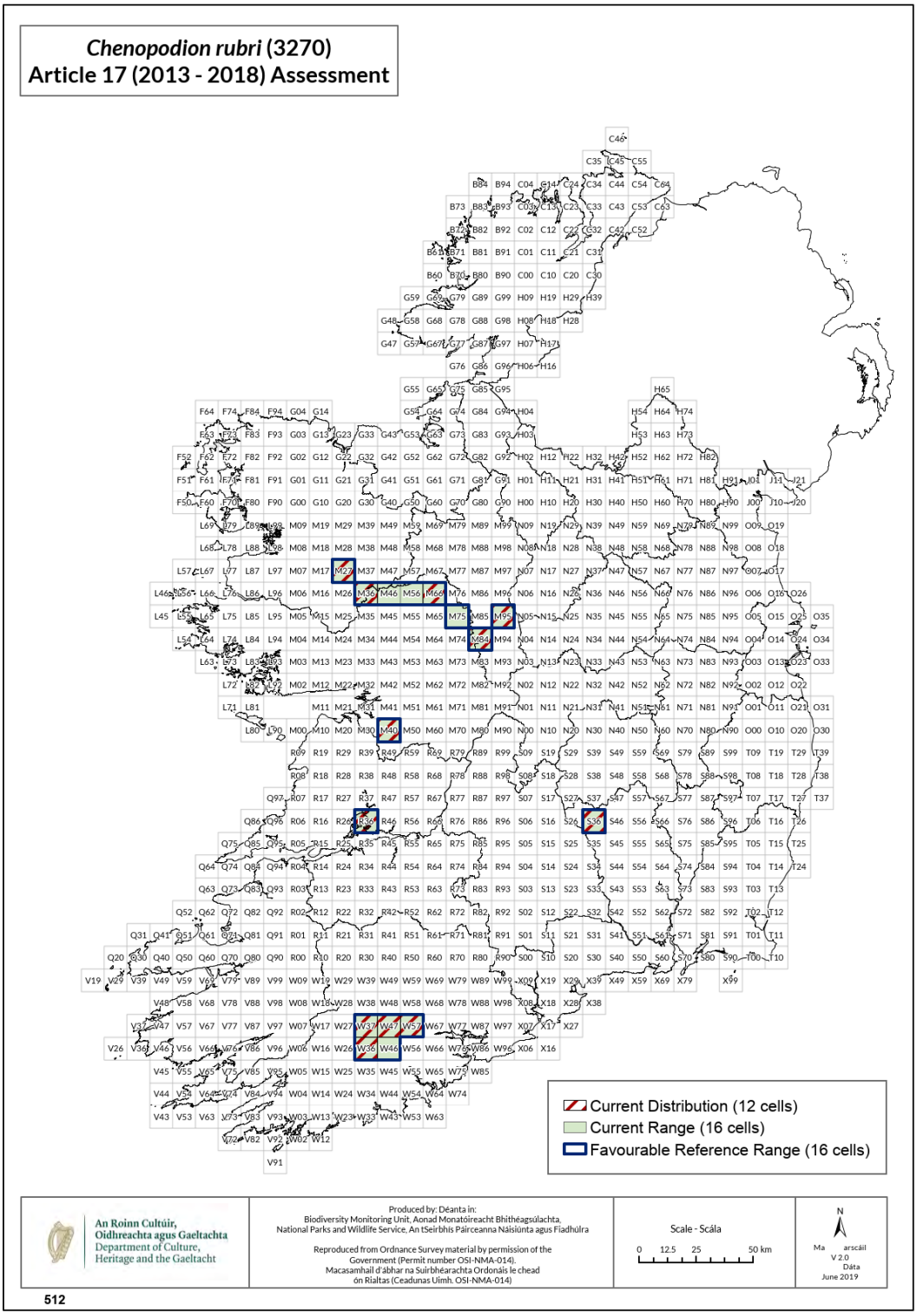
Annex 7 Badger setts

Annex Table 26: Badger setts

Potential badger sett 1	A potential disused badger sett comprising a single entrance, which was clear free from leaf litter and no cobwebs mammal pathways leading from it	

