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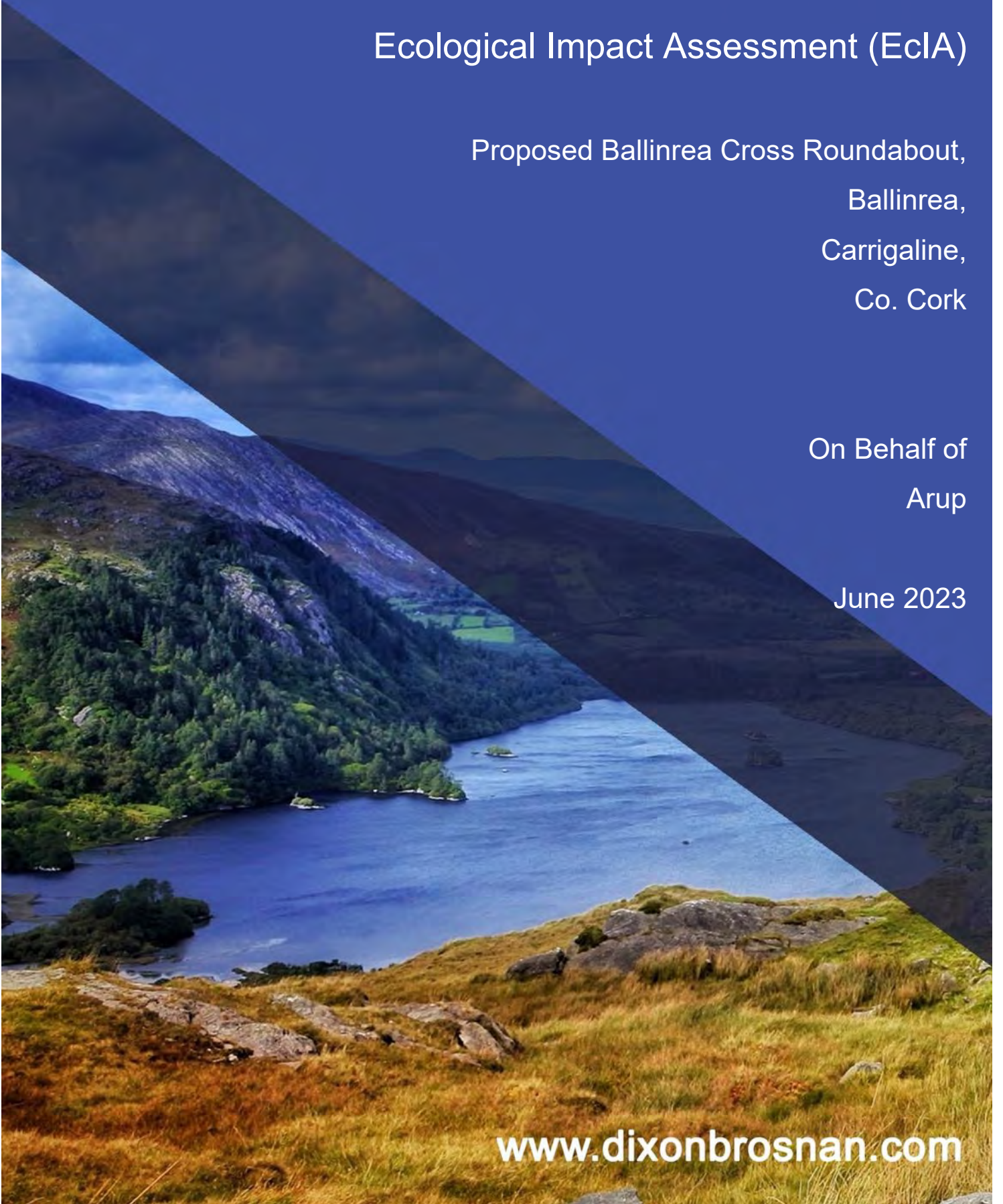
Ecological Impact Assessment (EclA)

Proposed Ballinrea Cross Roundabout,
Ballinrea,
Carrigaline,
Co. Cork

On Behalf of
Arup

June 2023

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1. Introduction

DixonBrosnan Environmental Consultants were commissioned to assess the potential impacts of the proposed Ballinrea Cross Roundabout at Ballinrea, Carrigaline, Co.Cork and all associated site works, on terrestrial and aquatic flora and fauna. This report describes and evaluates the habitats with their representative flora and fauna and addresses the potential impacts of the development on the ecology of the site and the surrounding area.

2. Methodology

2.1 Introduction

This appraisal is based on surveys of the proposed development site and a review of desktop data. Although not part of an environmental impact assessment report (EIAR) this report follows the structure and protocols detailed in *Advice notes for preparing Environmental Impact Statements* (EPA 2003) and *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA 2022).

2.2 Desktop Review

A desktop review facilitates the identification of the baseline ecological conditions and key ecological issues relating to European sites and facilitates an evaluation assessment of potential in-combination impacts. Sources of information used for this report include reports prepared for the Carrigaline area and information from statutory and non-statutory bodies. The following sources of information and relevant documentation were utilised:

- National Parks & Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre (NBDC)– www.biodiversityireland.ie
- *Cork County Biodiversity Action Plan 2009-2014*;
- *Cork County Development Plan 2022*;
- Bat Conservation Ireland – <http://www.batconservationireland.org>
- Birdwatch Ireland - <http://www.birdwatchireland.ie/> and
- Invasive Species Ireland - <http://www.invasivespeciesireland.com/>

This report follows the Environmental Protection Agency’s Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022). It also takes account of the Draft Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, August 2018), Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition (Chartered Institute of Ecology and Environmental Management CIEEM 2016) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1 (CIEEM, 2018).

Reference was also made to the following documents where relevant:

- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union (EU), 2017);
- Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC (EC Environment Directorate-General, 2018);
- Guidance on integrating climate changes and biodiversity into environmental impact assessment (EU Commission 2013);
- Assessment of plans & projects in relation to N2K sites – Methodological Guidance (EC 2021);
- Biodiversity Net Gain Good practice principles for development (CIEEM 2019)
- Biodiversity Net Gain. A practical guide. (CIEEM 2016);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters Inland Fisheries Ireland (2016);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC 2021);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority (NRA) 2009);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- A Guide to Habitats in Ireland (Fossitt, 2000);
- Guidelines for the treatment of Badgers prior to the construction of National Road Schemes. National Roads Authority, Dublin (National Roads Authority (NRA) 2005a);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority (NRA) 2005b).
- Guidelines for the treatment of bats during the construction of national road schemes (National Roads Authority (NRA) 2005c);
- Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. (National Roads Authority (NRA) 2006).
- Guidelines for the treatment of Otters prior to the construction of National Road Schemes (National Roads Authority (NRA) 2008);
- Bird Census Techniques (Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. 2000)
- Bird Monitoring Methods - a Manual of Techniques for Key UK Species. (Gilbert, G., Gibbons, D.W. & Evans, J. (1998))

- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed)' (Collins, 2016) and
- Bat Mitigation Guidelines for Ireland Volume 2. (F. Marnell, C. Kelleher and E. Mullen NPWS (2022)).

2.2.1 Relevant Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Act 1976, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC).

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats.

The relevant categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to meet the EU Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) are designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act 2000. A NHA is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

Relevant European Legislation

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Relevant Irish Legislation

- The Wildlife Act 1976, as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife

(Amendment) Act 2010, Wildlife (Amendment) Act 2012, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);

- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);

In addition to the above, in assessing the likely significant effects on the prevailing biodiversity arising from the proposed works (including decommissioning works), due regard, where relevant, has been given to relevant legislation and guidance, including the following:

- EIA Directive (2014/52/EU)
- Planning and Development Acts 2000, as amended and the Planning and Development Regulations 2001, as amended
- Wildlife Act 1976, as amended
- Flora (Protection) Order, 2022 (S.I. No. 235/2022)
- EU Water Framework Directive 2000/60/EC
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)
- National Biodiversity Action Plan 2017 - 2021
- EU Biodiversity Strategy for 2030 (EU, 2020)
- EU Strategy on Green Infrastructure (EU, 2013)
- National Biodiversity Action Plan for 2017-2021 (Department of Culture, Heritage and the Gaeltacht, 2017)
- National Parks and Wildlife Service (NPWS) Threat Response Plans (NPWS, Various)
- Cork County Development Plan 2022-2028 (Cork County Council 2022).

2.3 Survey Overview

Site visits were carried out on the 16th May 2023 and 25th May 2023. The following surveys were carried out at the site:

- Habitats were mapped according to the classification scheme outlined in Fossitt, (2000) and Heritage Council (2011);
- The proposed development area was surveyed for invasive species;

- General bird surveys were carried out in conjunction with habitat surveys. There are no specialised habitats for birds within the site boundary.
- A general mammal survey was carried out in conjunction with the habitat survey following NRA guidelines (NRA 2005b, NRA 2005c, NRA 2008) and
- A Night time emergence/activity surveys were carried out on the 25th May 2023 using an Echotouch Touch 2 PRO bat detector, two Elekon Batlogger 2 and a Pulsar Helion 2 XP50 Pro Thermal Imaging Camera. A day time assessment of tree suitability for roosting bats and Potential Roost Features (PRFs) was carried out on 16th May 2023. This survey followed the guidelines set out in Collins (2016).

This report was prepared by Carl Dixon MSc (Ecological Monitoring) and Sorcha Sheehy PhD (Ecology/Ornithology).

Carl Dixon MSc (Ecology) is a senior ecologist who has over 25 years' experience in ecological and water quality assessments. Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included Rural Environmental Protection Scheme (REPS) planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Dr. Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant specialising in bird behaviour. Sorcha received a BSc in Applied Ecology from UCC and subsequently went on to receive a PhD in behavioural ornithology at UCC. During her PhD research, Sorcha studied bird-aircraft collision with a particular focus on bird behaviour, included field-based behavioural observations at airports, bird cadaver examination and collision classification and the use of radar tracking to model collision risk. Sorcha has worked for over 15 years in a professional ecology role and specialises in the coordination of ecology projects and assessments. She has coordinated and contributed to Habitats Directive Assessments (AA screenings and NIS) and Environmental Impact Assessment Reports (EIAR) for a range of small and large-scale projects with particular expertise in assessing impacts on birds. Notable projects include Arklow Bank Wind Park, Shannon Technology and Energy Park and Waste to Energy Facility Ringaskiddy.

3. Proposed Development

3.1 Existing site

Ballinrea Cross Junction is located on the outskirts of Carrigaline, Co. Cork, approximately 2km northwest of Carrigaline town centre and 9km southeast of Cork City Centre (**Figure 1**). The junction is a connects the Ballinrea Road and the L2473. The Ballinrea Road is a local

commuter route from Donnybrook in Cork City to Carrigaline. The L2473 is a loop road that provides local access around Carrigaline's north-western community.

The proposed development site is located in a rural setting and surrounded by agricultural grassland, one off housing development and farm buildings.

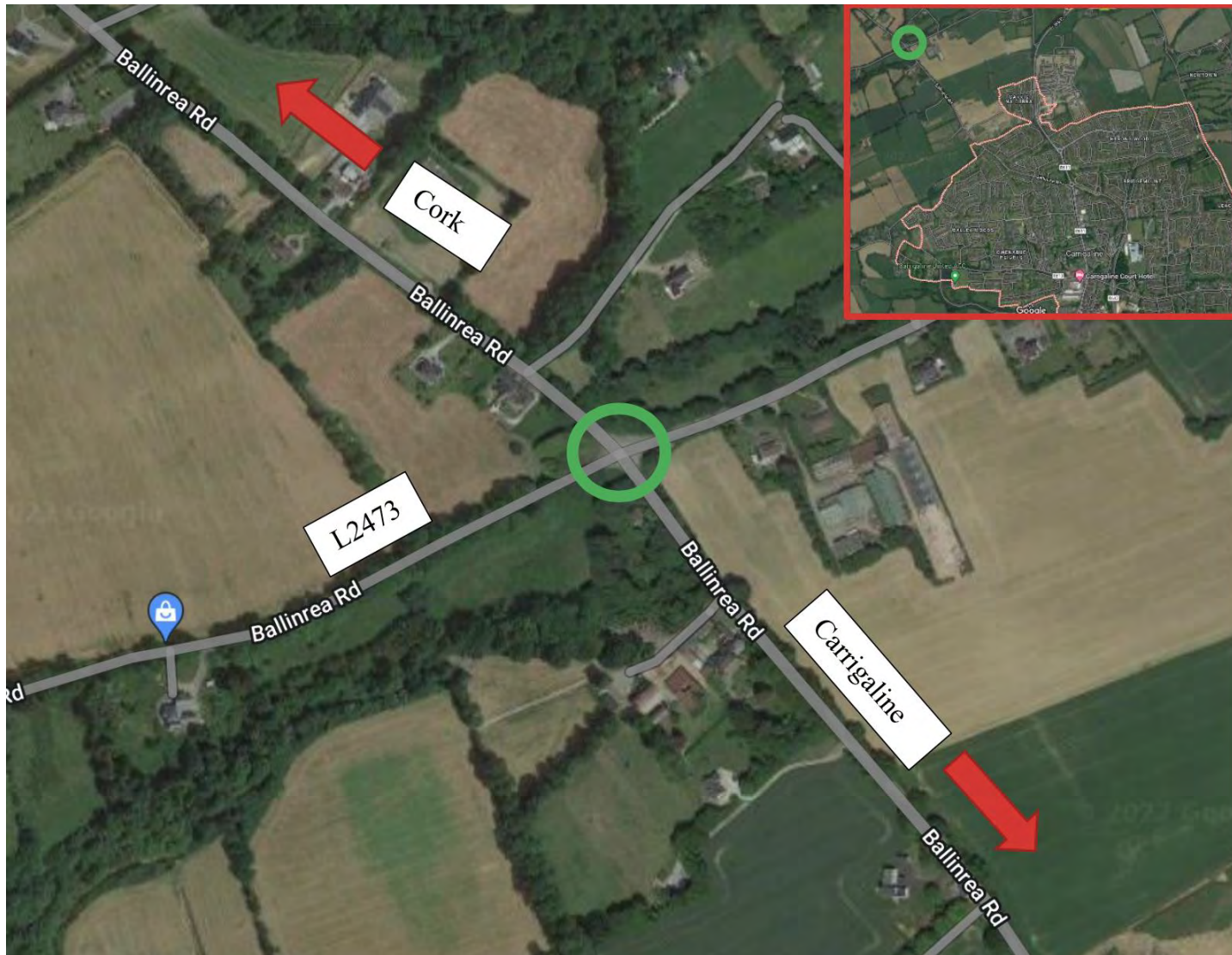


Figure 1. Site location | Source Arup

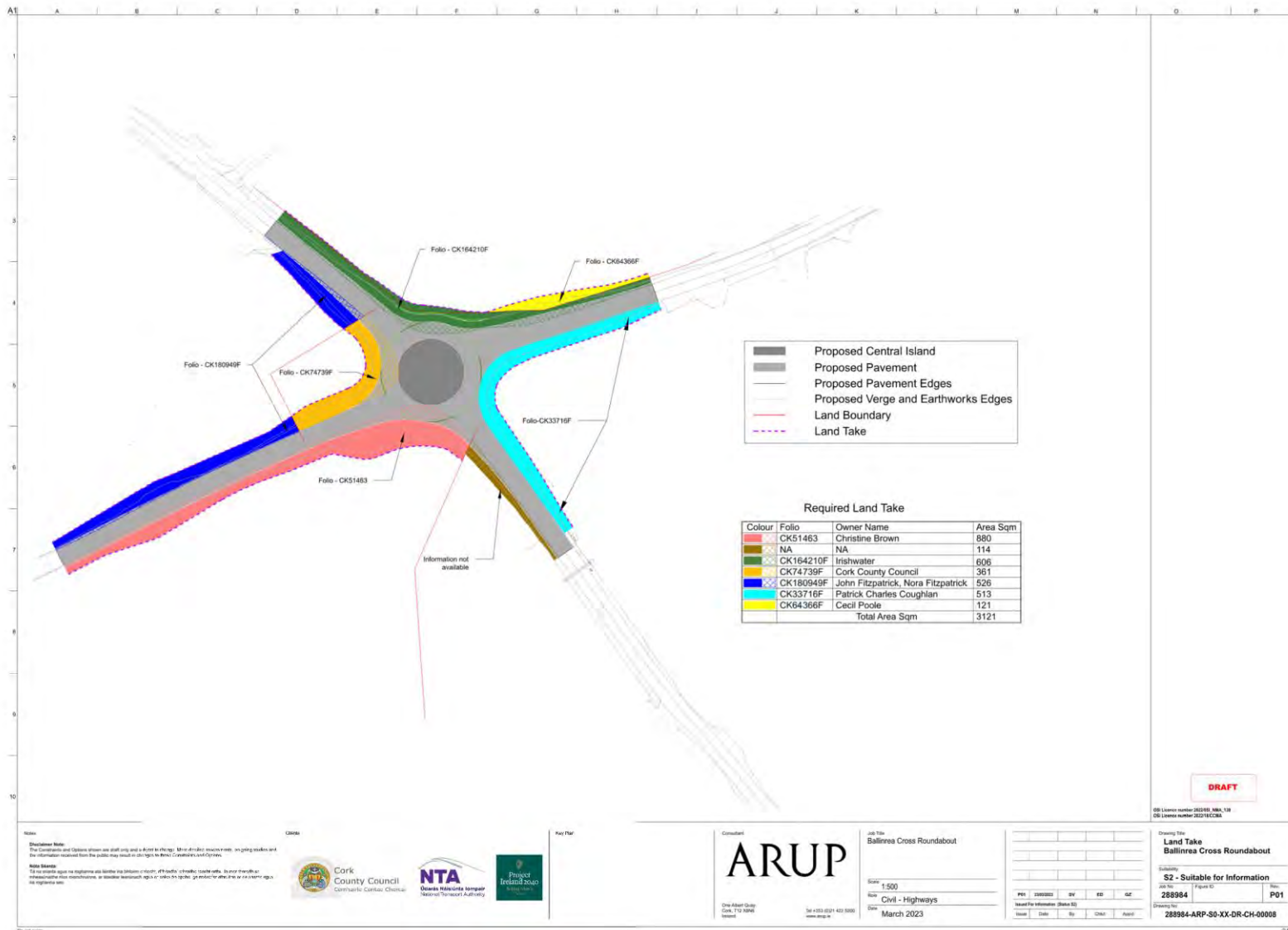


Figure 2. Overview of proposed development site | Source Arup

3.2 Proposed Development

The proposed scheme consists of the provision of a junction upgrade to a roundabout to address the poor visibility. The preferred option in the Ballinrea Cross Roundabout Design Options report (Report reference: 288984-ARUP-01- XX-RP-01) has been designed in accordance with the relevant standards. This report has been prepared in accordance with DN-GEO-03030 and approval is sought to proceed to Phase 4, Statutory Procedures.

The site layout is shown in **Figure 2**.

4. Designated Conservation Areas

4.1 European (Natura 2000) Sites

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

The proposed development site is located within the likely zone of impact of two Natura 2000 sites i.e., Cork Harbour SPA and Great Island Channel SAC (**Table 1**). The location of these Natura 2000 sites is shown in **Figure 3**. A small stream flows through the proposed development site. Although this is not included in the EPA mapping, based on the direction of flow and location, this is likely to be a tributary of the Owenacurra River. The lower reaches of the Owenacurra River/Estuary form part of the Cork Harbour SPA (c.5.1km downstream). Given the identified downstream hydrological connectivity a viable source pathway connector link has been identified between the proposed development site and Cork Harbour SPA.

Given the distance of Great Island SAC and the dilution available within Cork Harbour, no viable pathway for impact has been identified.

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenabue and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenabue River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poul nabibe inlets. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e., > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive.

Table 1. European sites and their location relative to the proposed development site

European sites	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
Special Area of Conservation (SAC)			
Great Island Channel SAC	001058	Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]	Located 7.8km east (19.1km downstream) of the proposed development site. Given the distance from the proposed development site and the dilution available within Cork Harbour, no viable pathway for impact has been identified.
Special Protection Area (SPA)			
Cork Harbour SPA	004030	Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Grey Heron (<i>Ardea cinerea</i>) [A028] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas 14irsute14</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142]	2.2km southeast (5.1km downstream). A small stream (probably a tributary of the Owenabue River) flows through the proposed development site. The lower reaches of the Owenacurra River/Estuary form part of the Cork Harbour SPA (c.5.1km downstream). Given the potential hydrological connection of the proposed development relative to this European site boundary a viable source pathway connector link has been identified.