Annex 8 Distribution of Annex I Habitats




Chenopodion rubri (3270)
Article 17 (2013 - 2018) Assessment
Current Distribution (12 cells)
Current Range (16 cells)
Favourable Reference Range (16 cells)
An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhitheagsúlachta,
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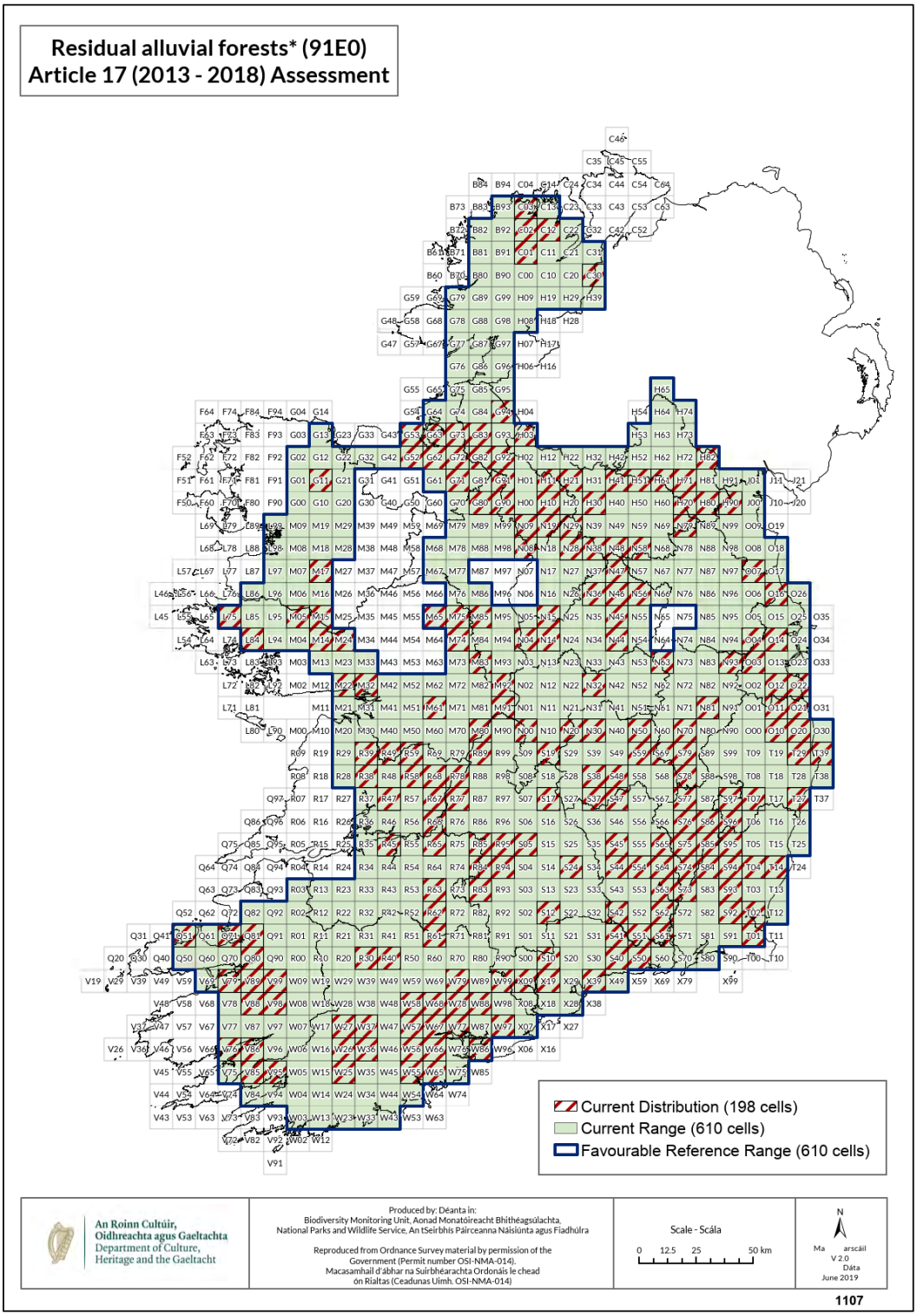
Reproduced from Ordnance Survey material by permission of the Government (Permit number OSi-NMA-014).
Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. OSi-NMA-014)
Scale - Scála
0 12.5 25 50 km
N
Ma arscáil V 2.0 Dáta June 2019
512