European sites	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
		Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa 15irsute</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Common Gull (<i>Larus canus</i>) [A182] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	



Figure 3. Location of the proposed development boundary and Natura 2000 sites located within zone of influence of the site | Source: EPA Envision mapping <https://gis.epa.ie/EPAMaps/> | Not to scale

4.2 Nationally Protected Sites

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. These areas are considered nationally important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are also of significance for wildlife and habitats. Prior to statutory designation, pNHAs are still subject to limited protection, in the form of:

- Agri-environmental farm planning schemes support the objective of maintaining and enhancing the conservation status of pNHAs;
- There is a requirement for the Forest Service to gain NPWS approval before they will pay afforestation grants on pNHA lands; and,
- A recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

The NHAs and pNHAs located in the vicinity of the proposed development site are listed in **Table 2** and are shown in **Figure 4**.

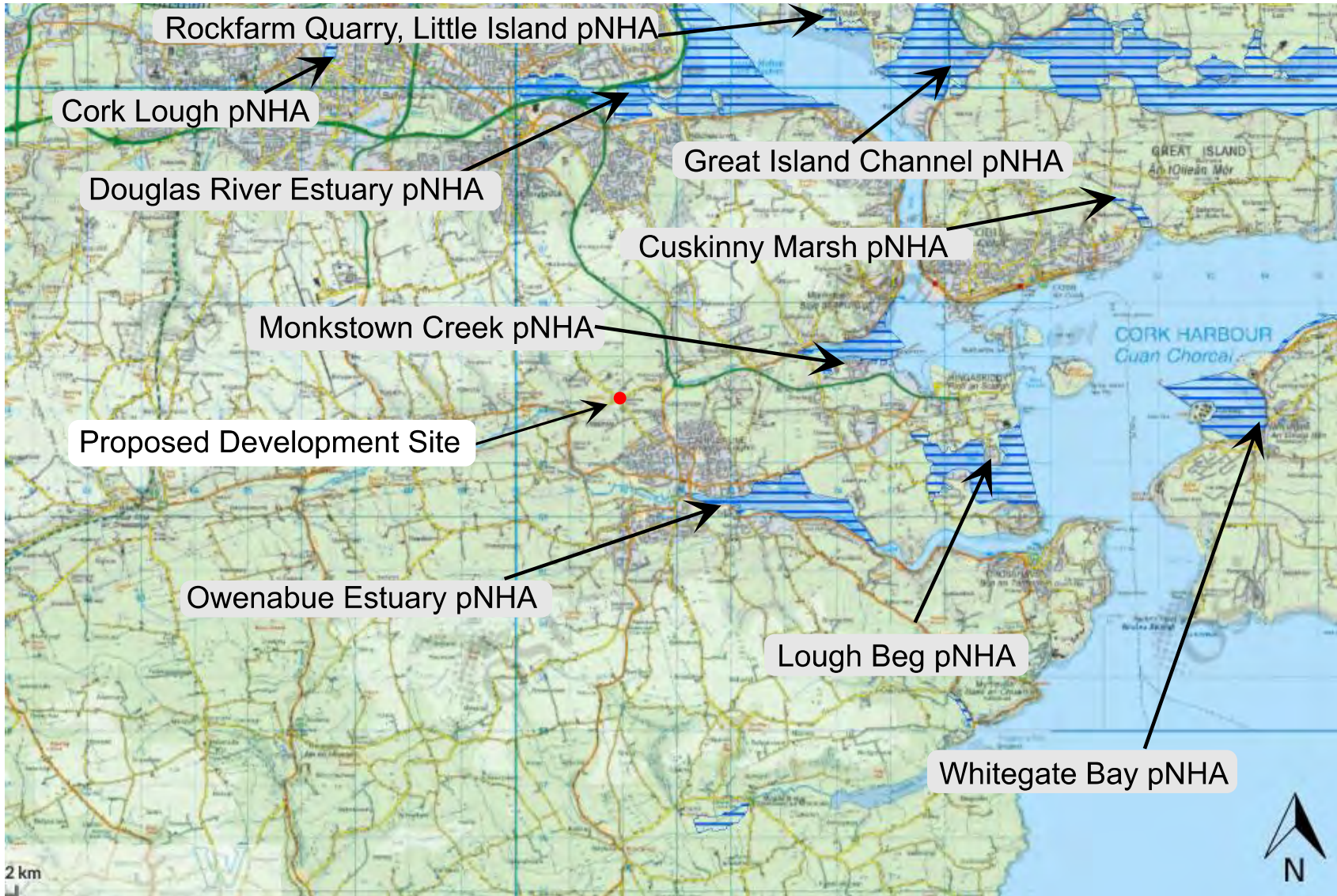


Figure 4. Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development site | Source EPA envision mapping | Not to scale

Table 2. Natural Heritage Area (NHA)/proposed Natural Heritage Area (pNHA) in the vicinity of the proposed development site

NHA/pNHA	Site Code	Overlapping with Natura 2000 site	Distance at closest point and potential source-pathway-receptor link
Owenabue Estuary pNHA	001990	Cork Harbour SPA	<p>This pNHA forms part of Cork Harbour SPA. It supports a range of wetland habitats and is an important overwintering area for a range of wetland bird species including and Dunlin, Redshank and Curlew.</p> <p>2.2km southeast. A small stream (probably a tributary of the Owenabue River) flows through the proposed development site. The lower reaches of the Owenacurra River/Estuary form part of the Cork Harbour SPA (c.5.1km downstream).</p> <p>Given the potential hydrological connection of the proposed development relative to this European site boundary a viable source pathway connector link has been identified.</p>
Monkstown Creek pNHA	001978	Cork Harbour SPA	<p>The area is of value because its mudflats provide an important feeding area for waterfowl including: Shelduck, Teal, Redshank and Dunlin. The pNHA also supports a Cormorant roosting site.</p> <p>3.4km northeast. Given the distance from the proposed development site, no viable pathway for impact has been identified.</p>
Lough Beg pNHA	001066	Cork Harbour SPA	<p>As part of the Cork Harbour SPA, Lough Beg plays a part in supporting internationally important numbers of waders (over 20,000) and of two particular species, the Black-tailed Godwit and Redshank. Wildfowl are relatively numerous as compared to other parts of the Harbour and include Wigeon, Teal and Shelduck Golden Plover, Lapwing and Dunlin.</p> <p>5.5km east. Given the distance from the proposed development site, no viable pathway for impact has been identified.</p>
Douglas River Estuary	001046	Cork Harbour SPA	<p>This site comprises the estuary of the Douglas River in Cork Harbour. It supports a range of wetland habitats and is an important overwintering area for a range of wetland bird species including: Teal, Wigeon, Shelduck, Red-breasted Merganser, Oystercatcher, Lapwing, Golden, Curlew, Black-tailed Godwit, Bar-tailed Godwit Redshank and Dunlin.</p> <p>5.1km north. Given the distance from the proposed development site, no viable pathway for impact has been identified.</p>
Cuskinny Marsh pNHA	001987	None	<p>This site is located 2.5km east of the centre of Cobh on the shores of Cork Harbour. Cuskinny Marsh is of interest because it contains a nice mix of habitats, within a small area, and supports locally important numbers of wildfowl.</p> <p>9.2km east No viable pathway identified.</p>

NHA/pNHA	Site Code	Overlapping with Natura 2000 site	Distance at closest point and potential source-pathway-receptor link
Great Island Channel pNHA	001058	Great Island Channel SAC and Cork Harbour SPA	See Great Island Channel SAC and Cork Harbour SPA. 7.8km east. Given the distance from the proposed development site, no viable pathway for impact has been identified.
Rockfarm Quarry Little Island pNHA	001074	None	Rock Farm Quarry is located c. 9km west of Cork City on Little Island in the River Lee estuary. The area is of considerable interest botanically because of its species diversity and the presence of "rarities" for the region, such as the dense-flowered orchid and the Portland Spurge. 7.9km north No viable pathway identified.
Whitegate Bay pNHA	001084	Cork Harbour SPA	This site forms part of the Cork Harbour Special Protection Area. It comprises open water with extensive mudflats. Species particularly associated with this part of the SPA include Grebes, diving ducks and waders and include Shelduck, Wigeon, Dunlin, Knot, Curlew, Redshank, Bar-tailed Godwit, turnstone, Oystercatcher and Ringed Plover. 10.1km east. Given the distance from the proposed development site, no viable pathway for impact has been identified.
Cork Lough	001081	None	8.1km northwest. No viable pathway identified.

The proposed development is potentially hydrologically connected to the Owenabue Estuary pNHA via the local drainage network. While a number of pNHAs listed in **Table 2** are hydrologically connected to the Owenabue Estuary via Cork Harbour, given the distance from the proposed development site, no viable pathway for impact has been identified.

4.3 Ramsar Sites

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Cork Harbour is listed as a Ramsar site, which is a non-statutory designation.

4.4 Important Bird Areas – Cork Harbour

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The boundary of the Cork Harbour IBA (Site code IE088) largely follows the boundary of the Cork Harbour SPA.

The Cork Harbour IBA (Site Code: IE088) qualifies for designation under the following IBA Criteria (2000):

- A4iii - The site is known or thought to hold, on a regular basis, $\geq 20,000$ waterbirds or $\geq 10,000$ pairs of seabird of one or more species.
- B1i - The site is known or thought to hold $\geq 1\%$ of a flyway or other distinct population of a waterbird species
- B2 - The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.
- C3 - The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).
- C4 - The site is known to regularly hold at least 20,000 migratory waterbirds and/or 10,000 pairs of migratory species of one or more species.

- C6 - The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.

Table 3. Summary of the Cork Harbour IBA trigger species.

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Eurasian Curlew (<i>Numenius arquata</i>)	NT	winter	1995	1,669 individuals	B2
Bar-tailed Godwit (<i>Limosa lapponica</i>)	NT	winter	1996	456 individuals	B2
Black-tailed Godwit (<i>Limosa limosa</i>)	NT	winter	1996	1,399 individuals	B1i, C3
Dunlin (<i>Calidris alpina</i>)	LC	winter	1995	12,050 individuals	B1i, B2, C3
Common Redshank (<i>Tringa tetanus</i>)	LC	winter	1996	1,344 individuals	B1i, C3
Common Tern (<i>Sterna hirundo</i>)	LC	breeding	1995	102 breeding pairs	C6
A4iii Species group - waterbirds	n/a	winter	-	20,000 individuals	A4iii, C4


5. Flora


5.1 Habitats



Habitat surveys and mapping were carried out on the 16th May 2023 and 25th May 2023. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within or adjacent to the proposed development site was classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.