Residual alluvial forests* (91E0)
Article 17 (2013 - 2018) Assessment
Current Distribution (198 cells)
Current Range (610 cells)
Favourable Reference Range (610 cells)
An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
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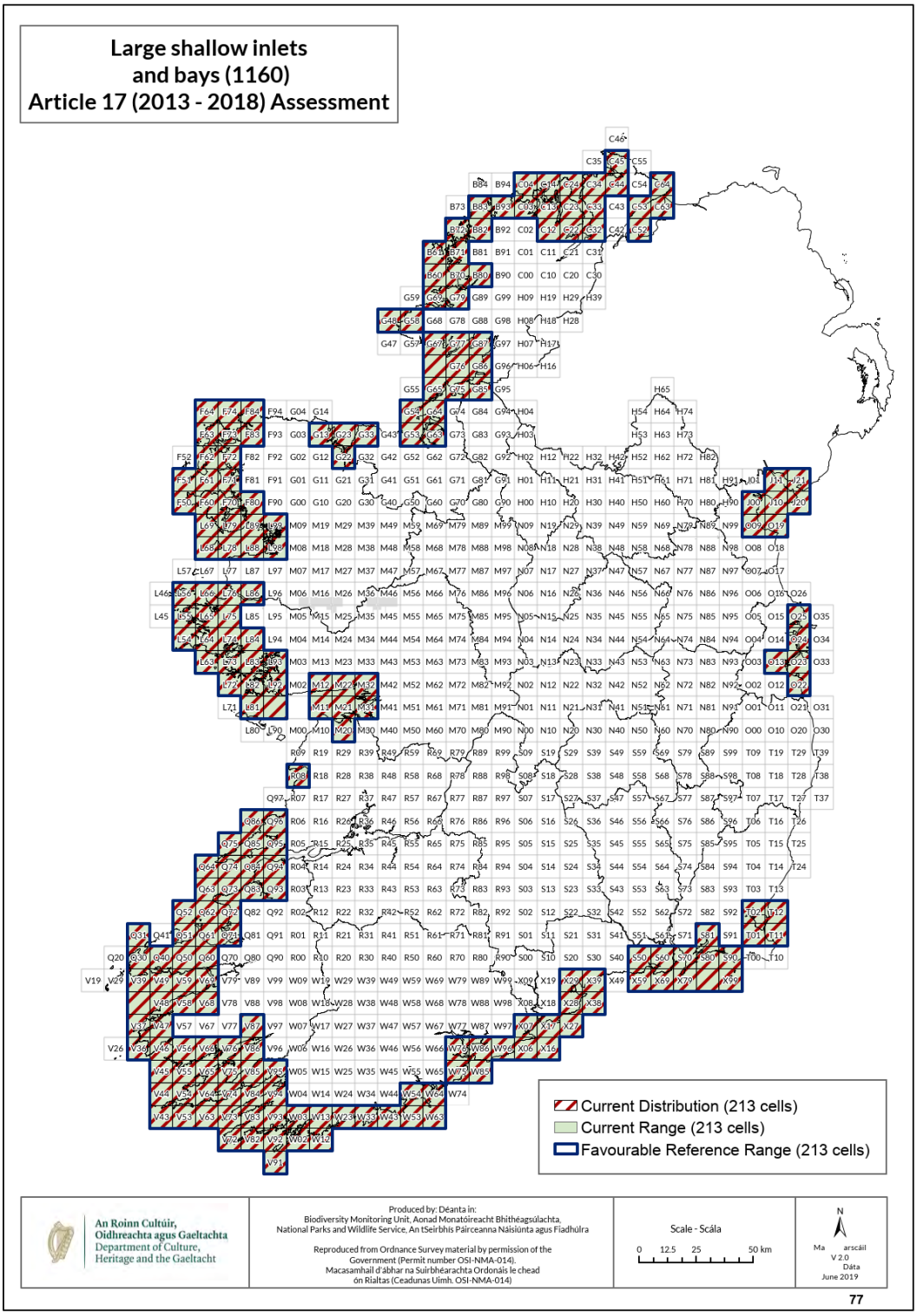
Ma arscáil
V 2.0
Dáta
June 2019
1107


Large shallow inlets
and bays (1160)
Article 17 (2013 - 2018) Assessment
Current Distribution (213 cells)
Current Range (213 cells)
Favourable Reference Range (213 cells)
An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
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ón Rialtas (Ceadunas Uimh. OSI-NMA-014)
Scale - Scála
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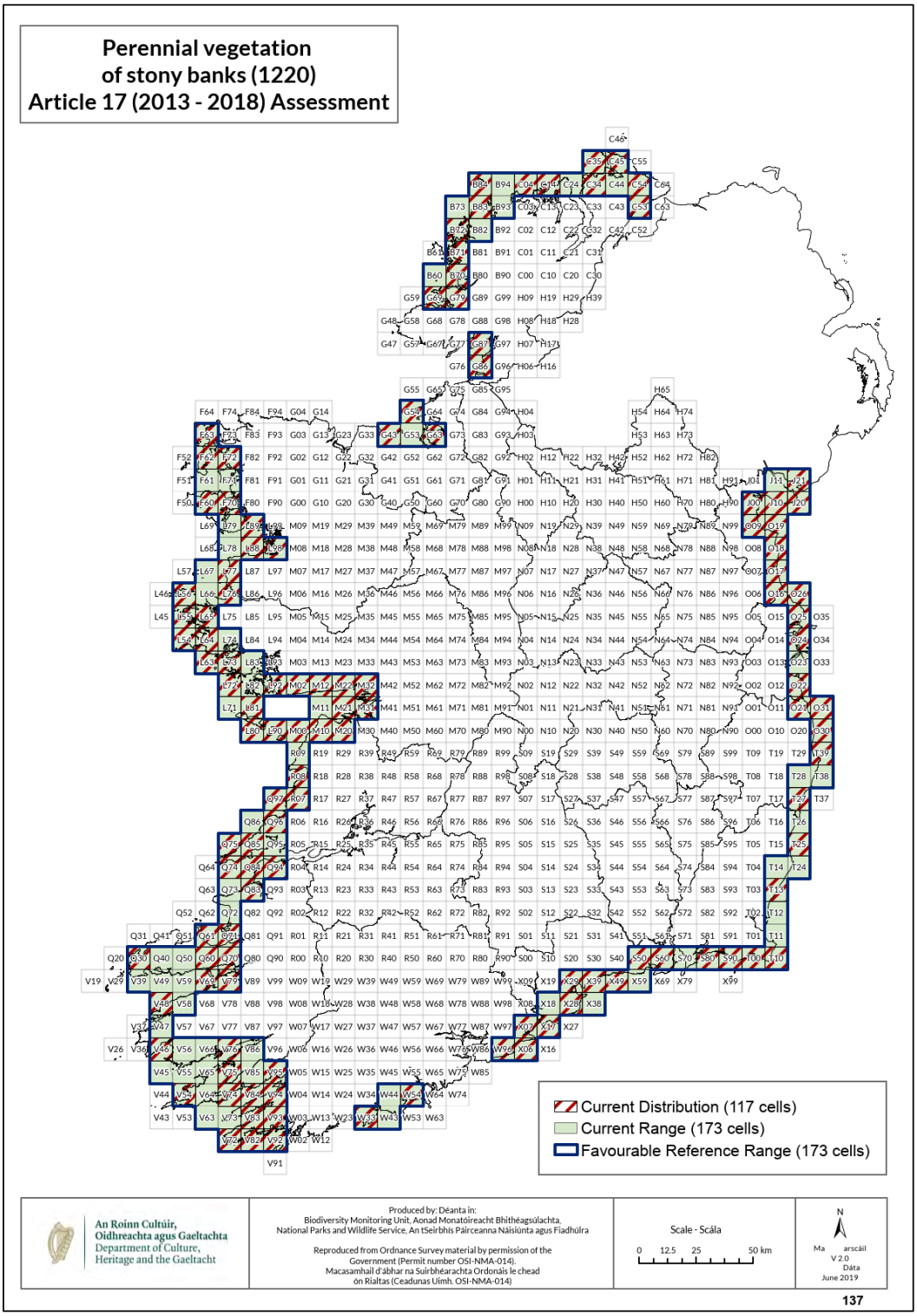
N
Ma arscáil
V 2.0
Dáta
June 2019
77