A current overview of habitats recorded within the site is shown in **Figure 5** and the habitats recorded on site are described in **Table 4**. Site photographs are also included below. The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 1**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value).



Table 4. Habitat present and their relative value.



Habitat	Comments	Ecological value (NRA guidelines)
<p>Dry meadows and grassy verge GS2</p>	<p>The works area includes a mosaic of grassy verge and treeline habitat. These areas are dominated by common grass and herbaceous species. A broad band of dry meadows and grassy verge habitat runs along the north-western and south western verges of the road. A range of common species including dock, ragweed, creeping buttercup, ribwort plantain, sow thistle, vetches, daisy, mayflower, hogweed, dandelion, herb Robert, cleavers, cocksfoot, bluebell, germander, speedwell, nettle, bindweed, meadowsweet and groundsel.</p> <p>A small area of three cornered leek is also present along the southwestern verge of the proposed development ts.</p>  <p>Plate 1. Dry meadows and grassy verge (southwestern verge looking south)</p>	<p>Local importance (lower value)</p>

Habitat	Comments	Ecological value (NRA guidelines)
	 <p data-bbox="547 685 1099 745">Plate 2. Immature sycamore on southwestern verge (looking north)</p>	
<p data-bbox="204 779 360 801">Treeline WL2</p>	<p data-bbox="547 779 1099 996">Continuous treeline borders much of the site. Many of the treelines include a large proportion of non-native species, including lime, cherry and leylandii. Notably one mature oak was recorded adjacent to the stream. Although none of these trees are mature enough to provide significant roosting habitat for bats. Understorey species include Hawthorn, Elder and Cherry Laurel.</p> <p data-bbox="547 1025 1099 1081">The treelines within the site include the following species (Cross-reference with Figure 5)</p> <p data-bbox="547 1111 660 1133">Treeline 1</p> <ul data-bbox="547 1137 852 1413" style="list-style-type: none"> Sycamore (mature) x 3 Sycamore (semi-mature) x 1 Sycamore (immature) x 1 Leylandii x 1 Cherry (immature) x 1 Semi-mature oak x 2 Poplar (immature) x 1 Willow (semi-mature x 2) Ash (semi-mature) x 1 Ash (immature) x 1 <p data-bbox="547 1442 660 1464">Treeline 2</p> <ul data-bbox="547 1469 724 1547" style="list-style-type: none"> Cherry laurel x 1 Leylandii x 20 Ash (mature) x 1 <p data-bbox="547 1576 660 1599">Treeline 3</p> <ul data-bbox="547 1603 852 1742" style="list-style-type: none"> Sycamore group (immature) Sycamore (mature) x 2 Sycamore (semi-mature) x 1 Hawthorne (mature) x 2 Ash (mature) x 2 <p data-bbox="547 1771 660 1794">Treeline 4</p> <ul data-bbox="547 1798 788 1906" style="list-style-type: none"> Sycamore (mature) x 1 Ash (mature) x 3 Ash (semi-mature) x 1 Leylandii (mature) x 1 <p data-bbox="547 1935 660 1957">Treeline 5</p> <ul data-bbox="547 1962 868 2040" style="list-style-type: none"> Leylandii (semi-mature) group Sycamore (mature) x 3 Sycamore (semi-mature) group 	<p data-bbox="1125 779 1402 835">Local importance (lower to higher value)</p>

Habitat	Comments	Ecological value (NRA guidelines)
	<p>Sycamore (semi-mature) x 3 Sycamore (immature) x 1 Ash (semi-mature) x 2 Hawthorn (mature) x 5</p> <p>Treeline 6 Ash (mature) x 3 Ash (semi-mature) x 5 Sycamore (mature) x 4 Sycamore (immature) x 1 Beech (immature) group Mature oak x 1</p> <p>The understory of the treelines is dominated by bramble and umbellifers such as alexander's, hogweed, hemlock water dropwort, cleavers, nettle and bramble.</p>  <p>Plate 3. Treeline 1 (looking north-west)</p>  <p>Plate 4. Treeline 1 along south-eastern boundary</p>	

Habitat	Comments	Ecological value (NRA guidelines)
	 <p data-bbox="549 654 1102 712">Plate 5. Treeline 2 along southwestern corner of junction (looking southwest)</p>  <p data-bbox="549 1361 999 1395">Plate 6. Treeline 3 (looking south-west)</p>	

Habitat	Comments	Ecological value (NRA guidelines)
	 <p data-bbox="549 936 1043 969">Plate 7. Treeline 4 (looking north-east)</p>  <p data-bbox="549 1641 1043 1675">Plate 8. Treeline 5 (looking north-west)</p>	

Habitat	Comments	Ecological value (NRA guidelines)
	 <p>Plate 9. Mature treeline/treeline 6 with mature oak on corner 9 (looking north-west)</p>  <p>Plate 10. Treeline 1(left) and treeline 6 (right) (south-west)</p>	
Upland/eroding river FW1	<p>Adjoining the road and dry meadow and grassy verge is a small stream. This is piped under the junction before flowing south along the southwestern verge. This is a small fast-flowing stream which may have the potential to support trout in the lower reaches or in small pockets of deeper water. The banks include dense stands of hemlock water dropwort, cleavers, hogweed, herb Robert, wood avens, willowherb, montbretia and ground ivy.</p>	Local importance (higher value)

Habitat	Comments	Ecological value (NRA guidelines)
	 <p data-bbox="549 936 1099 992">Plate 11. Eastern side of junction where stream is culverted</p>  <p data-bbox="549 1413 1099 1507">Plate 12. Watercourse at emergence point from culvert (southwestern of junction) with relatively deep plunge pool and high levels of shade</p>	



Habitat	Comments	Ecological value (NRA guidelines)
	 <p data-bbox="549 967 1102 1059">Plate 13. Stream pictured to north-east of proposed development site (outside works area boundary)</p>	
<p data-bbox="204 1122 521 1171">Buildings and artificial surfaces BL3</p>	<p data-bbox="549 1122 1086 1234">An agricultural building is located along the southwestern corner of the site and is located immediately adjacent to the road. This is a corrugated iron structure with corrugated iron roof.</p> <p data-bbox="549 1261 1046 1317">This building is of low to negligible potential for bats.</p> <p data-bbox="549 1344 1082 1400">The Ballinrea road and the L2473 local road meet at the site of the proposed development.</p>  <p data-bbox="549 1787 1054 1843">Plate 14. Agricultural building at south-west corner of site</p>	
<p data-bbox="204 1874 336 1899">Scrub WS1</p>	<p data-bbox="549 1874 1098 2004">On the north-west corner of the junction, an area of scrub is located on the boundary of the dry meadows and grassy verge habitat. This area is dominated by bramble with occasional willow, red fescue, pennywort and remote sedge.</p>	<p data-bbox="1126 1874 1406 1930">Local importance (lower value)</p>



Figure 5. Habitat map of proposed development site (approximate red line boundary)

5.2 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of high impact invasive species which have been recorded within grid square W76 (**Table 5**).

Table 5. NBDC list of high impact invasive species recorded within W76

Species Group	Species
Bird	Rose-ringed Parakeet (<i>Psittacula krameri</i>)
Flowering plant	Cherry Laurel (<i>Prunus laurocerasus</i>)
Flowering plant	Common Cord-grass (<i>Spartina anglica</i>)
Flowering plant	Japanese Knotweed (<i>Fallopia japonica</i>)
Flowering plant	<i>Rhododendron ponticum</i>
Insect - beetle (Coleoptera)	Harlequin Ladybird (<i>Harmonia axyridis</i>)
Terrestrial mammal	American Mink (<i>Mustela vison</i>)
Terrestrial mammal	Brown Rat (<i>Rattus norvegicus</i>)
Terrestrial mammal	Coypu (<i>Myocastor coypus</i>)
Terrestrial mammal	Fallow Deer (<i>Dama dama</i>)
Terrestrial mammal	House Mouse (<i>Mus musculus</i>)
Terrestrial mammal	Sika Deer (<i>Cervus nippon</i>)
Tunicate (Urochordata)	Leathery Sea Squirt (<i>Styela clava</i>)

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The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that:

‘Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, [‘refers only to exotic species thereof’][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.’

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed and Himalayan Balsam, as follows: “any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [...] shall be guilty of an offence.”

One third schedule species, three-cornered leek, was recorded on the south-western corner of the site (See **Figure 5** for locations). This species can spread to semi-natural grassland and can form dense monocultural masses, which may pose a threat to indigenous biodiversity (Downen, 2011; BSBI, 2011). The life cycle three-cornered leek means it only has the potential to effect low growing spring flowers, with native bluebells considered to be at risk (Downen, 2011).

One other non-native invasive species i.e., Cherry Laurel was recorded at the proposed development site. This species is not included in the Third Schedule. Therefore, its presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011). Cherry Laurel can outcompete native species and suppress regeneration by forming thick stands and avoids herbivory by wildlife (Maguire *et al.*, 2008).

5.3 Threatened/Rare Flora

The National Biodiversity Data Centre's (NBDC) online database provides data on the distribution of species within 10km grid squares. The site of the proposed development lies within 10km grid square (hectad) W76 of Ordnance Survey Ireland's National Grid System. Endangered and protected flowering plants recorded by the NBDC are listed in **Table 6**. Three species recorded within W76 are listed under the Flora Protection Order 2022 (S.I. No. 235 of 2022).

These species were not recorded within study area during site survey. No rare species were recorded during the site survey, nor are they expected to occur given that the habitats within the study area are common.

Table 6. NBDC listed endangered and protected flowering species for hectad W76

Species name	Designation
Common Toadflax (<i>Linaria vulgaris</i>)	Threatened Species: Near threatened
Dittander (<i>Lepidium latifolium</i>)	Threatened Species: Vulnerable
Fragrant Agrimony (<i>Agrimonia procera</i>)	Threatened Species: Near threatened
Glebionis segetum	Threatened Species: Near threatened
Little-robin (<i>Geranium purpureum</i>)	Flora Protection Order (S.I. No. 235 of 2022) Threatened Species: Endangered
Meadow Barley (<i>Hordeum secalinum</i>)	Flora Protection Order (S.I. No. 235 of 2022) Threatened Species: Endangered
Pale Flax (<i>Linum bienne</i>)	Threatened Species: Near threatened
Pennyroyal (<i>Mentha pulegium</i>)	Flora Protection Order (S.I. No. 235 of 2022) Threatened Species: Endangered

Round-leaved Crane's-bill (<i>Geranium rotundifolium</i>)	Threatened Species: Endangered
Sea-kale (<i>Crambe maritima</i>)	Threatened Species: Near threatened
Sharp-leaved Fluellen (<i>Kickxia elatine</i>)	Threatened Species: Least concern
Yellow Bartsia (<i>Parentucellia viscosa</i>)	Threatened Species: Near threatened
Yellow Horned-poppy (<i>Glaucium flavum</i>)	Threatened Species: Near threatened

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6. Fauna

6.1 Otter

Otters (*Lutra lutra*), along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed. (NRA, 2005b). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City.

Thus, Otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

A review of existing records showed that Otter or signs of Otter have been recorded on 26 occasions within grid square W76, the most recent being in December 2022. A small stream flows through the proposed development site. Although this is not included on the EPA or OS mapping, based on the flows observed onsite this is likely to be a tributary of the Owenabue River. Otter have been recorded within the Owenabue River/Estuary on several occasions and use the Owenabue River, both upstream and downstream of the Carrigaline town.

No signs of Otter were recorded within 150m of the proposed development site.

The stream at the proposed development site is small in size with low flows in proximity to the Ballinrea road. This is unlikely to support any significant fish populations in the immediate vicinity of the works area but may support fish including Brown Trout in the lower reaches and in deeper pools. Overall, the proposed development site is of low to negligible value for Otter.

6.2 Bats

6.2.1 Bat in Ireland

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the *Rhinolophidae* (Horseshoe bats) and the *Vespertilionidae* (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus pipistrellus*, soprano *Pipistrellus pygmaeus* and Nathusius' *Pipistrellus nathusii*, four *Myotis*: Natterer's *Myotis nattereri*, Daubenton's *Myotis daubentonii*, whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, the brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). All bat species in Ireland, with the exception of Leisler's Bat are listed as "Least Concern". Leisler's bat which is "Near-threatened" (Marnell *et al.* 2009). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because the species has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990s to present.

A review of existing bat records within grid square W76 (sourced NBDC) showed that six bat species have been recorded locally (**Table 7**). It is noted that other species which have not been included within this database are also likely to occur. The Lesser Horseshoe bat does not occur within 10km of the proposed development site. The closest record of Lesser Horseshoe Bat is at Ovens, over 20km from the proposed development site (NBDC). While the remaining Irish bat species; Nathusius' Pipistrelle and Whiskered Bat have not been recorded in the local area to date, Whiskered bats could occur as these species are widespread in the Irish countryside. Nathusius' pipistrelle (and Brandt's bat) are rarer Irish species, which are less likely to occur.

Table 7. Presence of Irish bat species within W76

Common name	Scientific name	Presence
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	Absent
Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	Present
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Present
Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>	Absent
Natterer's Bat	<i>Myotis nattereri</i>	Present
Daubenton's Bat	<i>Myotis daubentonii</i>	Present
Whiskered Bat	<i>Myotis mystacinus</i>	Absent
Brown Long Eared Bat	<i>Plecotus auritus</i>	Present
Leisler's Bat/ Lesser Noctule	<i>Nyctalus leisleri</i>	Present

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All bat species are protected under the Wildlife Acts 1976, as amended which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

In addition to domestic legislation bats are also protected under the EU Habitats Directive (92/43/EEC) with all bat species are listed in Annex IV of the Directive. Lesser Horseshoe Bat is further listed in Annex II of the EU Habitats Directive. The level of protection offered to Lesser Horseshoe Bats effectively means that areas important for this species are designated as Special Areas of Conservation. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate under the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law) issued by the National Parks and Wildlife Service (NPWS).

The Irish government is also a signatory to the 1979 Bonn convention (Convention on the conservation of migratory species of wild animals) and the 1982 Bern convention (The convention on the conservation of European wildlife and natural habitats) and has a commitment to the 1991 Eurobats agreement (Agreement on the conservation of bats in Europe).

A study by Lundy *et al.* (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur.

Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The habitat indices for all Irish bats for the landscape around the proposed development site is shown in **Table 8**.

Table 8. Model Predicted Habitat suitability indices for all Irish bat species

Bat species	Common Name	Habitat indices
All Bats		34.22
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	53
<i>Plecotus auratus</i>	Brown long-eared bat	45
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	45
<i>Rhinolophus hipposideros</i>	Lesser horseshoe	0
<i>Nyctalus leisleri</i>	Leisler's bat	49
<i>Myotis mystacinus</i>	Whiskered bat	40
<i>Myotis daubentonii</i>	Daubenton's bat	32
<i>Pipistrellus nathusii</i>	Nathusius' pipistrelle	7
<i>Myotis nattereri</i>	Natterer's bat	37

Source: NBDC 30/05/23

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Potential roost features associated with trees include cracks, crevices, loose bark, woodpecker holes and splits. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Bats generally make use of large mature trees that contain natural holes, cracks/splits in major limbs, loose bark, hollows/cavities, dense epicormic growth (bats may roost within it) and bird and bat boxes. The importance of trees to bats varies with species, season and foraging behaviour. For Leisler's bats, trees are essential for both summer and winter roosts while Daubenton's and Natterer's bats utilise trees more often during the summer months. Other species such as brown long-eared bats and pipistrelle bats avail of trees in the winter months. In general, individual males throughout the season use tree roosts, more often, while females will use trees for temporary night roosts or night perches for consuming prey. Hollow trees are widely used by bats for both summer and winter roosts (weather dependent) and bats will roost in 'sound' trees in crevices, holes and under split bark. Bats rest, give birth, raise young and hibernate in tree holes, crevices and beneath loose bark. Species of trees utilised by bats include Oak, ash, beech and Scots pine. Trees, especially native ones also play host to numerous insect species which are prey items for bat species. Trees also provide shelter for

swarming insects which bats will avail of. In addition, trees are important commuting routes for bats. A gap in a hedge/treeline of greater than 10m may force some species of bats to seek an alternative commuting route.

6.2.2 Bats at Proposed Development Site

A night time emergence/activity surveys was carried out on the of May 25th 2023 using an Echotouch Touch 2 PRO bat detector, two Elekon Batlogger 2 and a Pulsar Helion 2 XP50 Pro Thermal Imaging Camera. A day time assessment of trees and the agricultural building earmarked for demolition was carried out on May 25th 2023 to identify Potential Roost Features (PRFs). Surveys followed the guidelines set out in '*Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*' (Collins, 2016). Weather conditions were suitable with bright dry conditions and suitable temperatures and bats were actively foraging. The conclusions of this assessment are therefore considered accurate in terms of accessing bat usage of the site.

In general, the semi-mature trees along the verges do not have the structural features such as cracks and crevices of significant value for roosting bats. There are number of mature trees within the site boundary, including one mature Oak tree on the corner of the north western road junction. These trees have the potential to provide roosting sites for bats. The oak tree and one mature ash were classified as low to moderate roost suitability due to presence of PRFs i.e. dense covering of ivy. The remaining trees within and along the site boundary were considered to have low to negligible potential roost suitability i.e. trees were of insufficient age and without PRFs or trees were of sufficient size and age to possibly contain PRFs but few were observed from the ground level assessment. No emergence was recorded elsewhere within the site. The small agricultural building, which is earmarked for demolition, is of low to negligible value for roosting bat.

Bat activity was generally low during the bat survey. Small numbers of Common and Soprano Pipistrelle were recorded indicating small numbers of bats or commuting through the wider landscape. However no prolonged period of foraging was recorded. It is noted that there is high light levels along the road associated with road traffic along at this very busy junction which may reduce foraging levels. Occasional sporadic signals of Leislars Bat were recorded early in the survey period which is probably indicative of Leislars commuting from roosts to foraging areas in the wider landscape. No prolonged foraging was recorded. One brief signal for a myotis bat was recorded in the overground garden of a house in proximity to the agricultural shed close to the road. This may indicate some sporadic foraging.

Overall therefore the site is considered of local ecological importance (lower value) for foraging pipistrelle bats with no evidence of emergence from trees or the agricultural building. High levels of disturbance from traffic including high light levels may be deterring some species and from using this area and the level of foraging was generally low.

6.3 Other terrestrial mammals

Seventeen other species of terrestrial mammal have been recorded within grid square W76. Nine of which are protected under the Irish Wildlife Act; namely Badger (*Meles meles*), Pygmy Shrew (*Sorex minutus*), Red Squirrel (*Sciurus vulgaris*), Fallow Deer (*Dama dama*), Sika Deer (*Cervus nippon*), Red Deer (*Cervus elaphus*), Irish Hare (*Lepus timidus subsp. hibernicus*), Irish Stoat (*Mustela erminea subsp. hibernica*) and Hedgehog (*Erinaceus europaeus*).

6.3.1 Badger

Badgers and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to willfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage a protected species. Badgers are also protected under Appendix III of the Berne. Badgers are known to occur within the wider landscape (NBDC). The NBDC has 34 records of badger within W76, the most recent sighting in July 2018. A potential badger track was recorded in the northern section of the study area. However, no setts were located in proximity to the junction and no valuable habitats for foraging Badger are located within the works area.

6.3.2 Pygmy Shrew

Pygmy Shrew is common throughout mainland Ireland and has a preference for habitats such as hedgerows and grasslands. Due to the habitats present within the proposed site Pygmy Shrew is likely to be present.

6.3.3 Irish hare

Irish Hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book. No sign of hare was recorded within the proposed development site and no suitable habitat was recorded. Irish Hare is unlikely to use this site.

6.3.4 Hedgehog

Hedgehog is also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. Generally, hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas. Due to the habitats recorded within the proposed development site, Hedgehog could potentially occur.

6.3.5 Irish Stoat

Irish Stoat is one of the species protected under regulations (Protection of Wild Animals) in 1980 which enabled Ireland to comply with the provisions of the Bern Convention of European Wildlife and Natural Habitats, which was ratified by Ireland in April 1982. This species could potentially occur within the proposed development site.

6.3.6 Red Squirrel

Red Squirrel also listed on Appendix III of the Berne Convention can be found throughout Ireland. Red squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland. This species has been recorded on 53 occasions in W76, the most recent in January 2023. Due to the habitats recorded within the site this species could potentially occur, but is it unlikely to be a significant resource for this species.

6.3.7 Sika Deer and Fallow Deer

Both species are non-native to Ireland and prefer forest with dense understorey, thickets, natural woodlands and commercial plantations, but will also forage in open grassy areas with dense cover nearby. Sika and Fallow Deer are highly opportunistic feeders, foraging on grasses to a range of shrubs and tree species. No evidence of this species was recorded during site surveys and this species is unlikely to occur.