Perennial vegetation
of stony banks (1220)
Article 17 (2013 - 2018) Assessment
Current Distribution (117 cells)
Current Range (173 cells)
Favourable Reference Range (173 cells)
An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
Produced by: Déanta in:
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Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead
ón Rialtas (Ceadunas Uimh. OSI-NMA-014)
Scale - Scála
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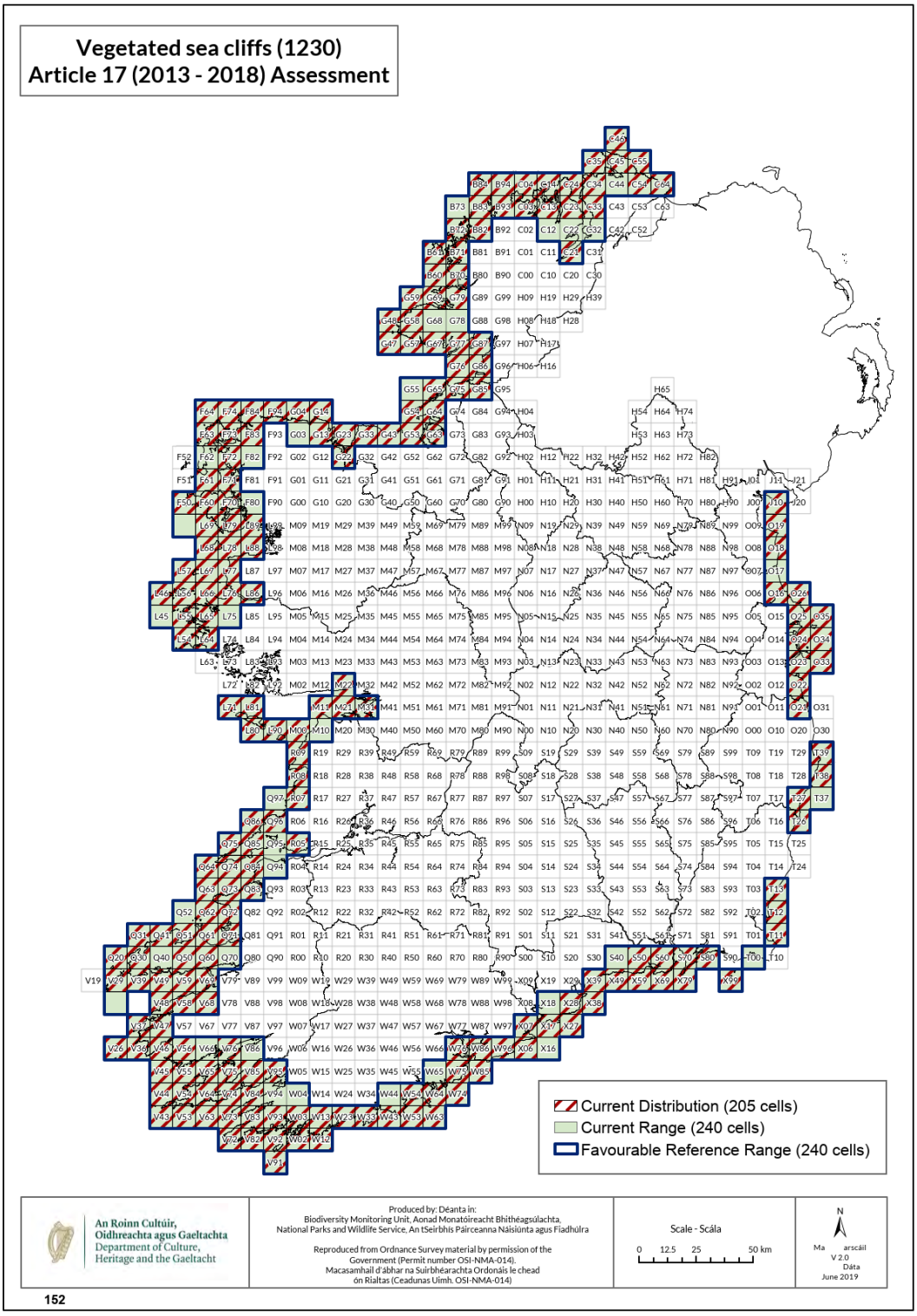
N
Ma arscáil
V 2.0
Dáta
June 2019
137