6.3.8 Red Deer

Red deer are the largest land mammal found on the island of Ireland. Red deer are primarily grazers, but other food sources if available are taken advantage of, these include heather, dwarf shrubs and rough grasses such as *Molina* sp. found on the uplands. Red Deer have been recorded on one occasion in W76 in June 2015. No habitat suitable for this species was recorded within the proposed development site.

6.4 Reptiles and Amphibians

According to records held by the NBDC, Common Frog (*Rana temporaria*) is the only amphibian recorded from grid square W76. Common Frog is listed on Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. This species was not recorded during the site visit. While they could potentially use small stream at, this is heavily shaded and suboptimal where it occurs within the site boundary.

Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands. The species has not been recorded in the surrounding landscape (NBDC) and it is unlikely that the species occurs within the proposed development site.

6.5 Birds

The NBDC has recorded the following Annex I bird species within W76, Bar-tailed Godwit (*Limosa lapponica*), Kingfisher (*Alcedo atthis*), Common Tern (*Sterna hirundo*), Corn Crake (*Crex crex*), Dunlin (*Calidris alpina*), Golden Plover (*Pluvialis apricaria*), Great Northern Diver (*Gavia immer*), Hen Harrier (*Circus cyaneus*), Little Egret (*Egretta garzetta*), Little Gull (*Larus minutus*), Mediterranean Gull (*Larus melanocephalus*), Merlin (*Falco columbarius*), Peregrine Falcon (*Falco peregrinus*), Red-billed Chough (*Pyrrhocorax pyrrhocorax*), Red-throated Diver (*Gavia stellata*), Ruff (*Philomachus pugnax*), Sandwich Tern (*Sterna sandvicensis*) and Short-eared Owl (*Asio flammeus*). There is no suitable habitat for these Annex I species within the proposed development site boundary.

Bird species listed in Annex I of the Birds Directive are considered a conservation priority. During the survey, all birds seen or heard within the development site were recorded. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists (Gilbert *et al.* 2021). Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green

listed species are regularly occurring bird species whose conservation status is currently considered favourable. Bird species recorded during the site surveys are listed in **Table 9**.

Table 9. Birds recorded at proposed development site

Species		Conservation Status: Annex I of Birds Directive or Red/Amber List*
Blackbird	<i>Turdus merula</i>	
Blue tit	<i>Cyanistes caeruleus</i>	
Chaffinch	<i>Fringilla coelebs</i>	
Chiffchaff	<i>Phylloscopus collybita</i>	
Dunnock	<i>Prunella modularis</i>	
Mallard	<i>Anas platyrhynchos</i>	Amber list
Mistle thrush	<i>Turdus viscivorus</i>	
Robin	<i>Erithacus rubecula</i>	
Rook	<i>Corvus frugilegus</i>	
Woodpigeon	<i>Columba palumbus</i>	
Wren	<i>Troglodytes troglodytes</i>	

*Gilbert *et al.* (2021)

Generally, the treeline habitats on the boundary of the road support a mix of bird species that are relatively common in the Irish countryside. Native trees in particular, such as Oak, Ash, Hawthorn and Willow provide nesting sites and foraging areas for these common bird species. However, the location of the site adjacent to a busy road network means that it is less valuable than other, less disturbed habitats in proximity. Mallard was recorded within the stream which runs adjacent to the proposed development site. The site does not provide potential foraging resources for birds listed as SCIs for the Cork Harbour SPA.

6.6 Other species

The Owenboy catchment drains a relatively small area to the south and southwest of Cork City, serving an area of approximately 113 km² between Crossbarry and Carrigaline. The catchment is bounded to the north by the River Lee and its sub catchments (Bride, Curraheen, Glasheen and Tramore). To the west and southwest the catchment is bounded by the Bandon catchment. The catchment is separated from the coast to the south by scattered small catchments such as the River Stick. At its eastern end the Owenboy flows through Carrigaline, where it becomes tidal, and continues to its confluence with Cork harbour at Crosshaven.

The Owenboy catchment follows the pattern of other catchments in County Cork, with the river flowing from west to east, and tributaries generally rising in hills to the north and south of the main channel. The main channel itself rises near Crossbarry. The straight-line distance from here to Carrigaline is 18 km, while the greatest distance on the north-south axis is no more than 9 km. Thus the catchment forms an elongated shape between the Bride and Bandon catchments.

While the Owenboy is joined by many tributaries along its length, all are quite small and most are unnamed. The short distance between the northern and southern boundaries of the catchment limits the areas of the tributary subcatchments. The only tributary of significance is the Aughnaboy, which drains the northwest corner of the catchment and meets the main channel near Crossbarry. All other tributaries consist of small streams rarely exceeding 5 km in length. Those rising in the eastern half of the catchment are particularly short.

There are no lakes in the Owenboy catchment. The river is generally fast flowing throughout its length. There are no barriers to flow such as sluice gates, tidal barriers or hydroelectric structures present. The river is tidal to Carrigaline.

The river is known to support both Sea Trout and Brown Trout. It does not support a significant population of Atlantic Salmon although occasional individuals may occur. European Eel is likely to occur and in estuarine water species such as Grey Mullet and Flounder may also be present. As noted above, the stream within the proposed development site is of low value for fish species and while it may support trout in the lower reaches, flows are too low in the vicinity of the proposed development site to support trout.

The NBDC lists a number of threatened invertebrate species for W76C, the 2km OS grid square in which the proposed development site is located. No rare terrestrial invertebrates have been recorded within this 2km grid square. Whilst no site is without invertebrate interest, it is considered unlikely that the proposed development site would support protected invertebrate species given its small size and roadside location.

7. Water Quality - River Basin Management Plan for Ireland 2018 – 2021 (3rd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The third cycle RBMP, which was published in July 2022, aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban waste-water on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first and second cycles.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. Data relating to the watercourses within the study area is provided in **Table 10** and the location of these shown in **Figure 6**.

Table 10. WFD Status

Catchment: Lee, Cork Harbour and Youghal Bay (Code 19) – 2nd Cycle			
<p>This catchment includes the area drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy Battery, Co. Cork, draining a total area of 2,153km². The largest urban centre in the catchment is Cork City. The other main urban centres in this catchment are Ballincollig, Macroom, Carrigaline, Crosshaven, Blarney, Glanmire, Midleton, Carrigtohill, Cobh, Passage West and Belvelly. The total population of the catchment is approximately 328,854 with a population density of 153 people per km².</p> <p>Several small coastal rivers drain the area to the southeast of Cork Harbour and the area at the eastern extreme of the catchment is drained by the Womanagh River which flows into the sea on the western side of Youghal Bay.</p> <p>The Lee-Cork Harbour catchment comprises 18 sub-catchments with 92 river water bodies, three lakes, 13 transitional, six coastal water bodies and 16 groundwater bodies. There are five heavily modified and no artificial water bodies in the catchment.</p> <p>The proposed development site is located within the Owenabue [Cork]_SC_010 sub-catchment. Two out of seven river water bodies within this sub-catchment are AT RISK, Owenabue (Cork)_020 and Owenabue (Cork)_040 due to Poor biological status. Owneboy_010 is of Good ecological status but is under REVIEW due to elevated phosphate. Owenabue (Cork)_030, Hilltown_010 and Kilnaglery_010 is under REVIEW due to their unassigned status.</p> <p>Channelisation and agriculture are the likely significant pressure impacting the AT RISK water bodies. Further investigation is required so as to determine a) what is driving elevated nutrient conditions within Owenabue (Cork)_010 and Owenabue (Cork)_020 and; b) whether any issues exist within the unassigned water bodies.</p>			
Waterbodies relevant to the proposed project			
Waterbody	WFD Risk	WFD Status (2013-2018)	Pressure Category
Owenabue_Cork (040)	At risk	Moderate	Hydro morphology-Channelisation
Owenabue Estuary	At risk	Moderate	Agriculture
Cork Harbour	At risk	Moderate	Anthropogenic Pressures

Source: EPA envision mapping and www.catchments.ie

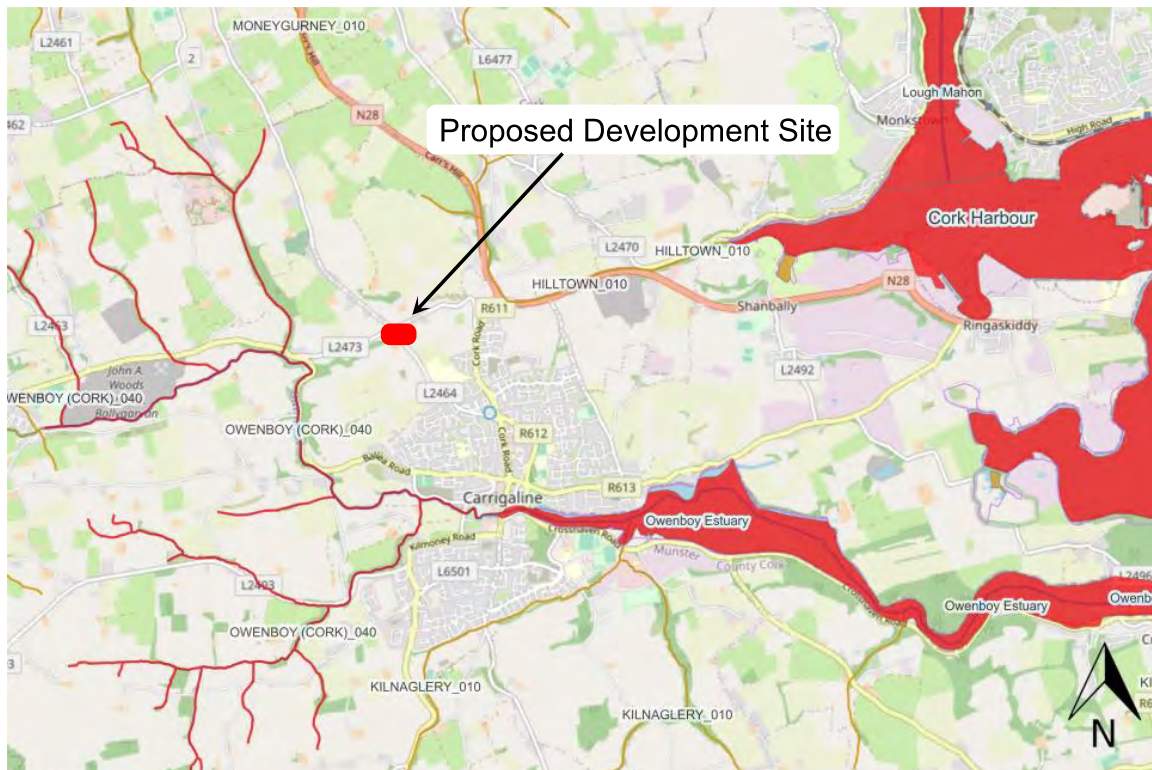


Figure 6. WFD waterbodies in the vicinity of the proposed development | Source: EPA Envision mapping <https://gis.epa.ie/EPAMaps/> | not to scale

8. Evaluation of Potential Impacts

During construction, potential impacts could arise from increased noise and disturbance which could result in the disturbance/displacement of birds and mammals. There will be a loss of terrestrial habitats. Increased dust levels during construction could have localised impacts on vegetation and habitats.