Vegetated sea cliffs (1230)
Article 17 (2013 - 2018) Assessment
Current Distribution (205 cells)
Current Range (240 cells)
Favourable Reference Range (240 cells)
An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht
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Scale - Scála
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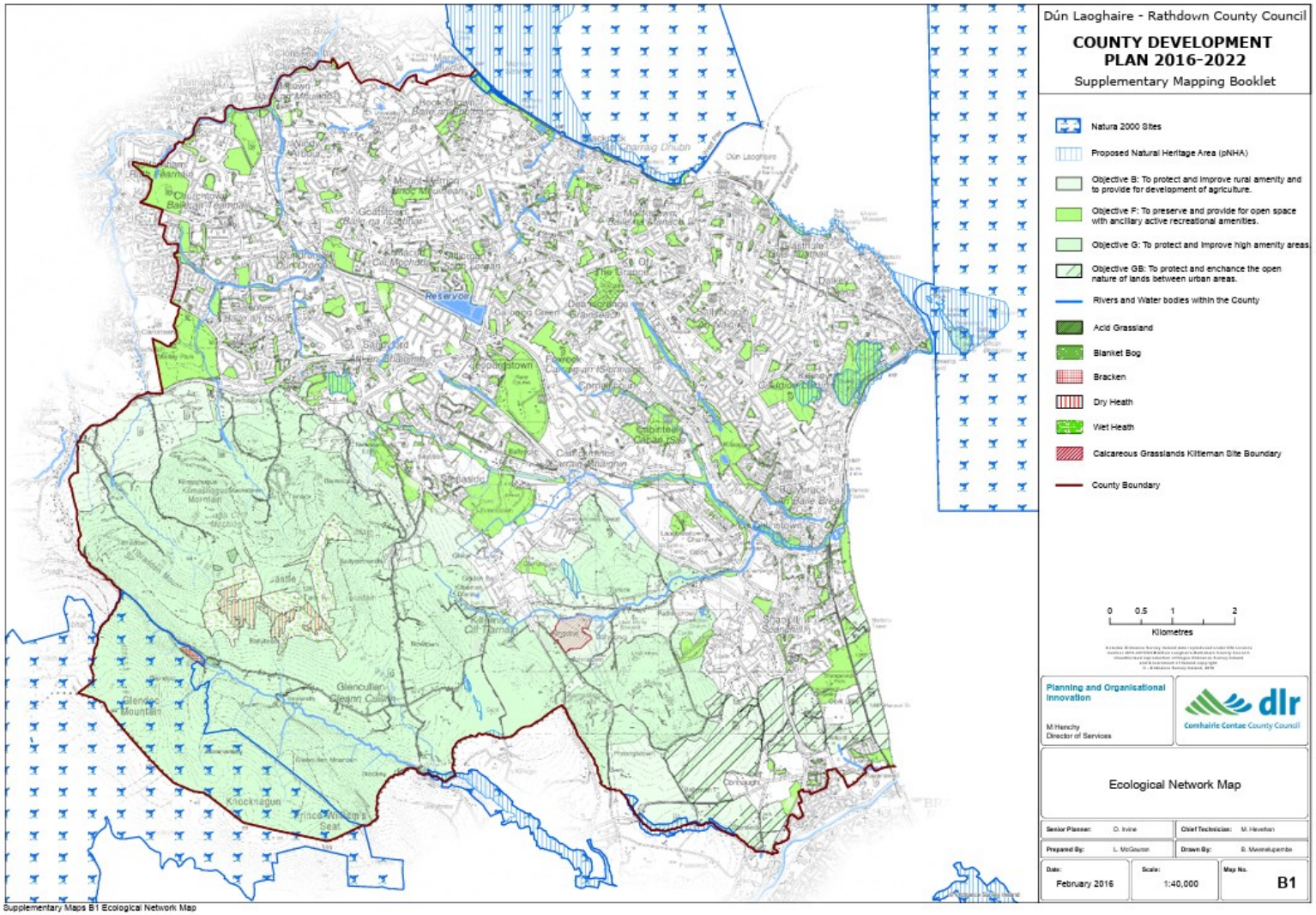
Ma arscáil
V 2.0
Dáta
June 2019
152

Annex 9 Map B1 – from the DLR County Development Plan



Supplementary Maps B1 Ecological Network Map

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