Discharges of silt and concrete were they to occur through inadequate control of surface water run-off, could impact on fisheries habitat and the aquatic ecology downstream of the proposed development site in the Owenabue River/Estuary. Minor spills of hydrocarbons during construction could impact on groundwater or surface water quality with resultant impacts on aquatic ecology.

8.1 Do Nothing' Impact

In the absence of development, treelines within the site will remain largely unchanged. Verge cutting is likely to continue in the absence of development and this would have minor and short-term impacts on treeline habitats. Invasive species may continue to spread, however they are unlikely to impact the existing habitats onsite.

8.2 Impact Appraisal

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include positive/negative, extent magnitude, duration, frequency and timing, and reversibility (IEEM, 2018).

Section 3.7 of the *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, (EPA, August 2017) provides standard definitions which have been used to classify the effects in respect of ecology. This classification scheme is outlined below in **Table 11**.

Table 11. EPA Impact Classification

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment.
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment.
Significance	Imperceptible	An effect capable of measurement but without significant consequences.
	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends.
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
Duration and Frequency	Momentary Effects	Effects lasting from seconds to minutes.
	Brief Effects	Effects lasting less than a day.
	Temporary Effects	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible Effects	Effects that can be undone.
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost.
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents.
	'Worst Case'	The effects arising from a development in the case where mitigation measures substantially fail.

9. Potential Impacts on Flora

9.1 Impacts on Habitats and Rare Flora

Impacts on terrestrial habitats are generally restricted to direct removal of habitats. Indirect impacts may occur via damage and disturbance arising from vehicular activities and storage of overburden and materials. Levels of dust during construction are predicted to be low and

effectively managed by mitigation. The impact on vegetation in adjoining habitats from wind-blown dust is predicted to be imperceptible. No rare floral species were recorded within the study area. Based on the criteria outlined by EPA 2022, as described above, the predicted impacts are detailed in **Table 12**.

Table 12. Predicted impacts as a result of the proposed development

Habitat	Ecological value (NRA guidelines)	Potential Impact
Dry meadows and grassy verge GS2	Local importance (lower value)	This habitat will be removed during construction works. Negative, slight, long-term, local impact.
Treelines WL2	Local importance (lower to higher value)	All treelines within the site boundary will be removed. In the case of higher value treelines, in particular treeline 6 which includes a mature oak tree, this will have a negative local impact, reducing foraging areas of bats and nesting habitat for birds. In the treelines dominated by non-native species such as leylandii, the impact will be reduced. Negative, slight to moderate, long-term local impact
Upland/eroding river FW1	Local importance (higher value)	This stream is currently culverted under the existing road. No changes are proposed to the stream or the existing culvert and there will be no direct impact on this habitat during construction works. Negative, not significant, long-term, local impact
Buildings and artificial surfaces BL3	Local importance (lower value)	The road surface will be upgraded and the farm building within the proposed development site boundary will be demolished. Negative, not significant, long-term, local impact
Scrub WS1	Local importance (lower value)	This habitat will be removed during construction works. Negative, not significant, long-term, local impact

9.2 Impacts from spread of invasive species

One scheduled invasive species, three cornered leek, was recorded on the south-west corner of the site. There is potential for this species to spread to semi-natural grassland and the potential for the species to form dense monocultural masses, may pose a threat to indigenous biodiversity (Downen, 2011; BSBI, 2011). The life cycle of *A. triquetrum* means it only has the potential to effect low growing spring flowers, with native bluebells considered to be at risk (Downen, 2011). In the absence of management, construction works may cause this species to spread into nearby grassland habitats. Mitigation measures, specified in **Section 13** of this report will ensure that construction works do not spread this species into nearby habitats.

Cherry Laurel will be removed during consecution works as part of the tree removal works. Mitigation measures, specified in **Section 13**, will be followed to ensure there is no impact on local habitat from tree removal works.

9.3 Impacts on Designated Site

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Report for Screening for Appropriate Assessment (AA) which has been submitted as part of this application. This report concluded the following:

The development area at Ballinrea, Carrigaline, Co. Cork either alone or in-combination with other plans and/or projects, does not have the potential to significantly affect any European Site, in light of their conservation objectives.

Therefore, a Stage 2 Appropriate Assessment is deemed not to be required.

Similarly no significant impacts effects on NHAs/pNHAs have been identified.

10. Potential Impacts on Fauna

10.1 Otter

No Otter breeding holts were recorded during site surveys and they are unlikely to occur within 150m of the proposed development. There are no habitats of significant value for Otter within the proposed development site. The small watercourse at the site will not be directly impacted by the works. In the immediate vicinity of the works area this stream is too small to be of significant value for fish. Whilst this stream has some potential for Common Frog (which are importance food source for Otter) the habitat in the immediate vicinity of the works area is suboptimal for Common Frog.

The proposed development will result in an increase in noise and disturbance during the construction phase during daytime hours. However, given Otter's largely nocturnal habits, ability to move away from short-term disturbance and ability to habituate to anthropogenic noise and disturbance, the impact on Otter during construction will not be significant.

Overall, the impact on Otter is predicted to be neutral, imperceptible and long-term.

10.2 Bats

Mature trees at the site, including one large mature Oak, could potentially provide roosting habitats for bats. However, no signs of emergence were recorded during the site survey. The

agricultural building earmarked for removal has low to negligible value for roosting bats. Whilst no signs of roosting bats were observed during site surveys, it is noted that the presence of occasional roosting bats in larger/mature trees cannot be altogether excluded. Therefore, mitigation measures have been prescribed during tree removal (and building demolition) to ensure that direct injury or mortality of bats is prevented.

Treelines at the site have the potential to provide foraging habitat for bats. Small numbers of foraging Common and Soprano Pipistrelle were recorded foraging along the treelines during the site survey. Leisler's Bat was also recorded commuting through the area. However, the numbers of bats recorded were small and activity levels were low. The location of the site adjacent to a busy road which is well lit may mean that the foraging value, particularly of mature treelines, is reduced. Lighting deters some bat species in particular *Myotis* species, from foraging (Azam *et al.* 2018). Studies have shown that illumination levels as low as 0.06 lux can influence the behaviour of bats. It is noted that Pipistrelle species appear to be more tolerant of light and disturbance (Speakman 1991; Stones *et al.* 2009; Haffner 1986). Leisler's Bats will also opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010). However, it is noted that more recently research suggests that even in light opportunistic foraging species, foraging activity may be impacted by increased lighting (Hooker *et al.* 2022).

All treelines at the site will be removed to facilitate road improvement works. This will lead to the loss of low value foraging and roosting habitat for bats. Overall, the impact will be negative, moderate and long-term at a local level.

10.3 Other Protected Mammals

Although the habitats to be directly affected may form part of the territories of various mammal species, the small size of the proposed development site and its location adjacent to a busy road means they do not provide critical resources for these species.

Increased noise and disturbance are predicted to occur during construction and to a lesser degree during operation. The predicted noise level will not be excessive in the context of normal domestic and road traffic levels in a suburban area.

The proposed development will result in the loss of treelines, dry meadows and grassy verge habitat and scrub. The impact on other mammals is predicted to be negative, slight and long-term at a local level.

10.4 Birds

The terrestrial bird species recorded within the proposed development site are typical for the terrestrial habitats onsite and are generally common. No rare or uncommon bird species or species of high conservation value were recorded and given the location of the site adjacent to a busy road, they are unlikely to occur. However, there will be a loss of common bird breeding and foraging habitat within the proposed development site i.e., treeline, scrub and semi-natural grassland.

Some displacement of feeding birds may occur during construction due to increased noise and disturbance. Disturbance can cause sensitive species to deviate from their normal,

preferred behaviour, resulting in stress, increased energy expenditure and, in some cases, species mortality.

It is noted that the area in proximity to the proposed development is subject to disturbance from the existing roads and therefore any birds which utilise this area will have habituated to moderate levels of daytime disturbance. Whilst works could potentially disrupt feeding patterns, given the availability of similar habitat in the surrounding area and the ability of birds to move away from disturbance, the impact on the feeding behaviour of these species is predicted to be slight. The most significant impact will be the loss of foraging and nesting habitat with the removal of treelines. The impact on terrestrial birds is therefore predicted to be negative, slight and long-term at a local level.

10.5 Reptiles and amphibians

Common Frog was not recorded during the site visit, however they could potentially use the stream which is culverted in part through the site boundary. As noted above, this habitat is suboptimal where it occurs within the site boundary and is unlikely to be of significant value for this species. There will be no direct impact on the stream habitat during site works and therefore, no significant impact on Common Frog is predicted to occur. The impact on amphibians is predicted to be neutral, imperceptible and long-term at a local level.

No potential impacts on reptiles have been identified.

10.6 Other species

During construction, there is potential for siltation and pollution of the local watercourse, from runoff during construction works. Given the nature (i.e., road upgrade works and site clearance adjacent to the river) and location of the works there is potential for runoff to the river in the absence of mitigation. This could result in impacts on water quality and aquatic ecology downstream of the works area.

Overall, construction works have the potential to result in a negative, slight and temporary impact to aquatic species/fisheries downstream at a local level in the absence of mitigation measures. Mitigation measures have been specified in **Section 13** of the report to ensure there will be no local impact on water quality during construction works.

No significant impact on terrestrial invertebrates is predicted to occur from habitat removal during construction works. Impacts on terrestrial invertebrates will be neutral, imperceptible and short-term at a local level.

11. Potential impact on water quality

Potential impacts on aquatic habitats which can arise from surface water emissions associated with the construction phase of the proposed development include increased silt levels in surface water run-off, inadvertent spillages of hydrocarbons from fuel and hydraulic fluid and spillage of cement.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals into the aquatic environment via direct means, surface water run-off or groundwater contamination. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion

or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate fish and can have a direct toxic effect. The lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars). In the case of turbulent waters, the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically contaminated and their respiratory capacity reduced (Svobodova *et al*, 1993). However, any such spills, in the unlikely event of their occurrence, would have a minor localised impact and would be negligible in the context of the available dilution downstream in the Owenabue River and Owenabue Estuary.

Mitigation measures have been included in **Section 13** to ensure there is no impact on water quality or aquatic receptors from surface water runoff during the construction phase. Following the implementation of mitigation measures, no significant impact on water quality and aquatic ecology during construction is predicted to occur. The impacts on water quality during construction are predicted to be negative, imperceptible and temporary.

It is noted that during operation, the existing over the edge (OTE) drainage system shall be replaced with a positive drainage system to comply with current regulations (TII Section 7, and CCC Section 5.15 & 5.21). Surface water will be collected through kerb and gullies which will discharge to a proposed pipe network system and conveyed to a bypass petrol interceptor prior to out-falling to the stream via the existing culverts. The impacts on water quality during operation are predicted to be negative, imperceptible and temporary.

Impacts on water quality within Natura 2000 sites has been specifically addressed in the AA screening which accompanies this application.

12. Cumulative Impacts

Cumulative impacts on fauna chiefly relate to increased noise and activity levels and potential impacts on water quality. Cumulative impacts from noise/disturbance are likely to be most pronounced during construction. This is a short-term impact which will be localised and managed by mitigation measures. As this proposed development is not predicted to significantly increase long-term noise and disturbance levels or impact significantly on water quality, no significant cumulative impacts have been identified.

13. Mitigation Measures

The mitigation measures have been drawn up in line with current best practice and mitigation measures will function effectively in preventing significant ecological impacts.

These mitigation measures take into account of CIRIA Guidelines *C532 Control of Pollution from Construction Sites* and CIRIA 2010 (Third Edition C692) *Environmental Good Practice on Sites CIRIA UK* in its preparation and the execution plan shall be prepared in full compliance with these guidelines.

Construction best practice measures (of relevance in respect of any potential ecological impacts) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- NRA (2010) *Guidelines for the Management of Noxious Weeds and Non- Native Invasive Plant Species on National Roads*. National Roads Authority, Dublin.
- Murphy, D. (2004) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*. Eastern Regional Fisheries Board, Dublin.
- IFI (2016) *Guidelines on protection of fisheries during construction Works in and adjacent to waters* (IFI, 2016)
- IFI (2021). *Planning for watercourses in the urban environment*.
- E. Murnane, A. Heap and A. Swain. (2006) *Control of water pollution from linear construction projects. Technical guidance (C648)*. CIRIA.
- E. Murnane et al., (2006) *Control of water pollution from linear construction projects. Site guide (C649)*. CIRIA.

All personnel involved with the project will receive an on-site induction relating to operations and the environmentally sensitive nature of the proximity the local watercourse and downstream aquatic receptors to re-emphasize the precautions that are required as well as the mitigation to be implemented. All staff and subcontractors have the responsibility to:

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
- Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to their line manager;
- Monitor the workplace for potential environmental risks and alert the immediate line manager if any are observed; and
- Co-operate as required, with site inspections.

13.1 Surface Water – Construction

The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (Masters-Williams et al 2001).

- The site boundary will be established before works commence and this boundary will be adhered to for the duration of works with no works or other site activities occurring outside this boundary.
- No machinery will be stored onsite as they will return to an off-site compound at the end of each working day

- Measures shall be put in place to minimise surface water run-off from the works area. The most vulnerable element to be protected on the site is the local watercourse which is culverted in part under the existing road. Silt fencing will be installed on the boundary of the stream (on the eastern and western roadside verge). Terrastop Premium Silt Fence (or similar) will be used.
- Mixing of materials will occur within the site compound and all wash water and waste/grey water will be stored securely.
- Soil excavation will be completed during dry periods and undertaken with excavators and dump trucks.
- Excavated material will be removed on an ongoing basis and storage of excavation is unlikely to be required.
- No topsoil storage will be required onsite for the completion of works.
- Waste separation shall follow standard construction site protocols.
- Welfare facilities shall be provided in accordance with legal requirements. Sanitary facilities shall have proprietary foul water storage facilities which shall be tankered away on a regular basis.
- During construction, all activities will cease during red weather warning for rainfall.

13.2 Management of hydrocarbons and concrete

No hydrocarbons will be stored onsite as all machinery will be taken off site at the end of each working day.

A hydrocarbon spill kit shall be available on site at all times to deal with any minor hydrocarbon spill or hydraulic fluid leakage. A detailed spillage procedure will be put in place and all will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. Spill kits will be maintained on site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Environment Protection Agency, Cork County Council, Inland Fisheries Ireland and the NPWS shall be notified.

A 'just in time' delivery policy will operate for all materials required onsite e.g., tarmacadam cement etc. This will ensure that the no storage of materials is required onsite.

All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site.

Machinery including hand-tools will never be washed in watercourses or drainage ditches.

Works will not take place during heavy rain when runoff is likely due to excess water. Shuttering will be designed to accommodate small increases in the volume of material contained within the shuttered area due to rainfall. Any excess tarmacadam or other construction material will be disposed of by removal offsite.

13.3 Invasive Species

An invasive species management plan (ISMP) has been submitted with this application. This includes details on all invasive species control measures to be followed during construction works. The plan will be developed with up to date survey data prior to commencement of works.

13.4 Ecology

13.4.1 General

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1st March to the 31st August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided.

To prevent incidental damage by machinery or by the deposition of spoil during site works, woodland, hedgerow, tree and scrub vegetation which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. There are existing hedgerows located on the southern and western property boundaries that are to be retained and protected (in accordance with the recommendations included in BS 5837: 2012). This covers:-

- The provision of adequate fencing around trees to prevent harmful encroachment / damage by vehicles or storage of materials during construction;
- The avoidance of any reduction in levels in the root protection area of individual trees; and
- Inspect for disease, dead wood or storm damage and, if necessary, treat or carry out tree surgery accordingly (using advice of qualified tree surgeon if necessary).

Further detail on tree protection measures are included in the Park Hood Landscape Management and Maintenance Plan which has been included with this application.

Habitats that are damaged and disturbed will be reinstated and landscaped once construction is complete. Further detail is included in the landscape drawings which have been submitted with this application.

13.4.2 Bats

A number of trees will be removed prior to construction. Although mature trees with the potential to be of significant value as bat roosts are absent from the site, the following precautionary measures will be implemented during the removal of semi-mature and mature trees.

- A supervising ecologist will work with the contractor to ensure that trees earmarked for retention are adequately protected.

- Tree-felling will ideally be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- Tree will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused toward watercourses or boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- If bats are recorded by the bat specialist within any trees no works will proceed without a relevant derogation licence from the NPWS.

14. Conclusions

Overall, the development will impact primarily on habitats of lower to higher local importance. There will also be a loss of common habitats which have which are used as foraging grounds for common bird and mammal species. Sections of treelines on the approach to the road junction will be removed to facilitate sightlines. These have been identified as providing low local foraging value for bats and low to negligible roosting value. The removal of these habitats will have a negative, moderate and long-term impact on local bat populations. Impacts on birds and other local fauna are predicted to be negative, slight and long-term impact at a local level.

During construction, there will be increased noise and disturbance which could potentially impact on birds and mammals. However, the impact will short term and will not be significant. Given the availability of alternative habitat in the vicinity, the impact on birds, mammals and other wildlife is likely to be slight and short-term.

Design measures and mitigation measures to protect water quality will ensure that no adverse impact on aquatic ecology. An invasive species management plan has been submitted with this application to ensure there will be no risk of the spread of invasive species during construction works.

No significant impacts on European sites (SAC/cSAC/SPA) have been identified. No significant impacts on National sites (NHA/pNHA) have been identified.

References

- BSBI. 2011. *Allium triquetrum* [Online]. Non-native species secretariat: GB non-native organism risk assessment scheme. Available: <http://www.nonnativespecies.org/index.cfm?pageid=143>
- CIRIA (2001). Control of water pollution from construction sites. E. Murnane, A. Heap, A. Swain (eds).
- DOWEN 2011. GB Non-native Organism Risk Assessment for *Allium triquetrum*. <http://www.nonnativespecies.org/>.
- EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements. Environmental Protection Agency.
- EPA (2003) Advice notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency.
- EPA (2015) Advice Notes for Preparing Environmental Impact Statements Draft September 2015
- EPA (2015) Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, draft September 2015);
- Fossitt J A (2000) A Guide to Habitats in Ireland. The Heritage Council, Kilkenny
- Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 – 2026". *Irish Birds* 43: 1-22
- Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods - a Manual of Techniques for Key UK Species*. RSPB: Sandy.
- Heritage Council, 2011 Best Practice Guidance for Habitat Survey and Mapping
- IEEM (2006) Guidelines for ecological impact assessment in the United Kingdom.
- Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- NRA (2005a). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Road Authority.
- NRA (2005c). Guidelines for treatment of bats during construction of National Road Schemes. National Road Authority
- NRA (2009). Guidelines for assessment of ecological impacts of National Road Schemes. National Road Authority.
- NRA. (2006b). Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. National Roads Authority.

Appendices

Appendix 1. NRA 2009 Guidelines

Table 1: Examples of valuation at different geographical scales

Ecological valuation: Examples
<p>International Importance:</p> <ul style="list-style-type: none"> • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network.⁴ • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level)⁵ of the following: <ul style="list-style-type: none"> ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). <ul style="list-style-type: none"> • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). <ul style="list-style-type: none"> • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).⁶
<p>National Importance:</p> <ul style="list-style-type: none"> • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level)⁷ of the following: <ul style="list-style-type: none"> ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Site containing 'viable areas'⁸ of the habitat types listed in Annex I of the Habitats Directive.
<p>County Importance:</p> <ul style="list-style-type: none"> • Area of Special Amenity.⁹ • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at the County level)¹⁰ of the following: <ul style="list-style-type: none"> ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.

- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, 11 if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)¹² of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

4 See Articles 3 and 10 of the Habitats Directive.

5 It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

6 Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

7 It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

8 A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

9 It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

10 It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

11 BAP: Biodiversity Action Plan

12 It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle