The Development of 88 Dwellings, Kilcarbery Co. Dublin

Ecological Impact Assessment

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South Dublin
County Council

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Contract

This report describes work commissioned by Therese Pender of South Dublin County Council, by an email dated 28th July 2023. Michael Coyle of JBA Consulting carried out this work.

Prepared by ..... Michael Coyle BA (Hons), MSc

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…….. Principal Ecologist

Purpose

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Abbreviations

AA	Appropriate Assessment
BAP	Biodiversity Action Plan
BoCCI	Birds of Conservation Concern in Ireland
DoEHLG	Department of Environment, Heritage and Local Government
CIEEM	Chartered Institute of Ecology and Environmental Management
EC	European Communities
EcIA	Ecological Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information Systems
GSI	Geological Survey Ireland
INNS	Invasive Non-Native Species
IAQM	Institute of Air Quality Management
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Service
pNHA	Proposed Natural Heritage Area
QI	Qualifying Interest
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
ZoI	Zone of Influence

1 Introduction

JBA Consulting Ireland Ltd. has been commissioned by Therese Pender on behalf of South Dublin County Council (SDCC) to undertake an Ecological Impact Assessment (EcIA) for a proposed development of 88 dwellings and associated landscaping works in Kilcarbery Co. Dublin.

1.1 Aims

The aims of this EcIA are to:

- Establish baseline ecological conditions to enable identification of potentially important ecological features within the zone of influence of the project
- Determine the ecological value of identified ecological features
- Assess the significance of impacts of the proposed project on ecological features of value
- Identify avoidance, mitigation or compensatory measures
- Identify residual impacts after mitigation and the significance of their effects
- Identify opportunities for ecological enhancement

1.2 Site location

The project is located in Kilcarbery, south of the townland of Deansrath, in the south-west suburban area of Dublin. The location of the site is shown in Figure 1-1. The north of the site runs along the along the Upper Nangor Road, while the south of the site is adjoining an area under construction which is to accommodate the development of 1000 homes. There are no watercourses available on site, and the nearest watercourse is the River Camac (Camac_030) which is located approximately 0.6km south-east of the development area.

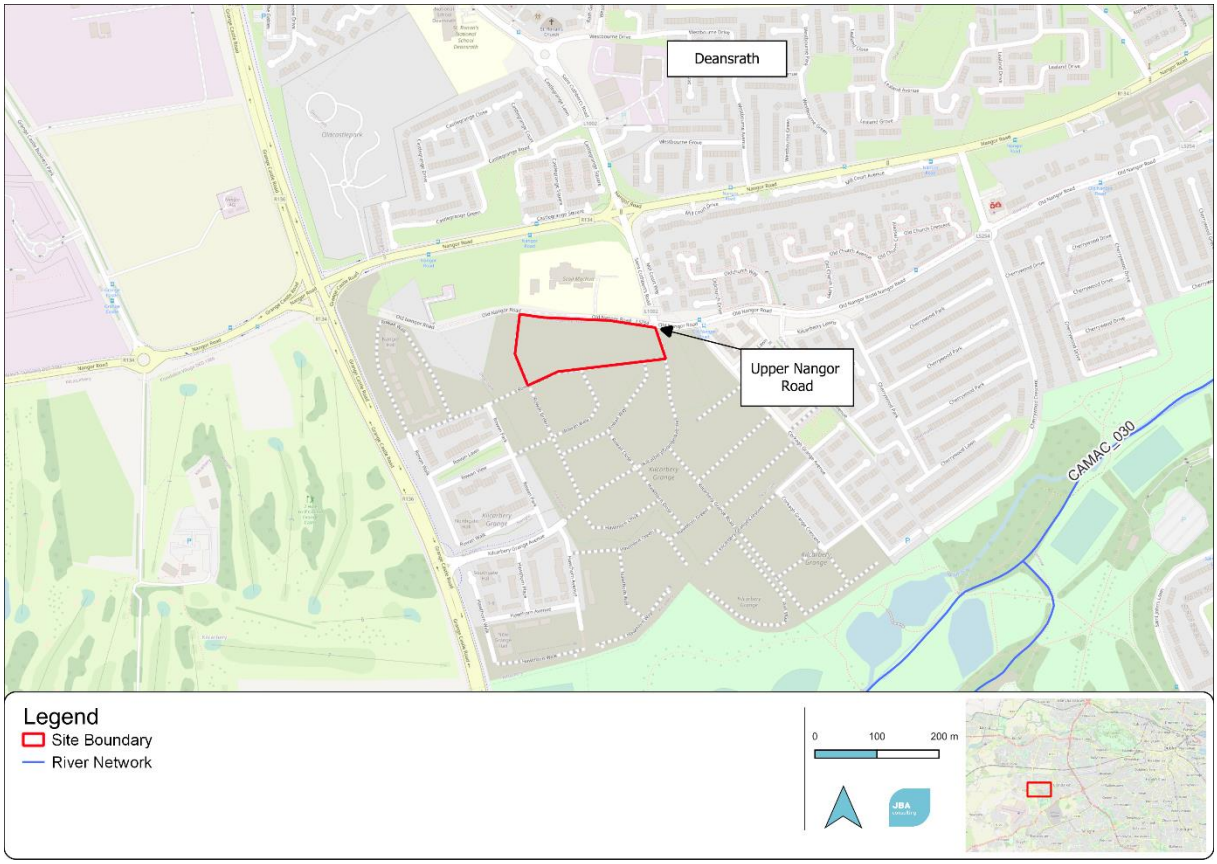

Figure 1-1: Site location (© OpenStreetMap contributors, 2023)

2 Project Description

2.1 Proposed project

The proposal has been prepared on behalf of South Dublin County Council as a Part 8 application for a residential development, consisting of 88 residential units on undeveloped lands measuring c. 2.03 hectares adjoining the Upper Nangor Rd, Kilcarbery Grange, Dublin 22.

The proposed development consists of a mix of 88 units consisting of a variety of house and duplex types. The units proposed include 44 no. 3bed 2 storey houses, 8 no. 4 bed 2 storeys houses, 36 no. duplex units (varying from 1 to 3 beds) within 3 storey duplex blocks. The development includes 100 no. surface car park spaces and 110 no. bicycle parking spaces, above ground sustainable urban drainage measures, an ESB kiosk, Irish Water below-ground foul pumping station, proposed new roads, footpath and cycle-paths (including works to provide a cycle-path along a portion of the Upper Nangor Rd), public open space areas, landscape works, bin/bicycle stores and all associated ancillary site development works.

These details can be seen in the Site Layout Plan, which can be viewed in Appendix A.

2.1.1 Duration of the Works

The construction of the proposed site will last approximately 18 months.

2.1.2 Surface Water Drainage

During the construction phase of the project, there is a designed surface water network which directs water towards a site low point outfall within the Kilcarbery site network, at predevelopment run-off rates for the catchment area.

During operation of the project, the surface water design elements are implemented to prevent the project from altering the current pre-development run-off rates of the site, and will be achieved through the following:

Attenuate Storm-water runoff: Storm water provisions in place include rain gardens, green spaces, tree pits, infiltration trenches and permeable paving as well as strategically positioned above ground detention basin and below ground Bioretention areas. Run-off directed to the rear of housing is directed to above ground rain gardens (at source). Up to significant Rainfall Events 3% of the annual exceeded probability , no run-off will leave the individual development plots during these events and all run-off will either be taken up by planting or allowed to soak naturally to the underlying geology.

Reduce Storm-water runoff: The site's rain gardens, green spaces, tree pits, infiltration trenches, control manholes and hydro brakes will be in place in order to reduce time of concentration and reduce runoff leaving the site in terms of overall volume as well as reduced peak run off to greenfield rates.

Reduce pollution impact: Infiltration is used to manage the majority of treatment volumes within the site. The run-off from roads, where there is no green space immediately alongside, is discharged via dropped kerbs into tree pits, with a gully downstream that also feeds into the tree pit. This gully has a high-level overflow which is directed into the drainage network. Interceptors are provided as a second line of defence on exit from the site to watercourses or downstream piped infrastructure.

Replication of the natural characteristics of rainfall runoff for the site: The project is designed to allow for the infiltration of water to the underlying geology for the majority of rainfall events as well as take up by planting both within curtilage and in open green spaces in varying forms. Green spaces are all passively drained to the underlying soil and where possible (subject to levels, safety, etc) are planted to allow for passive take up by plants or soakage directly to ground water. Water is also held at various locations as part of the biodiversity strategy.

Recharge the groundwater profile: Rainfall is allowed to infiltrate to the underlying geology without passing to the site wide conveyance network, which will maintain pre-development levels of recharge and percolation rates.

These measures are in line with SDCC Sustainable Drainage Explanatory Design & Evaluation Guide and the Greater Dublin Regional Code of Practice for Drainage Works (Dublin City Council, 2021). The first objective of the Code of Practice is Compliance with best environmental practices and relevant environmental legislation such as the Water Framework Directive.

2.1.3 Foul Water

The wastewater drainage for the site follows Irish Water's code of practice and standard details. Foul water is directed towards an onsite pumping station, which will then be pumped to a gravity network to the north of the site along Upper Nangor Road, before being treated in the Ringsend Wastewater Treatment Plant.

2.1.4 Site Lighting Plan

The lighting for the project includes the installation of a series of 6m high lighting columns, with a warm white light spectrum of 3000k throughout the housing estate of the project.

The Lighting Plan can be viewed in Appendix B

2.1.5 Landscape Plan

The landscape plans of this project include the creation of two linear park areas, along with the planting of linear and standing trees features, shrub and hedgerow features throughout the site boundary, consisting of a mixture of native trees, cultivars, and non-native species. The inclusion of this planting and parkland will connect the development to the wider environment.

In addition, there is also the inclusion of sustainable drainage features, including the planting of swales and wetland attenuation areas which will be sown with a mixture of native wildflower seeds.

The Landscape Plan can be viewed in Appendix C

3 Methodology

3.1 The EcIA Team

This EcIA was completed by JBA Ecologist Michael Coyle, BA (Hons), MSc and the report has been reviewed by JBA Principal Ecologist Patricia Byrne, BSc (Hons), PhD, MCIEEM.

These staff members thus fulfil the Environmental Impact Assessment (EIA) Directive personnel requirements of 'competent persons'.

3.2 Policy and Legislation

Policy and legalisation for nature conservation; and protected and priority species relevant to the proposed project is provided in Appendix D.

3.3 Methods

This EcIA assesses the ecological features present within the site and its surrounding area (the Zone of Influence (ZoI)) in relation to the proposed works. This allows for identification of the potential impacts of the proposed works upon the ecological features of the site at an early stage, whilst identifying the potential ecological constraints upon the proposed works. The assessment is based on a desk-based assessment, which determines the baseline conditions at the site of the proposed works, and site surveys, which provided information on habitats and species present on the site and its surroundings.

This EcIA will outline the findings of the desk-based assessment and the surveys and identify any potential impacts of the proposed works on ecological features within the ZoI of the site; and propose mitigation measures to avoid or reduce impacts where necessary.

3.4 Guidance

This assessment was conducted in accordance with the following guidance documents:

- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports Environmental Protection Agency (EPA, 2022).
- Best Practice Guidance for Habitat Survey and Mapping, The Heritage Council. (Smith et al., 2011b)

3.5 Baseline

To determine the baseline conditions at the site a review of all available information was made. When determining the pre-work conditions on-site, including the presence or absence of protected habitats and/or species, the precautionary principle was used where limited information was available.

A desk-based assessment was carried out to collate information regarding protected/notable species and statutorily designated nature conservation sites in, or within close proximity to, the study area. This included a data search for protected and notable species using the National Biodiversity Data Centre (NBDC) Mapping System (NBDC, 2023). A customised 2km polygon was created to extract all the species data from the project site and its surrounding area, while an extended customised 5km polygon was created to extract all species data in the set Zone of Influence for this project.

Information for statutory designated sites including Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, Natural Heritage Areas (NHAs) and proposed NHAs (pNHA) was collected from the online resources provided by the National Parks and Wildlife Service (NPWS).

Other information on the local area was obtained, including:

- EPA, 2023a. EPA Catchments.ie [online]. Available online at: https://www.catchments.ie/maps/
- EPA, 2023b. EPA Maps [online], Next Generation EPA Maps. Available online at: https://gis.epa.ie/EPAMaps/

- GSI, 2023. Geological Survey Ireland Spatial Resources website, available at https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228
- IFI, 2023. Water Framework Directive Fish Ecological Status 2008-2021 Available online at: https://opendata-ifigis.hub.arcgis.com/datasets/IFIgis::water-framework-directive-fish-ecological-status-2008-2021/explore?location=53.365760%2C-6.414157%2C14.45
- NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessment. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neil. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS, 2019c. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessment. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neil. . National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- Aerial photography available from www.osi.ie and Google Maps http://maps.google.com/ ;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie
- National Biodiversity Data Centre, 2023 – Species Distribution Maps; Available online at www.biodiversityireland.ie Accessed on various dates;
- All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians and fish;
- Water Framework Directive water maps (available online at http://www.wfdireland.ie/maps.html and https://www.catchments.ie/); and
- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (available online at http://www.iucnredlist.org).

3.5.1 Zone of Influence

The project will primarily affect the site only, but a wider Zone of Influence (ZoI) is utilised for impacts relating to noise disturbance (300m); air pollution (500m, IAQM, 2023); groundwater and surface water pollution (5km), with an additional 15km buffer for hydrologically connected transitional and coastal waters; and any supporting habitat for Qualifying Interest (QI) species within any of the above distance buffer.

3.5.2 Field Surveys

A general ecological site walkover, including habitat mapping, hedgerow mammal and preliminary bat roost surveys were conducted on the 7th of September by Ecologist Michael Coyle of JBA Consulting to inform the initial ecological baseline of the site.

The ecological walkover survey recorded habitats and protected species, following guidance outlined in the documents below:

- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009)
- Collins, J. (Ed.), 2016. Bat Surveys for Professional Ecologists: Good Practise Guidelines (3rd Edition)

Aerial photographs and site maps assisted the habitat survey. Habitats have been named and described following A Guide to Habitats in Ireland by Fossitt (2000). Nomenclature for higher plants follows that given in The New Flora of the British Isles 4th Edition (Clive Stace 2019). Identification of Irish plants generally follows Webb's An Irish Flora (Parnell and Curtis, 2012).

3.5.3 Water Framework Directive

In response to the increasing threat of pollution and the increasing demand from the public for cleaner rivers, lakes and beaches, the EU developed the Water Framework Directive (WFD). This Directive is

unique in that, for the first time, it establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats under one piece of environmental legislation for all European member states.

The WFD (Directive 2000/60/EC) is a substantial piece of EU water legislation that came into force in 2000. The overarching objective of the WFD is for the water bodies in Europe to attain Good or High Ecological Status. The Environment Protection Agency (EPA) is the competent authority in Ireland responsible for delivering the WFD. River Basin Management Plans (RBMP) have been created which set out measures to ensure that water bodies in the country achieve 'Good Ecological Status'.

Good Ecological Quality will depend on the quality of the individual quality elements on which the Ecological status is scored; namely the biological, chemical and morphological condition in a particular water body. Any reduction in any of these elements will result in a reduction of the overall ecological status.

3.5.4 Water Framework Status and Objectives

It is understood that Draft River Basin Management Plan for Ireland (2022-2027) has been adopted by all local authorities in order to achieve the aims of the WFD. The Plan sets out the new approach that Ireland will take to enhance protection, prevention, and monitoring of Irish waterbodies. The main actions include:

- Improve waste water treatment;
- Conservation and leakage reduction;
- Scientific assessment of water bodies and implementation of local measures;
- A new collaborative Sustainability and Advisory Support Programme;
- Dairy Sustainability Initiative;
- Development of water and planning guidance for local authorities;
- Extension of Domestic Waste Water Treatment Systems grant Schemes; and
- A new Community Water Development Fund

Regardless of their current quality, surface waters should be treated the same in terms of the level of protection and mitigation measures employed, i.e., there should be no negative change in status.

The third and current cycle aims to build particularly on the initiatives of the second cycle, particularly the governance and implementation structures, and to improve the establishment of Irish Water, An Fóram Uisce (The Water Forum), the Local Authority Waters Programme and the Agricultural Sustainability Support and Advisory Programme.

3.6 Screening of Ecological Features

The ecological features identified during the walkover surveys and from desk-based assessments were reviewed.

An informal screening process is presented at the start of the results section to ensure that the assessment focuses only on features where the impact could have important consequences for biodiversity (valued ecological features). Any features which are important beyond the site level were identified for further evaluation. Ecological features with little or no value beyond the site level were screened out and a short statement explaining this is given in the screening section.

An Appropriate Assessment (AA) Screening Report has been produced separate to this EcIA (JBA, 2023), to assess the potential for effects on Designated Natura 2000 sites. The AA Screening Report concluded there was **no potential for adverse significant effects on European sites** arising from the proposed development, either alone or in-combination with other plans or projects.

3.7 Assessment of the Effects on Features

Ecological features include nature conservation sites, habitats, species assemblages/ communities, populations or groups of species. The assessment of the significance of predicted impacts on ecological features is based on both the 'value' of a feature, and the nature and magnitude of the impact that the project will have on it. The impact is based on the project which includes a certain amount of designed-in mitigation, including construction best practice measures that will be implemented with a high degree of certainty.

3.8 Valuation of Receptors

The value of designated sites, habitats and species populations is assessed with reference to:

- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations).
- Any social benefits that habitats and species deliver (e.g., relating to enjoyment of flora and fauna by the public).
- Any economic benefits that they provide.

The valuation of designated sites considers different levels of statutory and non-statutory protection. Assessment of habitat depends on several factors, including the size of the habitat, its conservation status and quality. The assessment also takes account of connected off-site habitat that may increase the value of the on-site habitat through association. Valuation of species depends on a number of factors including distribution, status, rarity, vulnerability, and the population size present.

Designated sites, habitats and species populations have been valued using the scale in Table 3-1.

Table 3-1: Examples of criteria used to define the value of ecological features (derived NRA, 2008, rev. 2009)

Level of Value	Examples of Criteria
International	An internationally important site e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (or a site considered worthy of such designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive). Designated shellfish waters. Major fisheries area.
National	A nationally designated site e.g. Natural Heritage Area (NHA), a proposed Natural Heritage Area (pNHA), statutory Nature Reserve, or a site considered worthy of such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on The Wildlife Act 1976 or The Wildlife (Amendment) Act 2000. A species included in the Irish Red Data Lists/Books. Significant populations of breeding birds.
Regional/County (County Dublin)	Species and habitats of special conservation significance within County Dublin. An area subject to a project/initiative under the County's Biodiversity Action Plan. A regularly occurring substantial population of a nationally scarce species.
Local (works site and its vicinity)	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the local area. Species of national or local importance, but which are only present very infrequently or in very low numbers within site area.
Less than local	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species.

Guidance published by CIEEM (2018) recommends breaking down the importance of ecological features in a geographic context similar to the NRA guidance shown in Table 3-1 with the following frame of reference to be adapted to local circumstances.

- International and European

- National
- Regional
- Metropolitan, County, vice-county or other local authority-wide area
- River Basin District
- Estuarine system/Coastal cell
- Local

The NRA (2009) guidance is congruent with this CIEEM (2018) guidance and includes a 'Less than local' level. The NRA (2009) guidance on geographic criteria for ecological valuation, as described in Table 3-1 is followed in this report.

Ecological Valuation may also be considered of Local Importance (higher value) or Local Importance (lower value) (Table 3-2).

Table 3-2: Examples of criteria used to define the value of ecological features of local importance (NRA, 2009)

Level of Value	Examples of Criteria
Local Importance (higher value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan (BAP), if this has been prepared. Resident or regularly occurring populations (assessed to be important at the Local level) 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.

3.8.1 Magnitude of Impacts

Ecological effects or impacts can be described and categorised in a number of ways. Examples of relevant terms are listed in the table below.

Table 3-3: Categories of Effects (derived EPA, 2022a).

Description	Categories of Effects
Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation

Description	Categories of Effects
	or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects	**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 Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects 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 Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Describing the Probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	**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 Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.

Description	Categories of Effects
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment. Which are not a direct result of the project, often produced away from the project site of because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	Do-nothing Effects The environment as it would be in the future should the subject project not be carried out.
	Worst Case Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

3.8.2 Significance of impacts

The overall significance of an impact can be derived from the total description of the effect compared against the sensitivity and significance (value) of the receptor as shown overleaf in Figure 3-1 which is taken from the EPAs EIAR Guidelines (EPA, 2022). The context and character of the receptor must also be assessed, such as its position in relation to the effect and its connectivity to the effect, however this should be determined before assessing the significance of the impact.

The total description of the effect includes the character, magnitude, probability and consequences of the effect as described in Table 3-4 which are combined to give a general description of the effect on an ordinal scale from Negligible to High. The sensitivity and significance of the receptor is also described on an ordinal scale from Negligible to High.

The placement of the general description of the effect, and the sensitivity/significance of the receptor on this scale is determined by a Competent Person (a qualified ecologist in this case) as they interpret the qualities of the effect from the categories listed in Figure 3-1 and the receptors sensitivity and significance. Level of significance, also described as value of the receptor is previously set out in sub-section 3.8 above. Sensitivity of the receptor is assessed by the Competent Person based on the receptor's characteristics and how susceptible to impact they are from the type of effect.

The overall significance of an effect is then categorised into one of the following seven classifications:

- Imperceptible
- Not Significant

- Slight
- Moderate
- Significant
- Very Significant
- Profound

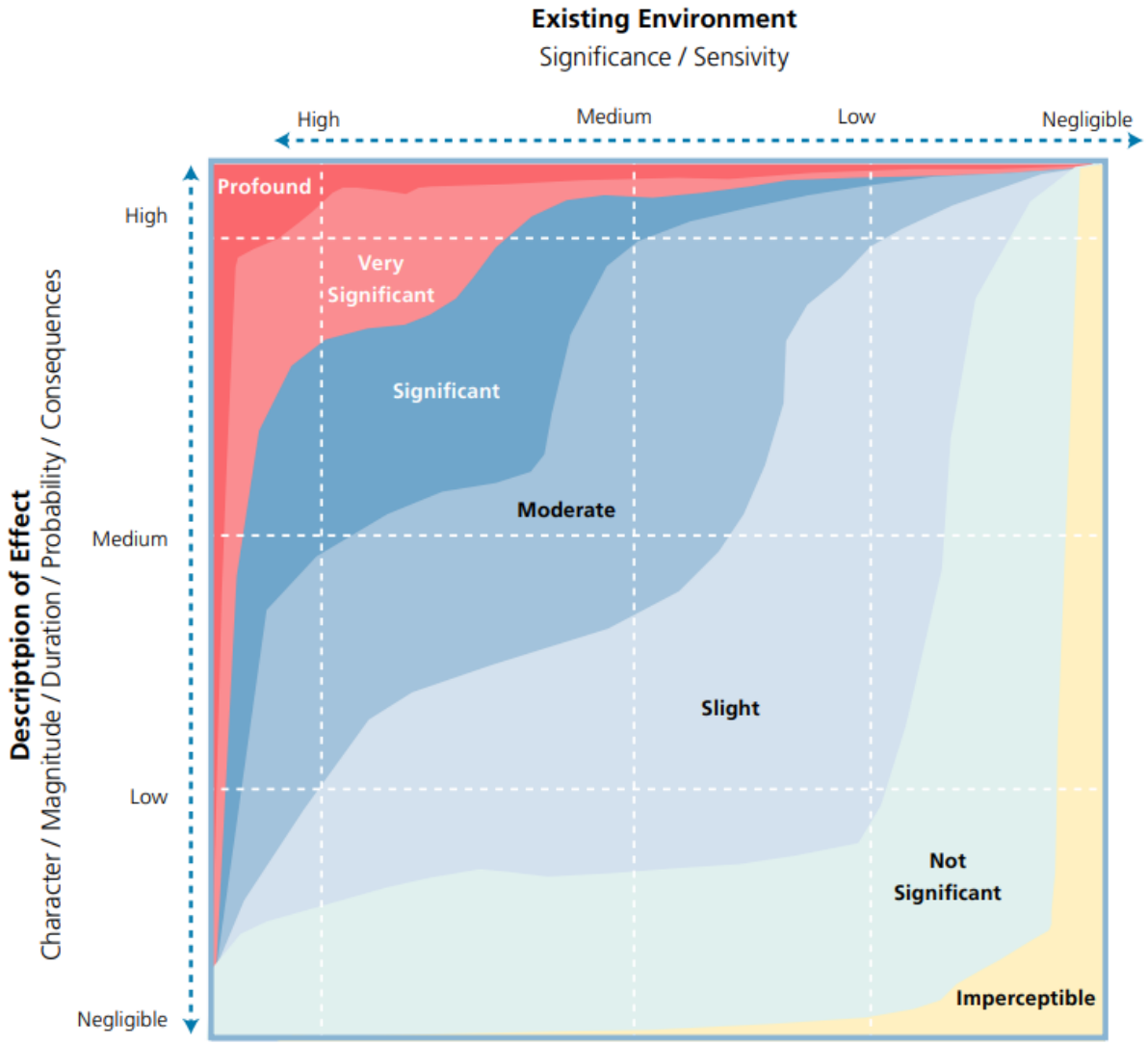

Figure 3-1: Chart showing the typical classifications of the significance of effects (EPA, 2022)

This chart has been interpreted in Table 3-4 as a significance of impacts matrix below, the scale has been ordered into an upper and lower bound for each qualitative category, so that degrees of significance within subcategories can be interpreted by the Competent Person.

Table 3-4: Significance of impacts matrix (derived from Figure 3-1, re EPA, 2022)

Magnitude of impact	Sensitivity/ Value of Receptor							
	High +	**High -**	**Medium +**	**Medium -**	**Low +**	**Low -**	**Negligible +**	**Negligible -**
High +	Profound	Very significant	Very significant	Significant	Moderate	Moderate	Not Significant	Imperceptible
High -	Very Significant	Very significant	Significant	Moderate	Moderate	Slight	Not Significant	Imperceptible
Medium +	Very Significant	Significant	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Medium -	Significant	Moderate	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Low +	Moderate	Slight	Slight	Slight	Slight	Slight	Not Significant	Imperceptible
Low -	Slight	Slight	Slight	Slight	Slight	Not Significant	Not Significant	Imperceptible
Negligible +	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Not Significant	Not Significant	Imperceptible
Negligible -	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Imperceptible	Imperceptible	Imperceptible

3.8.3 Residual Impacts

The project is assessed including some designed-in mitigation (e.g., appropriate drainage design). This is done where mitigation is proven to be effective and will be implemented effectively with a high certainty. Where significant residual impacts are still identified, further mitigation measures will be proposed as part of the Ecological Impact Assessment process to avoid, reduce or minimise them. Each impact assessment section assigns a final significance level to the impact described, which considers and includes the implementation of any stated mitigation measures; these are the residual impacts.

3.9 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features. Potential sources of cumulative impacts were sought within an area where there is the potential for a significant impact on a site or species. The plans and projects identified as potential sources of cumulative impacts are described in Section 5.

3.10 Limitations and Constraints

This EcIA is based on ecological site surveys and existing data from the above-mentioned sources. The report necessarily relies on some assumptions and is inevitably subject to some limitations. These do not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for. However, the site surveys have followed CIEEM (2019) Advice note on the lifespan of ecological reports and surveys. Any changes to the proposed works will require an assessment by a suitably qualified ecologist to determine if re-assessment is required.
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where possible.
- The precautionary principle is used at all times when determining potential ecological sensitivity of the site.
- Ecological surveys were conducted outside of the optimal window for vegetation and invertebrates (Early-September 2023), as such, some vegetation species may not have been present at the time of survey efforts, however, given the nature of the site, it is not anticipated that there would be any rare present

4 Baseline Conditions

These baseline conditions present information gathered from existing reports and desk-based sources as detailed in Section 3.6 and the site visit conducted on the 7th of September 2023.

4.1 Desk-based Assessment

4.1.1 Designated Sites

This section lists the designated sites of international and national importance. The ZoI for this project is a 5km general radius and any 15km downstream hydrological connection (including transitional waters buffer) for statutory sites; and a general 5km radius for non-statutory sites. **There are no statutory or non-statutory sites within these buffers that are at risk from the development.** Within Appendix E, Table E-1 lists these designated sites with their respective importance and distance from the proposed site development, while Figure E-1 and Figure E-2 display their proximity to the site. Table E-2 and Table E-3 lists site descriptions and their respective ecological features.

4.1.2 Screening of designated sites

An AA Screening has been carried out for this project by JBA (2023). Following initial screening, and based upon best scientific judgement it is concluded that **adverse significant effects are not anticipated** from the project on the following Natura 2000 sites within the Zone of Influence:

- South Dublin Bay SAC [000210]
- North Dublin Bay SAC [000206]
- South Dublin Bay and River Tolka Estuary SPA [004024]
- North Bull Island SPA [004006]
- North-west Irish Sea cSPA [004236]

The pNHA sites below, are being **screened out** due one or more of the following: lack of hydrological connectivity (surface water and groundwater) and/or distance from the proposed site; and the development's scale (capacity for dust generation):

- Grand Canal pNHA [002104]
- Liffey Valley pNHA [000128]
- North Dublin Bay pNHA [000206]
- South Dublin Bay pNHA [000210]
- Dolphins, Dublin Bay pNHA [000201]

4.1.3 Protected Species

National Biodiversity Data Centre (NBDC)

Records of protected flora and fauna including invertebrates, amphibians, fish, birds and mammals collated from the NBDC (2023) database, present within the surrounding 5km within the past 10 years are listed in Appendix E. This list includes their level of protection, if they are red or amber listed on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List or the Birds of Conservation Concern in Ireland (2020-2026) and the date of the last record of this species at this location.

4.1.4 Invasive Non-native Species

The records from the NBDC (2023) database, show that there are six high-impact, one medium-impact and one low-impact, invasive non-native species listed on the Third Schedule of Non-native species (subject to restrictions under Regulations 49 and 50) present within the 2km buffer zone of the proposed site within the past 10 years (Table 4-1).

Table 4-1: High and Medium impact invasive non-native species within 2km of the proposed site

Invasive Non-native Species	Proximity to site	Impact Status
Brown Rat *Rattus norvegicus*	1.8km	High Impact
Japanese Knotweed *Reynoutria japonica*	0.8km	High Impact
Grey Squirrel *Sciurus carolinensis*	0.6km	High Impact
American Mink *Mustela vison*	0.6km	High Impact
Three-corner Garlic *Allium triquetrum*	0.8km	Medium Impact
Himalayan Balsam *Impatiens glandulifera*	0.7km	High Impact
Spanish Bluebell *Hyacinthoides hispanica*	0.8km	Low Impact
Harlequin Ladybird *Harmonia axyridis*	0.6km	High Impact

4.2 Water Framework Directive

4.2.1 Surface Water Status

The entirety of the proposed project is located within the Water Framework Directive (WFD) Liffey and Dublin Bay catchment, and within the Liffey sub-catchment (EPA, 2023). There are no watercourses located within the area of the project, and the nearest watercourse is the River Camac (Camac_030) which is approximately 0.6km to the south-east of the site. Other WFD waterbodies that are located within the ZoI of the project site includes additional sections of the River Camac (Camac_020, and Camac_040), Baldonnell Stream (Liffey_170), River Liffey (Liffey_180) and the Grand Canal (Grand Canal Main Line). All of these waterbodies, along with their WFD status (2016-2021) and current risk are listed in Table 4-2, and are shown in Figure 4-1.

Table 4-2: WFD status and risk of local watercourses.

WFD Watercourse	WFD Status	WFD Risk	Approximate Distance from Site
River Camac (Camac_020)	Moderate	At Risk	1.6km
River Camac (Camac_030)	Poor	At Risk	0.6km
River Camac (Camac_040)	Poor	At Risk	2.1km
Baldonnell Stream (Liffey_170)	Poor	At Risk	1.2km
River Liffey (Liffey_180)	Poor	At Risk	4.4km
Grand Canal (Grand Canal Main Line Liffey and Dublin Bay)	Good	Not at Risk	1.2km

The proposed development will need to ensure that the goal of 'Good Status' is achievable, and that the proposed works will not hinder this goal during the construction and operational phases.

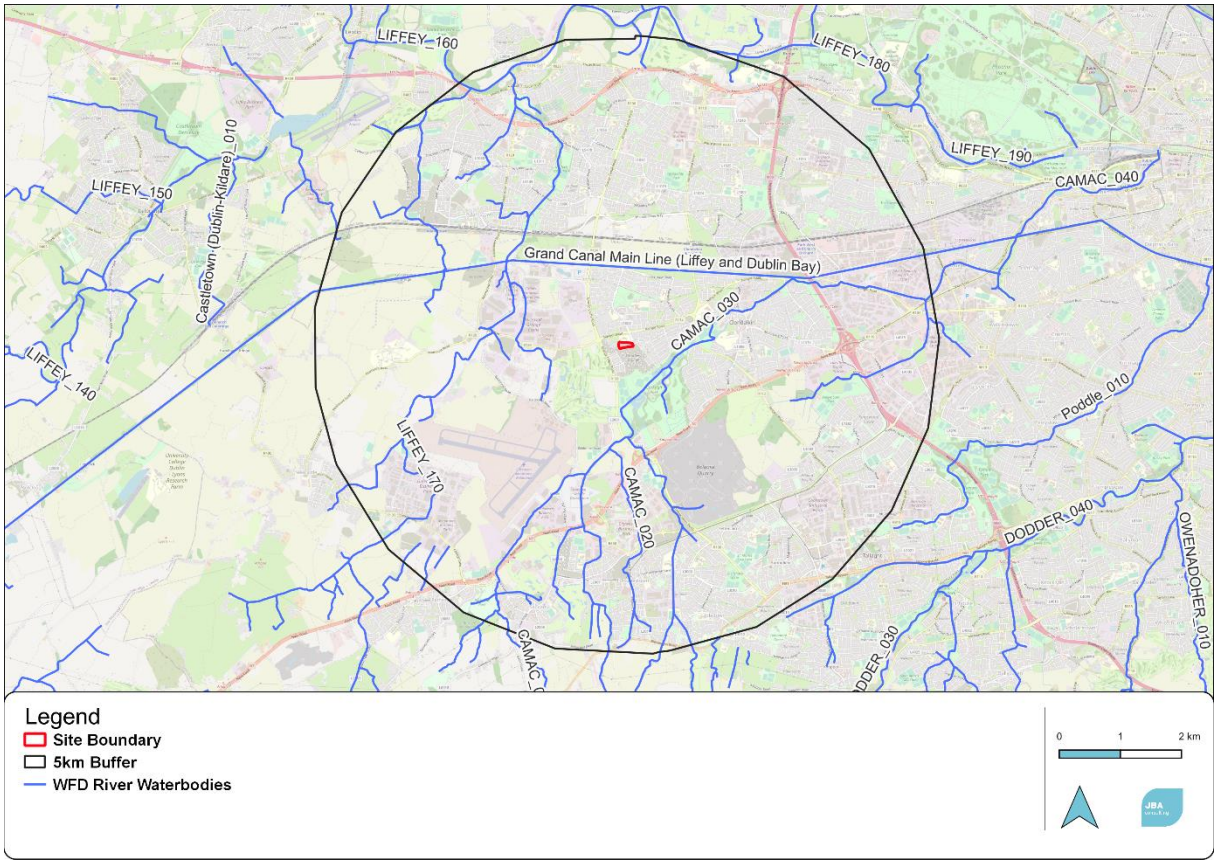

Figure 4-1: Water bodies in the vicinity of the site

4.2.2 Groundwater Status

The whole site is encompassed by the ground waterbody Dublin (IE_EA_G_008) (Figure 4-2). The WFD status for this groundwater body is currently "Good" water status, however its risk status is currently is due to be reviewed (EPA, 2023).

The underlying bedrock of the site is dominated by Dark limestone & shale ('calp) of the Lucan Formation, and the soil is derived of till derived chiefly from limestone. The permeability of the site's area is classified as Low with a low recharge capacity of 25%. The groundwater in the area of the site has an overall High vulnerability (Figure 4-3).

The aquifer within the underlying bedrock is considered to be Locally Important and is "Moderately Productive only in Local Zones", resulting in a limited and poor connection between fractures, fissures, and joints, which also contributes to the overall low recharge capacity of the area. This results in a rapid discharge, limited to only a few hundred metres.

In the context of this site, this means that the groundwater is slow to flow and limited to a poor network of fractures, fissure and joints, none of which are present within or adjacent to the site, and so there is a low level of retention or transferral within the groundwater, and percolated waters are likely to be discharged to the local River Camac.

The proposed development will need to ensure that the proposed construction works will have no negative effect on these water bodies and will support their maintaining 'Good' status into the future.

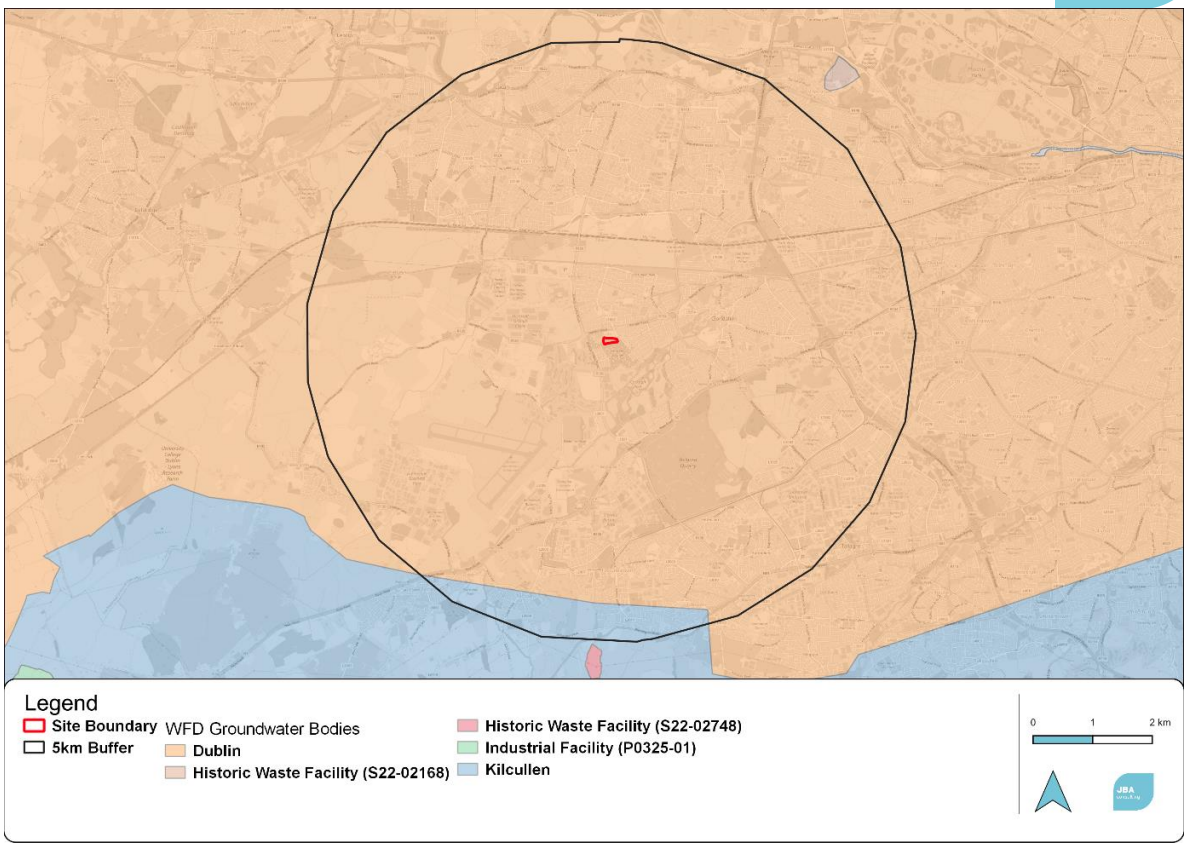

Figure 4-2: Groundwater bodies in the vicinity of the site

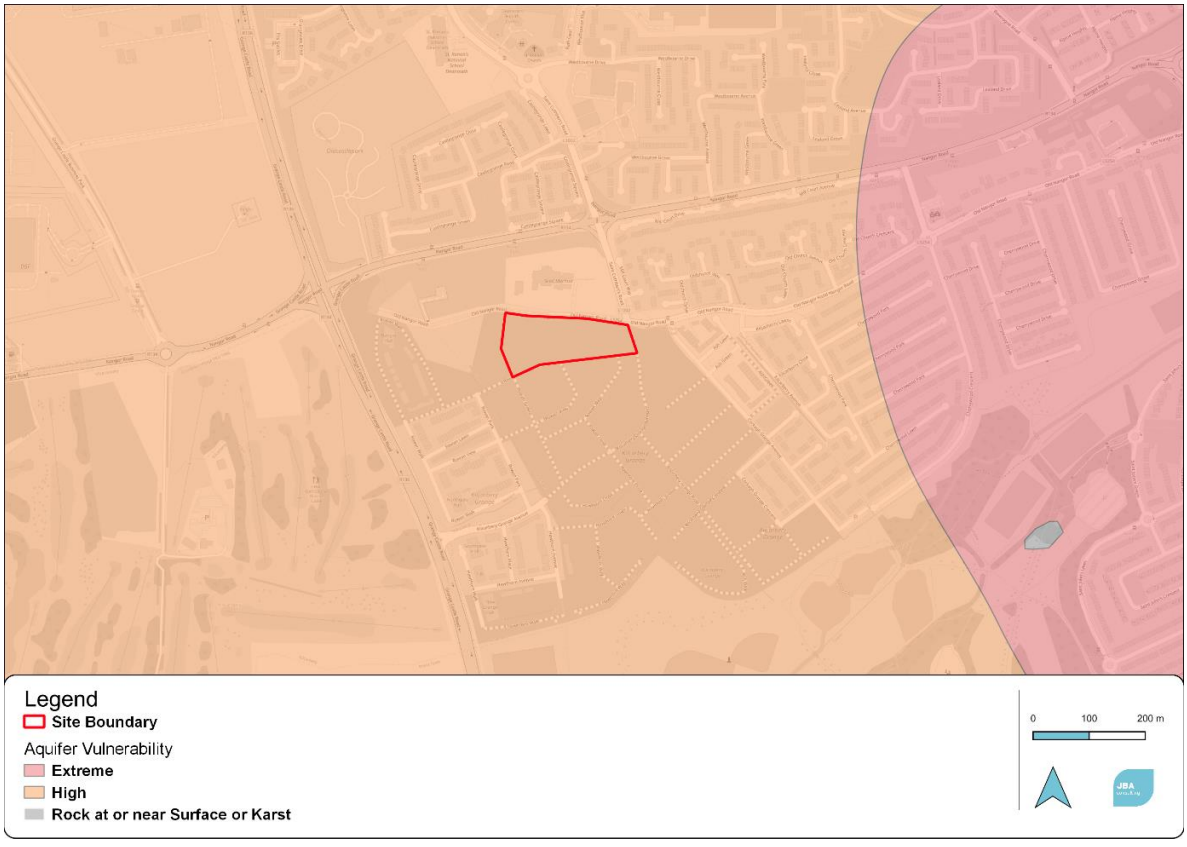

Figure 4-3: Aquifer vulnerability in the vicinity of the site

4.3 Site Visits

A baseline ecological site walkover, including habitat mapping, was conducted by JBA Ecologist, Michael Coyle. Habitats and species recorded are presented in detail in the following sections.

4.4 Habitats

The value of each habitat is based on the site visit. At the time of the ecological survey, the main area within the site boundary was under construction, with excavated soil mounds. This inner area was not surveyed for safety reasons, however given the nature of the site, it is assumed that there were no flora or ecological features of note present within the boundary. Habitats along the north of the site boundary were recorded and are displayed in Table 4-3 below and Figure 4-4 overleaf.

Table 4-3: Habitats recorded during site visit.

Habitat	Fossitt Code
Spoil and bare ground	ED2
Hedgerows / Treelines	WL1 / WL2

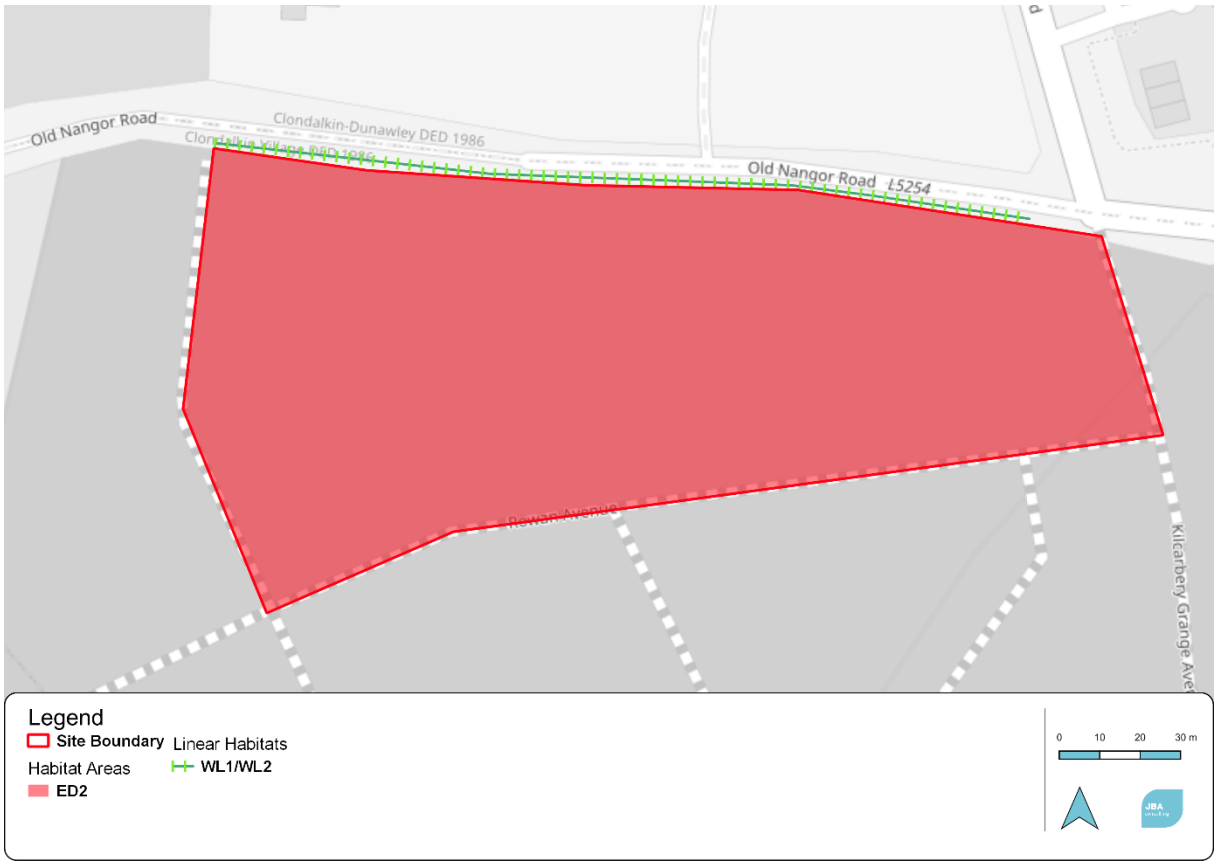

Figure 4-4: Habitat Map (© OpenStreetMap contributors, 2023)

Spoil and bare ground (ED2)

The majority of the site was dedicated to ongoing construction (Figure 4-5, Figure 4-6), with areas near the northern boundary, directly to the south of the hedgerow/treeline mosaic, are excavated soil and rocky mounds (Figure 4-7).

Figure 4-5: The construction area of the site, as seen from the western boundary

Figure 4-6: The construction area of the site, as seen from the north-east corner of the boundary

Figure 4-7: Soil mounds near the north boundary of the site

Hedgerow / Treeline (WL1 / WL2)

A hedgerow/treeline mosaic is located along the northern site boundary, the structure of the hedgerow varies, with sections with larger and more mature treeline features (Figure 4-8) and other areas of low growing and shrubby hedge-like features (Figure 4-9). The sections with taller features has tree and shrub species including Curly Hazel *Corylus avellana*, Hawthorn *Crataegus monogyna*, Sycamore *Acer pseudoplatanus*, a dead Ash *Fraxinus excelsior*, Willow *Salix cinerea*, Red Elderberry *Sambucus racemosa* and Privet *Ligustrum vulgare*, with some of these trees covered in light layers of Ivy *Hedera helix*.

At the base, along the roadside, were the herbaceous species Hogweed *Heracleum sphondylium,* False Oat-grass *Arrhenatherum elatius*, Bramble *Rubus fructicosus*, Dandelion *Taraxacum* spp, Curled Dock *Rumex crispus*, Ivy, Nipplewort *Lapsana communis*, Bush Vetch *Vicia sepium*, Small-flower Cranes-bill *Geranium pusillum*, Nettle *Urtica dioica*, Herb Robert *Geranium robertianum*, Rosebay Willowherb *Chamaenerion angustifolium*, Large Bindweed *Calystegia sepium*, Cleaver *Galium aparine*, Field Sowthistle *Sonchus arvensis*, Mugwort *Artemisia vulgaris*, Cock's Foot *Dactylis glomerata*, Creeping Thistle *Cirsium arvense*, Meadow Buttercup *Ranunculus acris*, Ribwort Plantain *Plantago lanceolata*, Woody Nightshade *Solanum dulcamara*, Creeping Cinquefoil *Potentilla reptans* and Chiccory *Cichorium intybus*. In areas of shaded understory there was a dense cover of Ivy, with the occasional presence of Lord and Ladies *Arum maculatum* and Hart's Tongue Fern *Asplenium scolopendrium*.

Figure 4-8: Mature treeline growth along the northern boundary

Figure 4-9: Semi-mature and shrubby hedgerow growth along the boundary

Outside of the site boundary, north of the existing feature, on the other side of Old Nagor Road, is an additional hedgerow/treeline with a similar makeup of species present (Figure 4-10).

Figure 4-10: Existing hedgerows featured and shrubby hedgerow growth along the boundary (Left) and local hedgerow located in close proximity to the site (Right)

A hedgerow ecological evaluation scoring system was applied using the ecological evaluation scoring system developed by the Blackthorn Ecology consultancy (2021) , which was an updated version of the guidelines set out in Foulkes et al. (2013). This system has previously been applied by JBA to hedgerow surveys for Dun Laoghaire Rathdown County Council (JBA, 2022). The hedgerow appraisal for the present site is available in Appendix G.

The hedgerow along the site boundary attained a Moderate hedgerow value for its structure, County level value for its ground flora diversity and moderate-to-high ecosystem service value. There were other hedgerows in the area (eg. other side of Old Nagor Road) that are not within the site which displayed healthier growth and displayed similar species makeup.

While hedgerow habitat on site met the criterion for overall "Moderate level" value through the categories within the hedgerow evaluation, the leading factor that led to this valuation is largely influenced by the number of different species of ground flora within the understory, however, these species included many low-ecologically important species including Nettle, Thistle, Cock's Foot and False Oat-grass. These species, while increasing the floral diversity, are widespread and were found in adjacent areas including the nearby adjacent hedgerow.

Therefore, in the context of the site and the lands immediately adjacent, this habitat is considered to be of **high local ecological importance**, given its appraisal score, and the nesting and foraging opportunities that it provides, but ecologically similar habitats occur adjacent to the site which fulfil the same ecological role.

4.5 Protected Flora

No protected floral species were recorded by the JBA Ecologist during the ecological walkover survey of the proposed site. Furthermore, the NBDC shows no record of any protected flora species being present within site or its immediate vicinity (NBDC, 2023).

4.6 Protected Fauna

4.6.1 Mammals

While no evidence of protected mammals were recorded on-site during the ecological walkover survey, ground-dwelling mammals that are protected under the Wildlife Act (and subsequent amendments) have been documented as being present within a 2km radius of the site in recent years (NBDC, 2023) include :

- Pygmy Shrew *Sorex minutus*
- Hedgehog *Erinaceus europaeus*

The ground-dwelling mammals within 2km that are afforded additional protection under the EU Habitats Directive Annex V include:

- Pine Marten *Martes martes*

While there was no evidence of these species on-site, there is a potential for Pygmy Shrew and Hedgehog to be present in the locality, therefore under the precautionary principal, they will be examined in the mitigation section of this report. This site is considered to be of **high local ecological importance** for above mammalian species, given the foraging and commuting resources present within the site.

Due to the absence of a suitable woodland that would facilitate Pine Marten habitation, the site is considered to be of less than local ecological importance for this species.

4.6.2 Bats

Desk Study

Two bat species have been documented as being present within a 2km radius of the site in recent years, which includes:

- Daubenton's Bat *Myotis daubentonii*
- Soprano Pipistrelle *Pipistrellus pygmaeus*

Bat species are regarded as being of international ecological importance given the level of EU protections afforded to them under the Habitats Directive, however, given the absence of a watercourse within the area, it is unlikely that Daubenton's Bats would frequent the site.

Preliminary Bat Roost Survey

During the ecological walkover of the proposed site, it was determined that there was no preferred roosting features on the site, given the absence of mature trees or dense Ivy that displayed cracks or cavities.

Bat presence / activity on-site

In the absence of bat activity survey data, under the precautionary principle, we must assume that Soprano Pipistrelle are likely to utilise this site for foraging and commuting given the presence of a hedgerow connecting into the wider landscape, and the above desk-based data records. Additionally, even in the absence of records of Common Pipistrelle *Pipistrellus pipistrellus* and Leisler's Bat *Nyctalus leisleri* within 2km of the site in recent years, these species frequent urban landscapes for foraging and commuting and are also assumed to utilise the site.

This site is considered to be of **high local ecological importance for bat species,** given the foraging and commuting resources present within and adjacent to the site.

4.6.3 Breeding and Wintering Birds

Bird species recorded during the site survey include Blue Tit *Cyanistes caeruleus*, Goldfinch *Carduelis carduelis*, Jackdaw *Corvus monedula* , Long-tailed Tit *Aegithalos caudatus* and Magpie *Pica pica*, which are all listed as Green List bird of conservations concern, and Linnet *Linaria cannabina*, which is an Amber List bird of conservation concern (Gilbert e al., 2021),

In addition to the birds encountered on site, NBDC details recent records of birds of conservation concern listed on the BoCCI Amber list within a 2km radius includes Barn Swallow *Hirundo rustica* (Breeding), Common Coot *Fulica atra* (Breeding and Wintering), Great Cormorant *Phalacrocorax carbo*

(Breeding and Wintering), House Martin *Delichon urbicum* (Breeding), House Sparrow *Passer domesticus* (Breeding), Sand Martin *Riparia riparia* (Breeding), Tufted Duck *Aythya fuligula* (Breeding and Wintering).

Within this 2km radius, there also includes the Red List species Common Pochard *Aythya farina* (Breeding and Wintering), Common Swift *Apus apus* (Breeding) Grey Wagtail *Motacilla cinerea* (Breeding)

While not listed as birds of concern within Ireland, the following bird present within this 2km radius are afforded protection under the Bird's Directive; Common Woodpigeon *Columba palumbus* (Annex II and Annex III).

The proposed site has been valued as being of **high local ecological importance** for the above breeding bird species of conservation concern given the nesting availabilities and foraging opportunities for breeding birds within the site, while the site is valued as being of less than local ecological importance for wintering bird species given the lack of foraging or roosting opportunities.

4.6.4 Amphibians

JBA Ecologists did not record any amphibian species during the ecological walkover survey. Additionally, recent records from NBDC do not place amphibian species within 2km of the site.

The proposed site has been valued as being of **less than local ecological importance** for amphibian species of conservation concern, given the lack of local records of their presence, and lack of resources within the site.

4.6.5 Fish

While present outside of the site boundary and the zone of influence for dust generation, the project will be integrated with the local surface water drainage network and will discharge to the greenfield runoff to the River Camac located approximately 0.6km south-east of the site boundary. Within the River Camac IFI records (IFI, 2022) indicate the presence of European Eel *Anguilla anguilla* Brown trout *Salmo trutta*; Minnow *Phoxinus phoxinus* and Three-spined Stickleback *Gasterosteus aculeatus*.

The proposed site has been valued as being of **high local ecological importance** for Fish due to its hydrological link with the Camac Tributary.

4.6.6 White-clawed Crayfish

While present outside of the site boundary and the zone of influence for dust generation, the project will be integrated with the local surface water drainage network and will discharge to the greenfield runoff to the River Camac located approximately 0.6km south-east of the site boundary. The River Camac has a population of White-clawed Crayfish, which is protected under the EU Habitats Directive Annex II and V, and also the Wildlife Acts.

The proposed site has been valued as being of **high local ecological importance** for White-clawed Crayfish due to its surface water drainage connections with the River Camac.

4.6.7 Terrestrial Invertebrates

Invertebrate species recorded during the site visit include Tortoiseshell Butterfly *Aglais urticae*. There was no evidence of invertebrate species listed under the Wildlife Act 1976 and its Amendments or the EU Habitats Directive recorded by the JBA Ecologists during the ecological walkover survey. Additionally, the NBDC shows no record of any protected invertebrate species being present within site or its immediate vicinity (NBDC, 2023). As the largest habitat is spoil and bare ground the site is considered of **less than local ecological importance** for invertebrate species given the low number of invertebrates recorded and the limited floral resources available for foraging and reproduction (i.e., host-plants).

4.7 Invasive Non-native species

There were no direct or indirect evidence of floral or fauna species listed under the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011 recorded by the JBA Ecologists during the ecological walkover survey.

4.8 Screening of Designated Sites & Ecological Features

The screening of designated sites and ecological features identified during the desktop study and ecological survey are given in Table 4-4. Sites and features screened out are not considered further in this assessment. Ecological features carried forward are assessed for potential impact during construction and operation in the following sections.

Table 4-4: Summary of ecological features and the screening assessment.

Designated site / Ecological feature	Value	Screening	Rational
North Bull Island SAC [004006]	International	Screened out	(JBA, 2023 - AA Screening)
North Dublin Bay SPA [000206]	International	Screened out	(JBA, 2023 - AA Screening)
South Dublin Bay and River Tolka Estuary SPA [004024]	International	Screened out	(JBA, 2023 - AA Screening)
South Dublin Bay SAC [000210]	International	Screened out	(JBA, 2023 - AA Screening)
North-west Irish Sea cSPA [004236]	International	Screened out	(JBA, 2023 - AA Screening)
Grand Canal pNHA [002104]	National	Screened out	Lack of connection
Liffey Valley pNHA [000128]	National	Screened out	Lack of connection
North Dublin Bay [000206]	National	Screened out	Large hydrological distance
South Dublin Bay [000210]	National	Screened out	Large hydrological distance
Dolphins, Dublin Bay [000201]	National	Screened out	Large hydrological distance
Buildings and artificial surfaces	Less than Local	Screened out	Low ecological value
Hedgerows / Treelines	High Local	**Screened in**	**High floral diversity, hedgerow structure, and resources for mammals, bats,birds and invertebrates**
Mammals	High Local	**Screened in**	**Resources for commuting and foraging**
Bats	High Local	**Screened in**	**Resources for commuting and foraging**
Breeding Birds	High Local	**Screened in**	**Resources for commuting, nesting and foraging**
Wintering Birds	Less than local	Screened out	Lack of resources
Amphibians	Less than Local	Screened out	Lack of resources
Fish	High Local	**Screened in**	**Connections to the River Camac, which has populations of fish species present**
White-clawed Crayfish	High Local	**Screened in**	**Connections to the River Camac, which has populations of Crayfish present**
Terrestrial Invertebrates	Less than Local	Screened out	Limited resources present

Designated site / Ecological feature	Value	Screening	Rational
Non-native invasive species	-	-	None present on site

5 Other Relevant Plans and Projects

5.1 Cumulative Effects

As part of the Ecological Impact Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative effects must also be considered at this stage.

5.2 Plans

The following projects or plans were identified as potential sources of cumulative effects:

- South Dublin County Development Plan 2022-2028
- Greater Dublin Drainage Strategy
- Third Cycle River Basin Management Plan for Ireland 2022-2027
- Planning Applications (retrieved from Data.gov.ie - Planning Application Sites, December 2023)

5.2.1 South Dublin County Development Plan 2022-2028

The proposed plan's development is in line with the South Dublin County Development Plan 2022-2028. It is an objective of the Plan to ensure that all development within the County conforms to eight key design principles which includes the promotion of sustainable energy and environmental services. These goals include:

NPO 52 requires that the planning system will 'be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital.

The Plan also aims to protect and enhance surface water quality, to support, improve and protect Natura 2000 sites, and to develop an integrated Green Infrastructure network to enhance biodiversity, provide accessible parks, open spaces and recreational facilities (SDCC, 2022a). The plan also states that work will be in conjunction with Irish Water to protect existing water and drainage infrastructure, to promote investments aiming to support environmental protection and facilitate the sustainable growth of the county (SDCC, 2022a).

A Screening for Appropriate Assessment was carried out on the plan, which was concluded that an Appropriate Assessment was necessary for this project. The associated Natura Impact Report concluded that there are no likely significant direct, indirect, or secondary impacts of the project on any Natura 2000 sites (SDCC, 2022b), **therefore the SDCC Development Plan is not anticipated to contribute to cumulative or in-combination effects.**

5.2.2 Greater Dublin Drainage Strategy

The Greater Dublin Drainage Strategy sets out the strategic planning for the development of waste water treatment in the Greater Dublin area in relation to the Ringsend WWTP Upgrade, Greater Dublin Drainage Project and associated wastewater network drainage projects (Irish Water, 2018b). The Ringsend WWTP Upgrade includes plans to expand the WWTP to its ultimate capacity, together with associated network upgrades required. The Greater Dublin Drainage Project is planned to relieve both the Ringsend WWTP and network loading by construction of a new WWTP at Clonshaugh, an orbital sewer and provision of an outfall pipe discharging 1km north-east of Ireland's Eye. The Ringsend WWTP upgrade is in progress and carried out in stages, with an increased capacity of 400,000 PE by Q1 2020 and the ultimate capacity of 2.4 million PE to be in operation by 2024 (Irish Water, 2018b).The Greater Dublin Drainage Project is strategically important to the Dublin Region in that it will provide capacity for residential and commercial growth (Irish Water, 2018b).

Overall, the Greater Dublin Drainage Strategy is not considered to adversely effect any Natura 2000 site, nor is it expected to contribute to any cumulative or in-combination effects.

5.2.3 River Basin Management Plan for Ireland 2018-2021 / 2022-2027

The 2nd cycle River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHPLG, 2018a). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public

health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The first cycle of River Basin Management Plans included the Eastern River Basin District - River Basin Management Plan 2009 – 2015 (WFD, 2010). The plans summarised the waterbodies that may not meet the environmental objectives of the WFD by 2015 and identified which pressures are contributing to the environmental objectives not being achieved. The plans described the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD.

- Prevent deterioration of water body status.
- Restore good status to water bodies.
- Achieve protected areas objectives.
- Reduce chemical pollution of water bodies

The River Basin Management Plan for Ireland (2018-2021) outlines the new approach that Ireland will take to protect our waters over the period to 2021. It builds on lessons learned from the first planning cycle in a number of areas:

- stronger and more effective delivery structures have been put in place to build the foundations and momentum for long-term improvements to water quality
- a new governance structure, which brings the policy, technical and implementation actors together with public and representative organisations. This will ensure the effective and coordinated delivery of measures.

Ireland's third River Basin Management Plan 2022-2027 (EPA, 2021a) was out for public consultation until March 31st 2022. The Consultation report was published in July 2022. Following review of the submissions, the DHLGH will commence a review and where necessary update the draft RBMP with a view to finalisation and publication in Q3/Q4 of 2022.

The 3rd cycle draft Catchment Reports were published in August 2021. The draft Catchment Reports provides a summary of the water quality assessment outcomes for respective catchments, including status and risk categories, significant threats and pressures, details on protected areas and a comparison between cycle 2 and cycle 3.

The third cycle draft Catchment Report for Liffey and Dublin Bay Catchment (EPA, 2021b) identified that between Cycles 2 and 3 there has been an overall slight improvement in the catchment's status. The overall change in quality between Cycles 2 and 3 include 8 waterbodies achieving a High Status, which is an increase three, 46 which are achieving a Good Status which remains unchanged between Cycles, 18 achieving a Moderate Status which is a decrease by four waterbodies, 9 achieving a Poor Status which remains unchanged between Cycles, and 2 achieving a Bad Status which is an increase of one.

The Third Cycle River Basin Management Plan for Ireland 2022-2027 is not anticipated to contribute to cumulative or in-combination effects.

5.3 SDCC Kilcarbery Masterplan

The proposed project is an extension of a parent plan and is adjoining an additional pre-existing scheme outside of the site boundary. The overall plan of the adjoining project consists of the construction of 1,034 residential units which includes:

578 no. houses, 154 no. duplex / apartments and 3/02 no. apartments ranging from 2 to 6 storeys comprised of the following:

- 578no. own door houses, including
    - 449no. 3-bed 2-storey houses
    - 31no. 4-bed 2-storey houses
    - 31no. 4-bed 2-storey houses
    - 98no. 4-bed 3-storey houses
- 154no. own door duplex / apartments in 3 to 4 - storey buildings, including:
    - 41no. 1-bed duplex / apartments.
    - 49no. 2-bed duplex /apartments

- 64no. 3-bed duplex / apartments.

- 302no. apartment units accommodated in 9no. 4 to 6-storey buildings (with own door access ground floor apartments), including:
  - Block 1 accommodating 29no. apartments (6no. 1-bed, 18no. 2-beds and 5no. 3beds)
  - Block 2 accommodating 24no. apartments (4no. 1-beds, 15no. 2-beds and 5no. 3beds).
  - Block 3 accommodating 30no. apartments (13no. 1-beds and 17no. 2-beds).
  - Block 4 accommodating 30no. apartments (13no. 1-beds and 17no. 2-beds).
  - Block 5 accommodating 45no. apartments (12no. 1-beds, 22no. 2-beds and 11no. 3-beds)
  - Block 6 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds).
  - Block 7 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds/) - Temporary creche at ground floor level to revert 7no. residential units on completion of permanent purpose-built creche in Phase 3.
  - Block 8 accommodating 33no. apartments (5no. 1-beds, 23no. 2-eds and 5no. 3-beds)
  - Block 9 accommodating 37no. apartments (16no. 1-beds and 21no. 2-beds)
- Private rear gardens provided for all houses. Private patios / terraces and balconies are provided for all duplex and apartment units. Upper-level balconies are proposed on elevations of multi-aspect duplex and apartment buildings.
- Ancillary uses include the provision of 1no. retail unit (c. 178sq. m) and community building (c. 785 sq. m)
- 1no. temporary creche (c. 557 sq. m gross floor area in lieu of 7no. ground floor apartment units in Block 7 pending construction of permanent creche at Grange Square)
- 1no. permanent creche building at Grange Square (c 9/09 sq. m gross floor area).
- New vehicular access from Outer ring Road / Grange Castle Road (R136) to the west (left in and left out arrangement) and 2no. new vehicular access points onto Old Nangor Road (L5254) to the north and associated re-alignment of existing adjoining roadways.
- New street network, including spine road (c. 6m in width) extending from Outer Ring Road / Grange Castle Road (R136) to the west onto Old Nangor Road (L5254 to the north.
- New pedestrian and cycle path network.
- Provision of Public Open Space (c. 4.6 Ha) including:
  - Oak Green Space (c. 7,453 sq. m).
  - Lime Green Space (c. 6646 sq. m).
- Provision of surface water attenuation measures (SuDS).
- Wastewater pumping station including 18hr storage tank and associated infrastructure.
- 1,510no. surface car parking spaces
- 1,105no. covered bicycle parking spaces.
- Communal bin storage for all terraced houses, duplex / apartment and apartment blocks.#
- All associated and ancillary site development, infrastructural, landscaping and boundary treatment works including bin storage.

The Masterplan includes the removal of Hedgerow, Treeline and Dry meadow habitats, while also including remedial planting as compensatory measure and natural habitat provisions. A screening assessment of the Kilcarbery Masterplan was completed by Scott Cawley Ltd (2023). Overall, it was concluded that it **is not considered to adversely effect any Natura 2000 site, nor is it expected to contribute to any cumulative or in-combination effects.**

5.4 Other Projects

Other projects dating back three years are listed in Table 5-1 (overleaf), which are not retention applications, home extensions and/or internal alterations, and have been granted planning permission in the locality of the proposed site.

The developments permitted below have the potential to have overlapping construction and short-term residual effects with the proposed project and therefore, in the absence of mitigation measures, these developments may result in potential in-combination or cumulative effects given their proximity to the local Natura 2000 sites.

Table 5-1: Other projects within approximately 2km which may have an accumulative effect on the development of the project

Planning Reference	Address	Application Status	Decision date	Summary of development
LRD23A/0005	Townlands of Kilcarbery, Corkagh Demesne, Deansrath and Nangor, Co. Dublin	Permission Granted	28/08/2023	Amendments to the permitted Strategic Housing Development (An Bord Pleanála Ref. ABP-305267-19 as amended by ABP-312219-21) consisting of:- An increase in the size of the permitted retail unit at Ground Floor of Apartment Block 2 from c.185 sq.m GFA to 270 sq.m GFA achieved by the omission of 1 no. 2 bed unit and associated elevational changes and localised reconfiguration of the adjacent communal open space. Replacement of 4 no. permitted bin / bicycle store structures with larger structures and associated localised adjustments to landscaping layout. The overall number of residential units under An Bord Pleanála Ref. ABP-305267-19 as amended by ABP-312219-21 decreases by 1 no. unit from 1,034 no. to 1,033 no. units (578 no. houses and 455 no. apartments) as a result of the proposed development. The scheme is as otherwise permitted under An Bord Pleanála Ref. ABP-305267-19 as amended by ABP-312219-21.
SD21A/0217	Profile Park, Nangor Road, Clondalkin, Dublin 22	Permission Granted	02/08/2022	10 year permission for development consisting of removal of an existing unused waste water treatment facility on site and the erection of two data centre buildings, gas powered energy generation compound, and all other associated ancillary buildings and works; the two data centre buildings, DUB 15 and DUB 16, will comprise a total floor area of c. 33,577sq.m over two storeys; the first 2 storey data centre building (DUB15), located to the southwest of the site, will comprise 16,865sq.m data storage use, ancillary office use and associated electrical and mechanical plant rooms, loading bays, maintenance and storage space; a second 2 storey data centre building (DUB16), located to the southeast of the site, will comprise 16,712sq.m data storage areas, ancillary office use and associated electrical and mechanical plant rooms, loading bays, maintenance and storage space; both data centre buildings will reach a height of 20m; emergency generators and associated emission flues and plant are proposed in compounds adjacent to each data centre building; gas powered energy generation is proposed to the north east corner of the site to provide electricity for the proposed development; the application proposes to re-route and widen an existing watercourse constructed following an earlier planning permission; it is proposed to reroute this watercourse along the eastern and southern boundary of the site; landscaping is proposed to the south of the site to screen the buildings; fencing and security gates are proposed around the site; new access roads within the site are proposed along with 71 car parking spaces and 26 cycle spaces, bin stores, site lighting, and all associated works including underground foul and storm water drainage attenuation and utility cables and all other ancillary works; a Natura Impact Statement will be submitted to the planning authority with the application.
SD23A/0039	Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22	Permission Granted	24/04/2023	Provision of an establishment to which to European Communities (Major Accident Hazards involving Dangerous Substances) Regulations 2006 as amended by Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 apply, constituting a change of use; The new establishment will include all the existing and permitted

Planning Reference	Address	Application Status	Decision date	Summary of development
				buildings (SD13A/0143 as amended by SD13A/0265, SD14A/0194 as amended by SD15A/0343, SD16A/0088 as amended by AD17A/0318 & SD20A/0283, SD21A/0203 & SD21A/0288, all within an existing campus; The proposal relates to the total quantum of fuel oil to be stored within existing and permitted tanks across the existing and permitted buildings; For the avoidance of doubt no works or physical development is proposed and the application relates to an existing development which comprises or is for the purpose of an activity requiring an integrated pollution prevention and control (IE) licence.
SD21A/0012	Buckandhounds, Bedlesshill, Kingswood, Brownsbarn, Cheeverstown & Belgard, Fortunestown, Tallaght, Dublin 24	Permission Granted	23/03/2021	Deepening of part (c. 43ha.) of the existing and permitted quarry (An Bord Pleanala refs. 301177 & QD0026) to a quarry floor level of -10mOD using conventional blasting techniques; use of mobile processing plant; product stockpiles; final restoration scheme and all ancillary works within a planning application area of 49.4ha and within the overall landholding of 241.6ha and will be accompanied by an Environmental Impact Assessment Report (EIAR).
SD21A/0239	Kingswood Business Park, Baldonnel, Dublin 22.	Permission Granted	28/02/2022	Alterations to an existing granted planning application (previously granted permissions Reg. Ref. SD18A/0314 [ABP-304148-19], SD19A/0408, SD20A/0187); reconfiguration of the ground floor area consisting of a new ancillary storage area to the proposed building's eastern elevation measuring 75sq.m, at mezzanine level; change of use of 57sq.m of warehouse floor area to staff facilities due to the following, addition of single storey fire protected corridor from Office A to in the south-west corner of the warehouse, overall 45sq.m floor area addition; addition of stairs from warehouse to mezzanine level, overall 12sq.m floor area addition; elevation alterations, introduction of covered glazed structure at the main Office entrance to the front (southern) elevation, overall height 6.18m; introduction of Integrated Modular Louvre System to Charging Area to the front (southern) and side (eastern) elevation; change of colour of southern elevation warehouse canopy to Anthracite; introduction of fire escape doors to the side (eastern) elevation; site plan alterations, omission of an existing roundabout and provision of revised road junction with an access/egress to the proposed development and to the existing Business Park; provision of a new boundary fence Type A to the southern and eastern site boundary; introduction of additional 26 HGV parking spaces to the western concrete yard (overall area 1547sq.m) and the omission of car parking at the same location; introduction of 8 van parking spaces (overall area 240sq.m) and rearrangement of the car parking spaces due to introduction of the above changes, plus addition of gas tank and generator; associated drainage layout adjustments due to the inclusion of the above alterations; all other details such as landscaping, external surface finishes etc. will remain as per the aforementioned granted planning applications.

5.5 Summary

The County and Local Development Plan; RBMP and projects within the locality of the proposed project are considered in combination with the currently proposed project in the Screening Assessment section below.

6 Impact Assessment

6.1 Introduction

The impacts on the valued ecological features are assessed here. The initial assessment considers the potential impact pathways and whether these apply to the ecological features. The impact assessment considers the project and the anticipated effects in the absence of any mitigation.

The potential impacts from the enhancement works are assessed under the following:

- Disturbance to habitats and species
- Habitat loss (foraging, commuting, general refuge and nesting)

The following sections describe the nature of immediate / short-term impacts, as well as any medium- or long-term impacts, predicted for designated protected sites, habitats and species in the absence of implemented mitigation measures during the maintenance works.

6.2 Do Nothing Scenario

If the proposed works were not to go ahead and the present land management continues as is, the ecological value of the site would remain unchanged.

6.3 Construction Phase

6.3.1 Habitats

Hedgerows/Treelines (WL1/WL2)

The hedgerow/treeline boundary along the north of the site is to be removed in its entirety to accommodate the building of the new dwellings in the area and sections will be reinstated within the relandscaping of the site.

While the hedgerow on site currently is fragmented and gappy, it still has a moderate value for its structure and a county value for its ground flora, and there will be a direct loss of this ecologically high value habitat and refuge opportunities for mammals. In the absence of mitigation, there will be **permanent, negative impact of moderate significance** on this habitat of local importance.

In order to retain the overall area's value as a biodiversity corridor connected to the wider landscape, the habitats adjacent to the site must also be considered for the provision of ecological services. During the work on the northboundary of the site, the local ecological features of the hedgerow/treeline outside the site boundary would be susceptible to root compaction, limb damage and pollutants.

Mitigations will be provided in the following sections to provide continuity of biodiversity value and to protect local habitats from any unnecessary damage.

6.3.2 Species

Ground-Dwelling Mammals - Pygmy Shrew, Hedgehog

While no signs of Pygmy Shrew or Hedgehog habitation were present during the ecological walkover, this does not ensure that the local mammal species were not there or do not occasionally visit the site area for foraging. Due to the loss of the hedgerow along the boundary, foraging activities will be affected, however, given the presence of other foraging sites in the vicinity of the site, the loss of the boundary's hedgerow will not result in a severe impact. Bearing this in mind, minor impacts may arise in the form of disturbance to foraging and commuting activities, as well as potential loss of life to individuals in the case of the accidents within the construction site (e.g. accidental trappings), after failure to exclude entry, or of mammals that were undetected during the removal of the hedge.

Therefore, in the absence of mitigation, during the construction phase, a **short-term, negative impact of slight significance** is anticipated for these mammal species due to potential incidents of entrapment and loss of life during the removal of the hedge, and a **permanent, negative impact of slight significance** is anticipated for these mammal species due to the removal of foraging and commuting resources.

Bats - Soprano Pipistrelle, Common Pipistrelle and Leisler's Bat

Impacts during construction relate to the construction-based external lighting which could reduce the quality of foraging and commuting within the habitats on-site for bats. Due to the loss of the hedgerow along the boundary, foraging activities will be affected, however, given the presence of other foraging and commuting features in the vicinity of the site, the loss of the boundary's hedgerow will not result in an overall significant impact.

Therefore, in the absence of appropriate mitigation for lighting during the construction phase, there is likely to be a **temporary, negative impact of slight significance** and a **permanent, negative impact of slight significance** anticipated for bat species due to the removal of foraging and commuting resources.

6.3.3 Breeding Birds

Local breeding bird species will potentially be physically disturbed from their foraging activities during the construction works. Due to the loss of the hedgerow along the boundary, foraging activities will be affected, however, given the presence of other foraging sites in the vicinity of the site, the loss of the boundary's hedgerow will not result in a severe impact. Additionally, any birds occupying the hedgerow at the time of its removal are at risk of a loss of life.

Therefore, in the absence of mitigation, during the construction phase, a **short-term, negative impact of slight significance** is anticipated for these bird species due to potential incidents of entrapment and loss of life during the removal of the hedge, and a **permanent, negative impact of slight significance** is anticipated for these bird species due to the removal of foraging resources and nesting opportunities.

6.3.4 Fish & Crayfish

Fish and Crayfish have been recorded within the River Camac, located 0.6km from the site. Bearing this in mind, adverse impacts may arise in the form of water pollutants entering the local stream, via surface water run-off, degrading the local water quality and potentially the physiology of local Eels and their prey species (e.g., degradation of gills).

Therefore, in the absence of mitigation, a **temporary negative impact of slight significance** is anticipated for the local Fish and Crayfish population due to pollutant spill.

6.4 Operational Phase

6.4.1 Habitats

Hedgerows/Treelines (WL1/WL2)

During the pre-construction works and in the preparatory stage of site development, some of the sod and upper horizon of topsoil, along with cuttings and some of the plants from the hedge and its bank are to be taken and stored. These are to be later reused in the open spaces of the development. This relocation of material from the existing hedgerow will allow for the current seedbank to develop and remain localised, while the function of the hedgerow will be retained.

In addition to the retention of the seed bank and some of the plant material, there is also anticipated to be compensation of the works on the hedgerow by the establishment of linear parks, hedges, scrub, shrubs, and rows of linear trees within and surrounding the development area, using a mixture of native trees, cultivars and ornamental shrubs. Once the additional planted habitats have matured, they will contribute to providing the same ecological functions as the existing hedge, providing an overall maintained ecological links within the development and to the wider landscape.

Therefore, **a medium-term positive impact of slight significance** is anticipated for this area, as the resources of the hedgerow on site will be retained in part, in addition to the planted trees and shrubs that, upon reaching maturity, will provide some similar form of resource provision (foraging and commuting) as the existing hedgerow habitat.

6.4.2 Species

Ground-Dwelling Mammals - Pygmy Shrew and Hedgehog,

Due to the nature of the project, direct impacts from the operation of this project on these species are not anticipated. During the operational phase of the project, it will take some time before newly planted trees have matured to fulfil their ecological role.

Therefore, **a medium-term positive impact of slight significance** is anticipated for these species as characteristics of the existing hedgerow is retained, and the planted trees reach maturity to provide at additional of resource provision (foraging and commuting) as the cleared hedgerow trees.

Bats

The project's site lighting plan (Appendix B) involves the operation of street lights that have a bat-friendly design, which includes being no higher than 6m, a warm white spectrum 3000k lighting, and LED luminaries with a sharp cut off, low intensity and dimming capability, which minimises the impacts that lights will have on Common and Soprano Pipistrelles which are commonly known to frequent urban landscapes as they are generally more tolerant to anthropogenic impacts, including lighting impacts, than the other bat species in Ireland. Leisler's Bat has also been recorded frequenting street lit and amenity grassland areas in the urban environment (Russ and Montgomery, 2002; Russ et al., 2003). This highlights the adaptability of three bat species present on-site to anthropogenic lighting sources.

In addition to their adaptability to anthropogenic lighting, studies have shown that pipistrelle species and Leisler's Bat can congregate around urban street lighting feeding on the insects attracted to the lower impact lighting (Rydell et al., 1993, Blake et al., 1994; Stone et al., 2015; Spoelstra et al., 2015; 2017). Therefore, the local individual bats have likely already obtained the necessary behavioural adaptations to adjust their respective foraging strategies for when the site has operational, bat-friendly lighting.

Given the above, **a medium-term positive impact of slight significance** is anticipated for bat species as characteristics of the existing hedgerow is retained, and the planted trees reach maturity to provide at additional of resource provision (foraging and commuting) as the cleared hedgerow trees.

6.4.3 Breeding Birds

Due to the nature of the project, direct impacts from the operation of this project on breeding bird species are not anticipated. During the operational phase of the project, it will take some time before newly planted trees have matured to fulfil their ecological role.

Therefore, **a medium-term positive impact of slight significance** is anticipated for breeding bird species as characteristics of the existing hedgerow is retained, and the planted trees reach maturity to provide at additional of resource provision (foraging and nesting) as the cleared hedgerow trees.

6.4.4 Fish & Crayfish

Given the nature and extent of the project's operations, adverse impacts for these species are not anticipated during the operational phase.

6.5 Summary

The following potential significant impacts have been identified below, with the necessary mitigation is discussed in the next chapter:

- Damage to existing hedgerow/treeline mosaic on site during the relocation process
- Degradation of neighbouring habitats (watercourses connected via surface water pathway and adjacent hedgerows) via pollution events; root compaction; and direct habitat damage, thus reducing the capacity of these habitats to support local wildlife.
- Removal of commuting and foraging habitat (treeline/hedgerow) for terrestrial mammals, bat species and birds as well as potentially accidental fatal entrapment for these faunal groups during the construction phase.

The mitigation is based on existing guidance documentation and where necessary additional mitigation is proposed to reduce the impacts identified above.

7 Mitigation

The following mitigation is recommended to ensure that the proposed works do not adversely impact on the ecological receptors outlined in Section 6.

Mitigation measures for anticipated impacts on designated sites and ecological features are outlined below.

7.1 Mitigation for the Construction Phase

7.1.1 Project Hedgerow Removal

With a local habitat of value being removed during the construction phase, it is necessary to implement the following mitigation measures to retain hedgerow ecological function, to reduce damage to commuting fauna and to prevent impacts from within the site spreading into the surrounding areas.

7.1.2 Hedgerow Transferral

The initial gathering of sod, topsoil, cuttings and plants with their roots from the existing hedgerow should begin and be completed before the removal of the remainder of the hedgerow, in order retain hedgerow function as long as possible and to minimise any damage to the transferred material. The cuttings will be transferred and potted off site, while the sod, topsoil and the plants with their roots will be transferred directly to the open space within the development area.

7.1.3 Mitigation for final clearance of the trees and hedgerows

Vegetation should be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., Hedgehog). The clearance of the hedgerow is to be conducted in the months of September-October; a time that is outside of the breeding bird and summer mammal season (March – August inclusive), and mammal hibernation window.

Where this seasonal restriction cannot be observed, a check for active roosts, hibernating mammals and nests will be carried out immediately prior to any site clearance by an appropriately qualified ecologist /ornithologist and repeated as required to ensure compliance with legislative requirements. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged. See sub-section 7.2.1 below for the remedial planting of trees within the landscape plan.

7.1.4 Dust generation management for adjacent habitats

The following measures will be implemented to prevent the generation and spread of dust from the site to nearby areas:

- Limit the removal of the hedgerow, breaking of the topsoil, earth stripping and dust-based construction activities from occurring during dry and windy weather.
- Wheel washing of vehicles leaving the site, covering of fine dry loads, or spraying of loads prior to exiting the site, and if necessary regular cleaning of public roads in the vicinity of the entrance.
- Appropriate maintenance of vehicles and machinery to minimise any extensive release of exhaust pollutants during works (OPR, 2004).

7.1.5 Pollution Control and Spill Prevention

A minimum stock of spill kits will be maintained at all times and site foremen's vehicles will carry large spill kits at all times. Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. Records will be maintained by the environmental site manager.

Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment. Containers found damaged or leaking will be removed from use and replaced immediately.

In the event of a spill the Contractor will ensure that the following procedure are in place:

- The appropriate and sufficient spill control materials will be installed at strategic locations within the site.
- Spill kits will be stored in the site compound with easy access for delivery to site in the case of an emergency. Typical contents of an on-site spill kit will include the following as a minimum:
- - Absorbent granules.
- - Absorbent mats/cushions.
- -Track-mats, geotextile material and drain covers.
- All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound.
- All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following.
- - 110% of the capacity of the largest tank or drum within the bunded area, or
- - 25% of the total volume of substances which could be stored within the bunded area.
- The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters.

7.1.6 Noise and vibration

The construction of the development will largely be limited to daylight hours where possible, ensuring minimum disturbance to commuting and foraging activities of local wildlife. The works will also be temporary. With regard to construction activities, reference will be made to BS 5228-1, which offers detailed guidance on the control of noise from demolition and construction activities. A variety of practicable noise control measures will be employed. These include:

- Erection of barriers at construction works boundary as necessary and around items such as generators or high duty compressors.
- Limiting the hours during which site activities likely to create high levels of noise are permitted. Construction activities will take place Monday to Friday, between 07:00 and 18:00, and on Saturdays, between 08:00 and 13:00.
- A site representative responsible for matters relating to noise will be appointed to liaise with South Dublin County Council.

Additional guidance relevant to acceptable vibration and noise levels will be followed and is contained in the following documents:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- British Standard BS 5228-2: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites: Vibration.
- NRA: 2014: Guidelines for the Treatment of Noise and Vibration in National Road Schemes.

7.1.7 General Avoidance Measures

It has been identified that there will be permanent impact through disturbance to wildlife during the work, and it is advised that these additional general avoidance measures be undertaken to protect commuting wildlife while the works are being carried out.

General avoidance measures that should be incorporated by the contractors working on site include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals;
- Due to the potential presence of Hedgehog; Pygmy Shrew and bat species, the use of lighting at night should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from all treelines / wooded areas.
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and

- Any pipes should be capped when not in use (especially at night) to prevent local fauna becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

7.1.8 Adjacent habitats

In order to avoid the damage and compaction of roots and vegetation, storage and movement of machinery should be avoided in rooting zones of the adjacent hedgerow/treeline habitat north of the site boundary.

Fencing should be in place in the along the area of exposed ground flora of the adjacent hedgerow on Upper Nangor Road, which will provide a sufficient buffer to prevent limb damage of the adjacent hedgerow, while also protecting the ground flora and rooting zone of local vegetation.

7.2 Mitigation and Biodiversity Enhancement features for the Operational Phase

7.2.1 Remedial Tree and Hedge Planting

The proposed transferral of sod, topsoil, cuttings and plants with their roots from the original hedgerow, along with the remedial tree and hedge planting will help enhance floral diversity within the site.

The newly added tree and hedge blossoms will improve the area for terrestrial invertebrates, while the fruits will be consumed by mammals and birds. Additionally, the trees once mature will provided ample nesting opportunities for local bird species. Furthermore, the increased invertebrate presence as a result of the new trees will provide additional prey items for insectivorous bird species, as well as the local bat populations.

7.2.2 Habitat Creation

The creation of wetland wild flora through the introduction of the attenuation areas will increase the habitat diversity within the site, with a native wildflower seed mix containing Devils Bit Scabious, Common Sorrel, Cowslip, Fleabane, Greater Trefoil, Hemp Agrimony, Lesser Knapweed, Marsh Cinquefoil, Marsh Marigold, Meadow Buttercup, Meadowsweet, Meadow Rue, Oxeye Daisy, Purple Loosestrife, Ragged Robin, Red Clover, Red Rattle, Ribwort Plantain, Selfheal, Sneezewort, Tufted Vetch, Water Avens, Wild Angelica, Wild Valerian, Yarrow, Yellow Flag Iris, Yellow Rattle, Red Rattle, Corn Marigold, Corn Poppy, Corncockle, Cornflower and Scentless Mayweed intended to be sown within the areas, increasing the overall floral diversity within the site that will lead to higher resource availability for foraging species.

It is recommended that these seeds are sourced from within the South Dublin area, in order to keep a localised genetic flow of floral species.

In addition to the attenuation areas within the site, swale / aquatic Planting is also planned, which will further increase the habitat diversity, and the introduction of the floral species Yellow Flag Iris, Water Plantain, Water forget-me-not, Bogbeam, Marsh Marigold, Ragged Robin and Brooklime.

7.2.3 Bats - Site lighting

7.2.3.1 Site Lighting Design

The lighting for the project includes the installation of a series of 6m high lighting columns, with a warm white light spectrum of 3000k throughout the housing estate of the project. The lighting layout will allow for the two linear park areas to function as dark corridors (where luminance is below 5 lux) and will allow for bat commuting and foraging conditions to remain throughout.

7.2.3.2 Light levels and type:

Lighting that meets the lowest light levels permitted under health and safety is preferable for bats in the vicinity. The specification and colour of light treatments, such as single bandwidth lights and no UV light are essential. LED luminaires are ideal and should be used where possible due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (3000K) should be used in the lighting located along the boundaries of the site to reduce the blue light component.

The development's proposed lighting design is compliant with this bat mitigation element.

7.2.3.3 Column heights of lamp posts:

As bats most likely forage in the unlit areas surrounding the site, the introduction of new lighting as a result of the new development, with accompanying light spillage, is anticipated to result in the bats becoming averse to commuting and foraging within the proposed site and potentially the adjacent habitats also. In order to reduce the amount of light spillage where it is not needed, the height of lamp columns should be restricted. A height of 6m or less is necessary to avert lighting impacts.

The development's proposed operational phase lighting design is compliant with this bat mitigation element.

7.2.4 Installation of Remedial Bat Boxes and Bird Boxes

Bat Boxes

In the interest of enhancing the site for the local bats (i.e., Pipistrelles and Leisler's Bat that display high site fidelity) JBA recommends that a minimum of two bat boxes should be installed on-site. If possible, these bat boxes should be south-facing and at least 4m off the ground. If erecting on a mature tree, the placement must be free from ivy with no branches within a 1m radius around the location of the box.

Within the Irish context, it is recommended that bat boxes be installed in dark areas around the site. Example of suitable bat boxes include the 1FF Schwegler Bat Box with Built-in Wooden Rear Panel and the 2F Schwegler Bat Box (General Purpose).

Guidance on installing bat boxes can be found here: https://www.bats.org.uk/our-work/buildingsplanning-and-development/bat-boxes/putting-up-your-box.

Simple bat boxes suitable for Pipistrelle's and Leisler's bats can be bought online or constructed by local community groups e.g., Men's Sheds. Note that some bat box designs (that are enclosed at the base) require annual cleaning out, which must be carried out by a Bat Specialist or NPWS Ranger.

Guidance on installing bat boxes is detailed in the following resource document: http://www.batcon.org/images/InstallingYourBatHouse_Building.pdf .

- A summary on installing bat boxes can be summarised as:
- Suggested locations include areas with mature trees within treelines.
- All bat boxes should be mounted at least 3-4 metres above the ground.
- Mount on the south facing side of the tree where the box exposed to the sun for part of the day.
- Do no install bat boxes on a tree that is near any lighting column.

These suggestions are generalised for the improvement of a site to become more bat friendly. As such, it is recommended that if there are intended to be bat enhancements on site, that a bat specialist provides more definitive advice on how and where to appropriately facilitate bat boxes.

Bird Boxes - House Sparrows

NBDC records list the House Sparrow on site, and additional bird boxes can be introduced into the site to facilitate nesting for them, and additional bird boxes and nesters can be introduced into the site to facilitate nesting for them.

Sparrows require a 32mm diameter oval opening for entry. Bird boxes can be hung from trees or nailed to the trunk at a height of 2-4 metres, and it is preferred that the bird boxes are south facing, although south-west or south-east facing are acceptable orientations when facing directly south is not possible.

Sparrow tower nest boxes are a multi-tiered construction of multiple boxes stacked vertically, and it is suggested that those resembling the Nestbox Eco Sparrow Towers (Figure 7-1) are used within the site. Tower nest boxes are to be installed within that are intended to be introduced through the landscaping enhancements. This will facilitate potential breeding of sparrows in the period before the introduced trees have fully matured.

Figure 7-1: Nestbox Co Eco Sparrow Tower

8 Residual Impact

Residual ecological impacts are those that remain once the development proposals have been implemented. The main aim of ecological mitigation, compensation and enhancement is to minimise or eliminate residual impacts.

8.1 Construction Phase

Preparatory and construction works will result in disturbance to the foraging and commuting habitat for protected species such as ground-dwelling mammals, bats, birds and terrestrial invertebrates, while the removal of the hedgerow / treeline along the site boundary will result in the temporary removal of foraging, nesting and commuting resources within the area.

Implementation of mitigation measures during the construction works phase, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. This will be included in a Construction Environmental Management Plan (CEMP). Included in this will be best practice measures for visual and audible disturbance, as well as control of surface and ground water pollution, which will minimise any damage to surrounding habitats and the species present outside the site area.

With the proposed mitigation implemented the residual impact during the construction phase is assessed to be of temporary negative impact on account of the removal to habitats of high local ecological importance, as well as the local protected species.

8.2 Operational Phase

The proposed relocation of sections of the existing hedge, along with the remedial planting within the development, i.e., tree and hedge planting; and the creation of new habitats through sowing of wildflower mix within the attenuation wetlands will help retain the overall floral and faunal biodiversity of the site, while the establishment of the two linear dark corridors will allow for the site and the wider environment to be connected for ground-dwelling mammals and bats.

The creation of new habitats, i.e., swale / aquatic planting and the wetland attenuation areas will lead to increased floral diversity within the site, providing additional resources for fauna within the area.

Overall, the works will have a slight, positive residual impact on the biodiversity within and adjacent to the site, given the efforts to relocate sections the hedgerow, and that the remedial planting will restore ecological function to the site, and the creation of habitats will add new resources to the area.

9 Summary of Impact Assessment

9.1 EcIA Table

Table 9-1 presents a summary of the impacts envisaged when mitigation approaches are included. Residual impacts are also described.

All other ecological impacts can be avoided, mitigated or compensated so there is no anticipated significant impact for the remaining species considered in the assessment.

Table 9-1: Summary of Impacts; Mitigations; and Significance of Residual Impacts on ecological features

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
Hedgerows / Treelines	Direct habitat removal	High Local	Permanent, negative impacts of moderate significance	Strict adherence to: - The mitigations lisited in Sub-section 7.1.1 in relation to the safe preparation and transferal of sod, topsoil, cuttings and plants - The mitigations listed in Sub-sections 7.1.3 in relation to the prevention of disturbance and/or entrapment of local fauna, and the timing and methodology of the removal of the hedgerow	Slight positive residual impact during the operational phase given the relocation of existing local features along with creation of new corridors, additional resources, and overall increase of ecological function
Mammals	Removal of habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	High Local	Short-term, negative impact of slight significance due to mammal entrapment and disturbance Permanent, negative impact of slight significance due to resources lost from habitat removal	Strict adherence to: - The mitigations listed in Sub-section 7.1.3 in relation to the timing and methodology of the removal of the hedgerow - The mitigations outlined in Sub-sections 7.1.4 and 7.1.5, ensuring the protection of local habitats which are used by local mammal species. - The mitigations listed in Sub-sections 7.1.6 and 7.1.7 in relation to the prevention of disturbance and/or entrapment of local mammals.	Slight positive residual impact during the operational phase given the creation of corridors, additional resources, and overall increase of ecological function
Bats	Removal of habitats utilised	High Local	Short-term, negative	Strict adherence to:	Slight positive residual

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
	by local bat populations, reducing their ability to provide safe commuting routes and foraging opportunities. Physical, visual and audible disturbance from construction works.		impact of slight significance due to disturbance Permanent, negative impact of slight significance due to resources lost from habitat removal	- The mitigations listed in Sub-section 7.1.3 in relation to the timing and methodology of the removal of the hedgerow - The mitigations outlined in Sub-sections 7.1.4 and 7.1.5, ensuring the protection of local habitats which are used by local bat species. - The mitigations listed in Sub-sections 7.1.6 and 7.1.7 in relation to the prevention of disturbance and/or entrapment of local bats. - The mitigations listed in Sub-section 7.1.8 in relation to the installation of remedial bat and bird boxes	impact during the operational phase given the creation of corridors, additional resources, and overall increase of ecological function
Breeding Birds	Removal of habitats utilised by local breeding birds populations, reducing their ability to provide nesting, safe commuting routes and foraging opportunities. Physical, visual and audible disturbance from construction works.	High Local	Short-term, negative impact of slight significance due to disturbance Permanent, negative impact of slight significance due to resources lost from habitat removal	Strict adherence to: - The mitigations outlined in Sub-sections 7.1.2 and 7.1.3, ensuring the protection of adjacent habitats which are used by local bird species. - The mitigations listed in Sub-sections 7.1.4 and 7.1.5 in relation to the prevention of disturbance of birds local mammals. - The mitigations listed in Sub-section 7.1.7 in relation to the timing and	Slight positive residual impact during the operational phase given the creation of corridors, additional resources, and overall increase of ecological function

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
				methodology of the removal of the hedgerow	
Fish & White-clawed Crayfish	Accidental introduction of pollutants into the habitats utilised by these water dwelling species	High Local	Slight, temporary negative impacts during the construction phase	Strict adherence to: - The mitigations outlined in Sub-sections 7.1.4 and 7.1.5 ensuring the protection of nearby watercourses which flow into rivers known for aquatic fauna.	Neutral residual impact during the operational phase

9.2 Cumulative Impacts

As there are no significant residual impacts on ecological features (following mitigation measures) from this development, there is therefore no potential for other plans or projects identified in Section 5 to act in combination with it. Therefore, significant cumulative impacts are not expected to occur on the ecological features within the proposed site.

10 Conclusion

The proposed development project has been shown to potentially impact a habitat of high local importance (hedgerow/treelines) and faunal groups (ground-dwelling mammals; bats; breeding birds, fish), whose ecological importance is of high local level in the context of this proposed site.

Based upon the information supplied, regarding the site layout and lighting plans along with remedial planting; and provided that the development is constructed in accordance with the mitigation measures outlined above, there will be no significant impacts alone or in-combination with other projects and plans, as result of the development and associated works on the ecology and local species of the area and on any designated conservation sites.

Given the scale of this development and its suitable landscape plan, the local ecology, including mammals, bats and birds, will benefit from the retention of existing ecological features (sod, topsoil, cuttings and plants from the existing hedge) along with the increased ecological function of the site (remedial planting of trees, habitat creation and installation of bird and bat boxes) associated with the operational phase of this project.

A Site Layout Plan

Issue Status	
Progress	
Planning Application	■
Fire Cert	
DisabMy Cert	
Tender	
Construction	
As Built	
Information Only	

No	Date	Revision	Initials
10	20.11.23	PART 8 ISSUE	ED

No	Date	Revision	Initials
01	13.07.23	Draft Issue For Discussion	ED
02	27.07.23	Draft Issue For Discussion	ED
03	10.08.23	Draft Issue For Discussion	ED
04	05.09.23	Draft Issue For Discussion	ED
05	27.09.23	Draft Issue For Discussion	ED
06	16.10.23	Frozen Layout as Baseline for Part 8 Pack	ED
07	24.10.23	Adjusted Ramp-station Layout as Baseline for Part 8 Pack	ED
08	02.11.23	Draft Part 8 Pack	ED
09	15.11.23	Draft Part 8 Pack – BKD Updated Unit Levels	ED

Project: RESIDENTIAL DEVELOPMENT AT UPPER NANGOR ROAD, KILCARBERY, CO. DUBLIN

Drawing Title: SITE LAYOUT PLAN

Drawing No: 6168A-P-101

Scale: 1:500@A1 | Rev: 10 | Drawn: ED | Date: 20/11/23

bkdarchitects

B Site Lighting Plan

Grid 1
Results - Horizontal Illuminance (lux)
Eav= 6.55
Emin= 1.00
Emax= 15.32
Emin/Emax= 0.07
Emin/Eav= 0.15
Emax/Eav= 2.34

Grid 2
Results - Horizontal Illuminance (lux)
Eav= 3.70
Emin= 1.07
Emax= 10.38
Emin/Emax= 0.10
Emin/Eav= 0.29
Emax/Eav= 2.81

Luminaire Data
Luminaire A AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@600mA Lamp 16 OSLON SQUARE GIANT@600mA NW 740 230V MF 0.85
Luminaire B AXIA 3.1 5295 Integrated lenses 8 OSLON SQUARE GIANT@600mA Lamp 8 OSLON SQUARE GIANT@600mA NW 730 230V MF 0.85
Luminaire C AXIA 3.2 5293 Integrated lenses 32 OSLON SQUARE GIANT@800mA Lamp 32 OSLON SQUARE GIANT@800mA NW 740 230V MF 0.85
Luminaire D AXIA 3.1 5293 Integrated lenses 16 OSLON SQUARE GIANT@600mA Lamp 16 OSLON SQUARE GIANT@600mA NW 740 230V MF 0.85
Luminaire E AXIA 3.1 5267 Integrated lenses 8 OSLON SQUARE GIANT@300mA Lamp 8 OSLON SQUARE GIANT@300mA NW 730 230V MF 0.85

Key
Luminaire A Column EXISTING
Luminaire B Column
Luminaire C Column EXISTING
Luminaire D Column EXISTING
Luminaire E Column
Beam Aiming Target
Photometric Centre

All Dimensions in metres

DRAWINGS NOTES:

1. LIGHTING TO BE SUPPLIED VIA A SOLAR TIME CLOCK WITHIN EACH PUBLIC LIGHTING MINI PILLAR.
2. A MAXIMUM OF 6No. LUMINAIRES PER CIRCUIT & 4No. CIRCUITS PER PUBLIC LIGHTING MINI PILLAR.
3. ALL COLUMNS TO BE 6 METRES HIGH WITH A 1 METRE OUTREACH BRACKET & SETBACK 1 METRE FROM KERB.
4. ALL COLUMNS TO BE HINGED & TO BE AT LEAST 1 METRE CLEAR OF ALL OVERHEAD HIGH VOLTAGE POWER LINES.
5. ALL EQUIPMENT TO BE SUITABLY IP RATED FOR THE ENVIRONMENT THEY ARE BEING INSTALLED.
6. FOR SCHEDULES OF EQUIPMENT SEE SPECIFICATION.
7. THE COMPLETE INSTALLATION TO BE CO-ORDINATED WITH ALL OTHER SERVICES.

LEGEND OF SYMBOLS:

URBIS SCHREDER AXIA 3.2 5267 8LED WARM WHITE 730 3000K 300mA 6M COLUMN FOR USE ON PEDESTRIAN WALKWAYS TO ACHIEVE 1 LUX MIN.

URBIS SCHREDER AXIA 3.1 5295 8 LED WARM WHITE 730 3000K 600mA 6M COLUMN FOR USE ON ROADS TO ACHIEVE P4 CLASS

PL MICROPILLAR TYPICAL SCHEMATIC

- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.
- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ARCHITECTURAL AND ENGINEERING DRAWINGS AND ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
- DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.

Rev No.	Date	Revision Note	Drn by	Chkd by

Rev No.	Date	Revision Note	Drn by	Chkd by

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OCSC
O'CONNOR SUTTON CRONIN
Multidisciplinary Consulting Engineers

Client:
Project: SCHOOL SITE AT KILCARBERY (SDCC)
Title: ELECTRICAL
SITE LIGHTING LAYOUT

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
-	-	-	-	-	-			

Date: Scale: @ A0 Drn by: Chkd by: Aprvd by:

N:\Projects\A-Jobs\A585\10 WIP\DESIGN\ELEC\CALCS\ELGT\New Kilcarbery Lighting\Site Lighting Drawing.dwg

C Site Landscape Plan

Soft Landscape Plan - sc. 1:500

LEGEND

SOFT LANDSCAPE
Proposed Tree Planting
Street Trees 14-16cm
T1 *Acer campestre 'Elsrijk'*
T2 *Pyrus calleryana 'Chanticleer'*
T3 *Carpinus betulus 'Fastigiata'*
T4 *Tilia cordata 'Greenspire'^*
T5 *Fagus sylvatica 'Dawyck' 16-18cm*

Open Space 14-16cm
T6 *Betula pendula*
T7 *Quercus robur 'Koster'*
T8 *Prunus avium^*
T9 *Amelanchier lamarckii*

Mulitstemmed Trees 12-14cm
T10 *Prunus avium 'Plena'*
T11 *Malus 'John Downie'^*
T12 *Betula pendula 'Multi-stem'*

G1 Amenity Grass
300mm min. Topsoil depth

G2 Amenity Grass - Rear Gardens
300mm topsoil depth

W1 Attenuation Areas: Native Wildflower Seed Mix - Ecotype Range EC05
Wetland Wild Flora (Seasonally Flooded) is a vigorous, medium tall mixture which can compete with the often fertile wetland soils on which many wetlands are situated. 1.5 grams per metre
Species List
Devils Bit Scabious, Common Sorrel, CowslipFleabane, Greater Trefoil, Hemp Agrimony, Lesser Knapweed, Marsh Cinquefoil, Marsh Marigold, Meadow Buttercup, Meadowsweet, Meadow Rue, Oxeye Daisy, Purple Loosestrife, Ragged Robin, Red Clover, Red Rattle, Ribwort Plantain, Selfheal, Sneezewort, Tufted Vetch, Water Avens, Wild Angelica, Wild Valerian, Yarrow, Yellow Flag Iris, Yellow Rattle, Red Rattle, Corn Marigold, Corn Poppy, Corncockle, Cornflower, Scentless Mayweed

S1 - Shrub Planting: Edging Buffer
450mm topsoil depth

Species Name	Specification	Plant/m2
Agapanthus 'Blue Umbrella'	c/g 2L 30-40cm ht.	7m²
Armeria maritima 'Splendens'	c/g 2L 30-40cm ht.	7m²
Bergenia cordifolia	c/g 2L 30-40cm ht.	7m²
Lavandula angustifolia 'Vera'	c/g 2L 30-40cm ht.	7m²
Perovskia 'Blue Spire'	c/g 2L 30-40cm ht.	7m²
Schizostylis coccinea 'Sunrise'	c/g 2L 30-40cm ht.	7m²

S2 - Shrub Planting
450mm topsoil depth

Species Name	Specification	Plant/m2
Agapanthus africanus	c/g 2L 30-40cm ht.	7m²
Allium ursinum	c/g P9 20-30cm ht.	7m²
^Eryngium 'Bowles' Mauve'	c/g 2L 30-40cm ht.	5m²
Libertia grandiflora	c/g 3L 30-40cm ht.	3m²
Kniphofia 'Royal Standard'	c/g 2L 30-40cm ht.	7m²
Tulbaghia violacea	c/g 2L 30-40cm ht.	3m²

S3 - Tree Pit Shrub Planting

Species Name	Specification	Plant/m2	%
Persicaria affine	c/g 1L 20-30cm ht.	7m²	50
Astible	c/g 2L 30-40cm ht.	7m²	5
Iris siberica	c/g 2L 30-40cm ht.	7m²	15
Helleborus	c/g 2L 30-40cm ht.	7m²	10
Kniphofia Red Hot Poker	c/g 2L 30-40cm ht.	7m²	15
Carex pendula	c/g 2L 30-40cm ht.	7m²	15

S4 - Swale / Aquatic Planting (Planting will Provide Habitat)
40% Yellow Flag iris (Iris pseudacorus) 2Ltr.
10% Marsh marigold (Caltha palustris) 2Ltr.
10% Water plantain (Alisma plantago-aquatica) 2Ltr.
10% Ragged robin (Lychnis flos-cuculi) 1Ltr.
10% Water forget-me-not (Myostis scorpiodes) 1Ltr.
10% Brooklime (Veronica beccabunga) 1Ltr.
10% Bogbeam (Menyanthes trifoliata) 1Ltr.

H1 - Native Hedgerow (450mm topsoil depth / 100cm Double Staggered Row)

Species Name	Specification	Centres
Craetagus monogyna	c/g 2L 40-60cm ht.	500mm
Prunus spinosa	c/g 2L 40-60cm ht.	500mm
^Ilex aquifolium	c/g 2L 40-60cm ht.	500mm
Rosa canina	c/g 2L 40-60cm ht.	500mm
Viburnum opolus	c/g 2L 40-60cm ht.	500mm

H2 - Structural Hedgerow (450mm topsoil depth / 100cm Single Row)

Species Name	Specification	Centres
Prunus lusitanica	100cm ht.	500mm

Project Title: **Residential Development at Kilcarbery, Clondalkin, South Dublin**

REV	DATE	BY	CHECKED	DESCRIPTION
B	02/11/2023	PL	RMD	Planning
A	04/10/2023	PL	RMD	Planning

Client: **South Dublin County Council**
Drawing Title: Soft Landscape Plan
Job No. 1799
Dwg No.1 4
Scale 1:500
Date 02/11/2023

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RMDA LANDSCAPE ARCHITECTS + CONSULTANTS

D Relevant Policy and Legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

D.1 Biodiversity Policy Guidance

'Biodiversity: The National Biodiversity Action Plan 2017-2021 (DCHG, 2017) sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and has been developed in response to The Earth Summit, held in Rio de Janeiro in 1992 (UN Convention on Biological Diversity) and subsequent EU and International Biodiversity strategies and policies.

As part of the Action Plan process Local Authorities (LA) must produce Biodiversity Action Plans (BAP). BAPs highlight local biodiversity issues and set out a series of objectives and action plans for the conservation of priority species and habitats where they occur in each district or county.

D.2 Designated Sites and Nature Conservation

D.2.1 Statutory Designated Nature Conservation Sites

Sites with statutory designations receive varying degrees of legal protection under Irish statute (i.e. Wildlife Act 1976 and Wildlife (Amendment) Act (2000) and European Directives (i.e. the EC Birds Directive (2009/147/EC) and EC Habitats Directive (92/43/EC). The EU directives were transposed into Irish national law and subsequent amendments were revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011 and Irish Statutory Instrument 477/2011

There are a number of statutory designations used for sites of high nature conservation value in Ireland, which are applied depending upon the importance of the site in a local, regional, national or international context. These include:

- National
- Natural Heritage Area (NHA)
- Wildfowl Sanctuary
- Statutory Nature Reserve
- Refuge for Fauna
- European
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- International
- UNESCO Biosphere Reserve
- Ramsar Convention Site
- National Park (Category II) Sites

D.2.2 Non-Statutory Designations

Non-statutory sites are afforded no statutory legal protection, but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value

A proposed Natural Heritage Area (pNHA) is an area deemed to be of special interest containing important wildlife habitat and often containing rare or threatened species. They may also be selected on the basis of their geology or geomorphology.

D.2.3 Protected and Notable Species

A number of species are protected under Irish and international legislation. In Ireland, primary protection is provided under the 1976 Wildlife Act and Wildlife (Amendment) Acts (2000 & 2010) and revision 2018. Species of European importance receive additional protection in Ireland under the Birds and Natural habitats Regulations 2011.

The Flora (Protection) Order (2015) makes it illegal to cut, uproot or damage a listed species in any way. It is illegal to alter, damage or interfere in any way with their habitats.

E Designated Sites

The site does not contain any natural direct links to the River Camac; however, the site will be integrated with the surface water drainage infrastructure which runs directly adjacent to the site; which flows south into the River Camac, which is located approximately 600m north from site. The River Camac flows into the Liffey Estuary Lower transitional waterbody, which is connected to the designated sites associated with Dublin Bay.

Table E-1: Proximity and importance of designated sites within their respective ZoI buffers.

Name	Designation	Importance	Distance from site	Hydrological distance from site
North Bull Island [004006]	SPA	International	13.5km	18.2km (indirect)
North Dublin Bay [000206]	SAC	International	16.6km	20km (indirect)
South Dublin Bay and River Tolka Estuary [004024]	SPA	International	14km	17.7km (indirect)
South Dublin Bay [000210]	SAC	International	14km	18.8km (indirect)
North-west Irish Sea [004236]	cSPA	International	18.3km	20.8km (indirect)
Grand Canal [002104]	pNHA	National	1.2km	n/a
Liffey Valley [000128]	pNHA	National	4.6km	n/a
North Dublin Bay [000206]	pNHA	National	13.3km	19.4km
South Dublin Bay [000210]	pNHA	National	14km	18.8km (indirect)
Dolphins, Dublin Bay [000201]	pNHA	National	15.2km	17.7km (indirect)

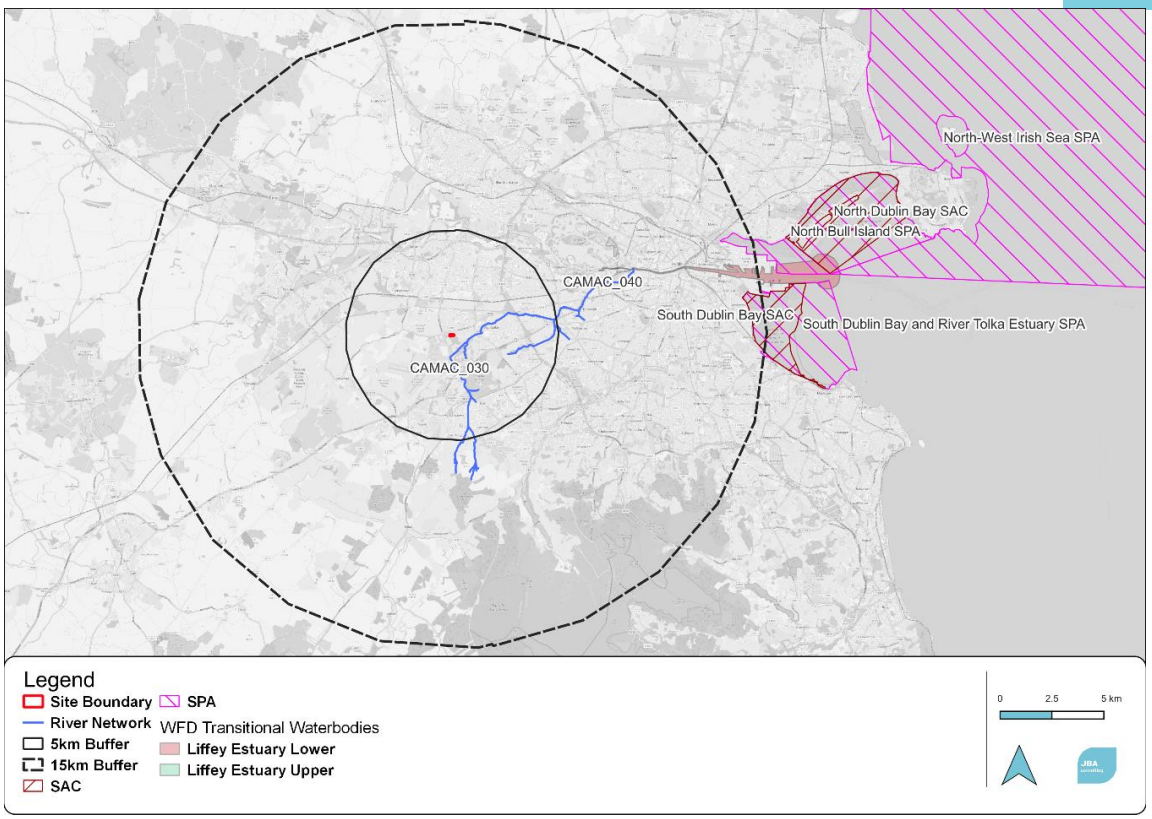

Figure E-1: Statutory designated sites (SAC and SPA) within the ZoI of the development (© OpenStreetMap contributors, 2023)

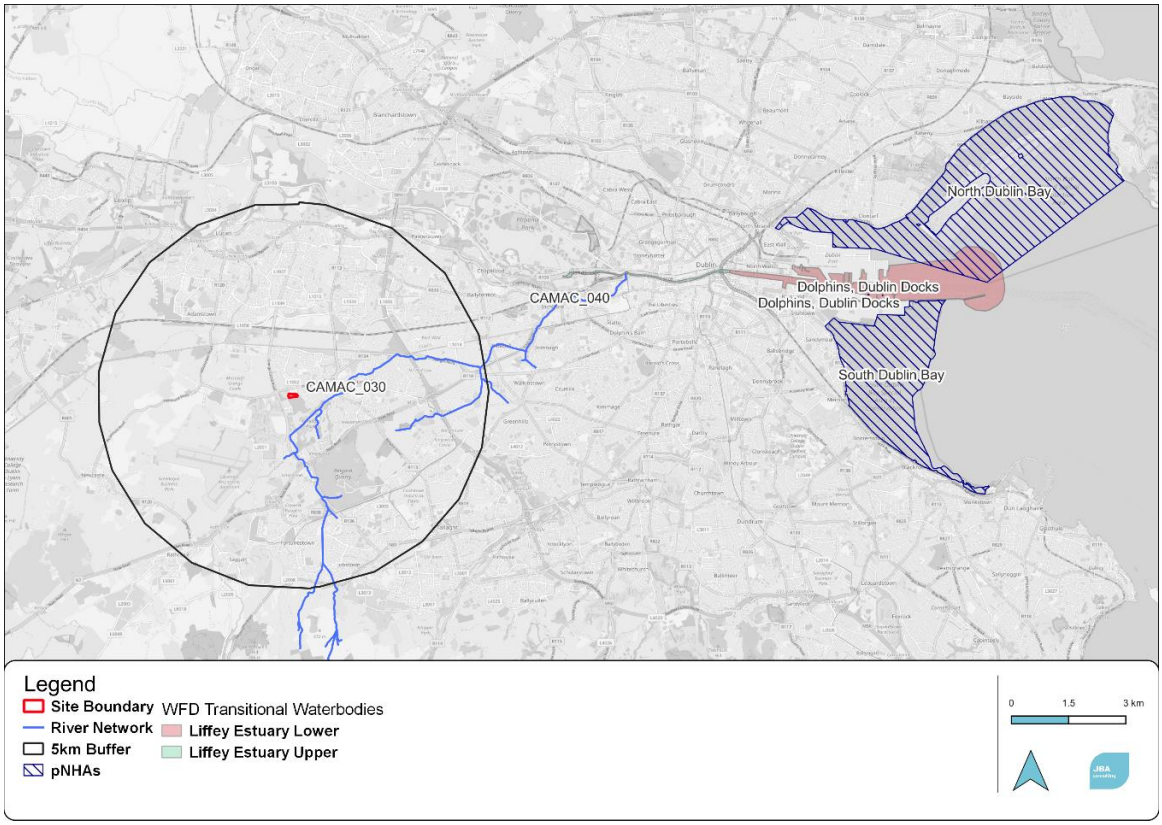

Figure E-2: Non-statutory(pNHA) designated sites within their respective ZoI of the site works (© OpenStreetMap contributors, 2023)

Table E-2: Site briefs; Qualifying Interests; and project threats and their impacts and sources to the Natura 2000 sites within the ZoI.

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
South Dublin Bay SAC [000210]	The intertidal flats at their widest points are 3km with channels existing at largest with Cockle Lake. A small sandy beach occurs near to Dun Laoighaire, with an almost entire artificial embankment. The sediments from the Tolka Estuary vary from thixotropic mud with a high organic content in the inner estuary to a well aerated and exposed sand system off the Bull Wall. Insights show that many birds who winter in South Dublin Bay do not continue towards North Dublin Bay. (NPWS, 2015a)	- Mudflats and sandflats not covered by seawater at low tide [1140] - Annual vegetation of drift lines [1210] - *Salicornia* and other annuals colonising mud and sand [1310] - Embryonic shifting dunes [2110]	Roads, motorways Low impact (outside) Urbanised areas, human habitation High impact (outside) (EEA, 2020a)
North Dublin Bay SAC [000206]	This SAC extends from the inner part of North Dublin Bay, and primarily focuses on North Bull Island. Dynamic dune systems and saltmarshes are found along this region. A variety of important and rare flora habituate this SAC, including Lesser Centaury, Red Hemp-nettle, and Meadow Saxifrage. North Dublin Bay is also of international importance for waterfowl as it hosts Brent Goose, Knot, Bar-tailed Godwit, Oystercatcher, Ringed Plover, Sanderling, and Dunlin (NPWS, 2013).	- Mudflats and sandflats not covered by seawater at low tide [1140] - Annual vegetation of drift lines [1210] - *Salicornia* and other annuals colonising mud and sand [1310] - Atlantic salt meadows *Glauco-Puccinellietalia maritimae* [1330] - Mediterranean salt meadows *Juncetalia maritimi* [1410] - Embryonic shifting dunes [2110] - Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] - Humid dune slacks [2190] - Petalwort *Petalophyllum ralfsii* [1395]	Urbanised areas, human habitation: High impact (outside) (EEA, 2020b)
South Dublin Bay and River Tolka Estuary SPA [004024]	This site covers a large part of the Dublin Bay, including the intertidal area of the River Liffey and Dun Laoghaire, along with the estuary of the River Tolka to the north of the River Liffey and Booterstown Marsh. The south of the bay has intertidal flats that at their widest extend for almost 3km. The site is important for wintering fowl, integral for the importance of the Dublin Bay complex (NPWS, 2015b).	- Light-bellied Brent Goose *Branta bernicla hrota* [A046] - Oystercatcher *Haematopus ostralegus* [A130] - Ringed Plover *Charadrius hiaticula* [A137] - Grey Plover *Pluvialis squatarola* [A141] - Knot *Calidris canutus* [A143] - Sanderling *Calidris alba* [A144] - Dunlin *Calidris alpina* [A149] - Bar-tailed Godwit *Limosa lapponica* [A157] - Redshank *Tringa totanus* [A162]	Roads, motorways Low impact (outside) Urbanised areas, human habitation High impact (outside) (EEA, 2020c)

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
		- Black-headed Gull *Chroicocephalus ridibundus* [A179] - Roseate Tern *Sterna dougallii* [A192] - Common Tern *Sterna hirundo* [A193] - Arctic Tern *Sterna paradisaea* [A194] - Wetland and Waterbirds [A999]	
North Bull Island SPA [004006]	This site covers all the inner part of north Dublin Bay, with the seaward boundary extending from Bull Wall lighthouse to Howth Head. The spit in the north is relatively recent, almost 5km long, 1km wide and running parallel to the coast between Clontarf and Sutton. The saltmarsh extends the length of the landward side of the island, providing the main site for wintering bird roosting in Dublin Bay. The wintering waterfowl use two lagoons as their primary feeding grounds, these lagoons are divided by a causeway. (NPWS, 2014)	- Light-bellied Brent Goose *Branta bernicla hrota* [A046] - Shelduck *Tadorna tadorna* [A048] - Teal *Anas crecca* [A052] - Pintail *Anas acuta* [A054] - Shoveler *Anas clypeata* [A056] - Oystercatcher *Haematopus ostralegus* [A130] - Golden Plover *Pluvialis apricaria* [A140] - Grey Plover *Pluvialis squatarola* [A141] - Knot *Calidris canutus* [A143] - Sanderling *Calidris alba* [A144] - Dunlin *Calidris alpina* [A149] - Black-tailed Godwit *Limosa limosa* [A156] - Bar-tailed Godwit *Limosa lapponica* [A157] - Curlew *Numenius arquata* [A160] - Redshank *Tringa totanus* [A162] - Turnstone *Arenaria interpres* [A169] - Black-headed Gull *Chroicocephalus ridibundus* [A179] - Wetland and Waterbirds [A999]	No project-relevant threats or pressures (EEA, 2020d)
North-west Irish Sea cSPA [004236]	The North-west Irish Sea cSPA constitutes an important resource for marine birds, it includes the estuaries and bays that open into it along with the collection of intertidal and subtidal habitats that stretch along the coast. These areas provide habitats for foraging and maintenance for QI seabirds on the north-west Irish Sea's islands and coastal headlines which are important during and outside the breeding period. The site is of conservation interest for many bird species (NPWS, 2023).	- Common Scoter *Melanitta nigra* [A065] - Red-throated Diver *Gavia stellata* [A001] - Great Northern Diver *Gavia immer* [A003] - Fulmar *Fulmarus glacialis* [A009] - Manx Shearwater *Puffinus puffinus* [A013] - Shag *Phalacrocorax aristotelis* [A018] - Cormorant *Phalacrocorax carbo* [A017] - Little Gull *Larus minutus* [A177]	No published threats or pressures by NPWS to date.

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
		- Kittiwake *Rissa tridactyla* [A188] - Black-headed Gull *Chroicocephalus ridibundus* [A179] - Common Gull *Larus canus* [A182] - Lesser Black-backed Gull *Larus fuscus* [A183] - Herring Gull *Larus argentatus* [A184] - Great Black-backed Gull *Larus marinus* [A187] - Little Tern *Sterna albifrons* [A195] - Roseate Tern *Sterna dougallii* [A192] - Common Tern *Sterna hirundo* [A193] - Arctic Tern *Sterna paradisaea* [A194] - Puffin *Fratercula arctica* [A204] - Razorbill *Alca torda* [A200] - Guillemot *Uria aalge* [A199]	

indirect impact via increased human populace within the ZoI

Table E-3: Site briefs and ecological features of conservation concern of proposed Natural Heritage Areas within the ZoI.

Site Name	Brief	Ecological Features of Conservation Concern
Grand Canal pNHA	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The diversity of the water channel is particularly high in the eastern section of the Main Line - between the Summit level at Lowtown and Inchicore. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The Smooth Newt Lissotriton vulgaris breeds in the ponds on the bank at Gollierstown in Co. Dublin. The rare and legally protected Opposite-leaved Pondweed Groenlandia densa (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin (NPWS, 2009).	- Otter *Lutra lutra* - Smooth Newt *Lissotriton vulgaris* - Opposite-leaved Pondweed *Groenlandia densa*
Liffey Valley pNHA	The Liffey Valley site is situated along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The river	- Green Figwort *Scrophularia umbrosa*

Site Name	Brief	Ecological Features of Conservation Concern
[000128]	meanders through low hills for much of its course through the site and forms the focus for the site itself. The Mill Race between Palmerstown and the weir at the Wren's Nest Public House is also included in the site. The river is a Salmon river and there are a series of weirs along the river between Palmerstown and Leixlip. The water level in the Mill Race has dropped and the channel has been filled with vegetation in a number of areas as a result. The threatened Green Figwort *Scrophularia umbrosa*, a species listed in the Irish Red Data Book, is recorded from a number of stations along the river within the site. This stretch of the river Liffey has the greatest number of recently recorded populations of this species in Ireland. The rare and legally protected Hairy St. John's Wort *Hypericum hirsutum* (Flora Protection Order 2022) has been recorded from the woodlands in this site. This species has only been recorded in Kildare and Dublin, at sites on the river Liffey, since 1970. The threatened Yellow Archangel *Lamiastrum galeobdolon*, listed in the Irish Red Data Book, is also recorded from these woodlands (NPWS, 2009).	- Hairy St. John's Wort *Hypericum hirsutum* - Yellow Archangel *Lamiastrum galeobdolon* - Salmonoid river
North Dublin Bay pNHA	As per North Dublin Bay SAC description in Table 4-2.	As per those outlined in SAC description
South Dublin Bay pNHA	As per South Dublin Bay SAC description in Table 4-2.	As per those outlined in SAC description
Dolphins, Dublin Bay pNHA	As per South Dublin Bay SAC description in Table 4-2.	As per those outlined in SAC description

F National Biodiversity Data Centre (2023)

F.1 Recent records (within 10 years) of protected species within the 5km of the site

Common Name	Record Date	Designation
Birds		
Barn Swallow *Hirundo rustica*	07/05/2016	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
Common Coot *Fulica atra*	13/01/2018	Protected Species: Wildlife Acts EU Birds Directive >> Annex II & Annex III Birds of Conservation Concern - Amber List
Common Pochard *Aythya ferina*	11/01/2023	Protected Species: Wildlife Acts EU Birds Directive >> Annex II & Annex III Birds of Conservation Concern - Amber List
Common Swift *Apus apus*	27/10/2022	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
Common Wood Pigeon *Columba palumbus*	28/03/2013	Protected Species: Wildlife Acts EU Birds Directive >> Annex II & III
Great Cormorant *Phalacrocorax carbo*	11/01/2023	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
House Martin *Delichon urbicum*	14/07/2017	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
House Sparrow *Passer domesticus*	11/01/2023	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
Sand Martin *Riparia riparia*	07/05/2016	Protected Species: Wildlife Acts Birds of Conservation Concern - Amber List
Tufted Duck *Aythya fuligula*	11/01/2023	Protected Species: Wildlife Acts EU Birds Directive >> Annex II & Annex III Birds of Conservation Concern - Amber List
Invertebrates		
Freshwater White-clawed Crayfish *Austropotamobius pallipes*	18/08/2013	EU Habitats Directive >> Annex II & V Protected Species: Wildlife Acts
Mammals		
Daubenton's Bat *Myotis daubentonii*	19/08/2013	Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Eurasian Pygmy Shrew *Sorex minutus*	15/09/2015	Protected Species: Wildlife Acts
Pine Marten *Martes martes*	25/06/2020	Habitats Directive >> Annex V Protected Species: Wildlife Acts
Soprano Pipistrelle *Pipistrellus pygmaeus*	19/08/2013	Habitats Directive >> Annex IV Protected Species: Wildlife Acts
West European Hedgehog *Erinaceus europaeus*	03/11/2021	Protected Species: Wildlife Acts

F.2 Recent records (within 10 years) of invasive species within the 5km of the site

Common Name	Record Date	Designation
Flora		
Butterfly-bush *Buddleja davidii*	13/08/2020	Medium Impact Invasive Species
Cherry Laurel *Prunus laurocerasus*	18/04/2022	High Impact Invasive Species
Indian Balsam *Impatiens glandulifera*	24/08/2021	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Japanese Knotweed *Fallopia japonica*	07/05/2016	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Spanish Bluebell *Hyacinthoides hispanica*	18/04/2022	Regulation S.I. 477 (Ireland)
Sycamore *Acer pseudoplatanus*	18/04/2022	Medium Impact Invasive Species
Three-cornered Garlic *Allium triquetrum*	01/05/2021	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Invertebrates		
Harlequin Ladybird *Harmonia axyridis*	19/06/2023	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Jenkins' Spire Snail *Potamopyrgus antipodarum*	22/06/2016	Medium Impact Invasive Species
Mammals		
American Mink *Mustela vison*	30/07/2018	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Brown Rat *Rattus norvegicus*	09/10/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Eastern Grey Squirrel *Sciurus carolinensis*	31/12/2017	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477 (Ireland)
European Rabbit *Oryctolagus cuniculus*	06/02/2014	Medium Impact Invasive Species
Greater White-toothed Shrew *Crocidura russula*	26/03/2020	Medium Impact Invasive Species

G Hedgerow Appraisal

To calculate the ecological significance of a hedgerow the Hedgerow Appraisal System assigns scores of 0-4 against several criteria: connectivity, historical significance, shrub/tree diversity, ground flora diversity, landscape value, and structures and other features. A hedgerow that scores a cumulative score of 12 or higher over the five categories is considered to be a hedgerow of "County importance". Data for each of the separate criteria was collected during the field survey.

Using Table G-1 a score was generated for each criterion using the maximum score for all the criteria's targets. For example, if a hedgerow was assigned a 1 for Ground Flora Diversity and a 3 for fern species, then the overall score for the Ground Flora Diversity criterion is 3. The values attributed to the hedgerow in this project are highlighted in bold italics.

Table G-1: Hedgerow appraisal criteria (as outlined in (Foulkes et al., 2013), targets and scores for the calculation of ecological significance (Blackthorn Ecology, 2021),

Criterion	Target	Score	Criterion Assessed
Connectivity	***None***	***0***	***Yes***
	Single Habitat Link	1	Yes
	Multiple Habitat Link	2	Yes
	Woodland/forest link	3	Yes
	Linked with designated area	4	Yes
Ground Flora Diversity	0 - 1 species	0	Yes
	2 - 3 species	1	Yes
	4 - 5 species	2	Yes
	6 - 7 species	3	Yes
	3 - 5 fern species	3	Yes
	8+ species	***4***	***Yes***
	6+ fern species	4	Yes
Landscape Value	***Mature trees***	***2***	***Yes - combined with tree/shrub diversity for analysis***
Historical Significance	Recently established	0	Yes
	Internal field boundary	1	Yes
	Road/rail/farm boundary	***2***	***Yes***
	Non-linear	3	Yes
	Townland boundary	4	Yes
Tree/shrub diversity	1 - 3 species	0	Yes
	4 - 5 species	1	Yes
	6 - 7 species	***2***	***Yes***
	8 - 9 species	3	Yes
	10+ species	4	Yes
Structures and features	Badger sett	2	Yes
	Other animal burrow	2	Yes
	Otter holt	3	Yes
	Green lane	2	Yes
	Dry drain*	***2***	***Yes***
	Wet drain[1]	3	Yes

Criterion	Target	Score	Criterion Assessed
	Stream/River	4	Yes

* - A ditch which shows no signs of being wet (i.e., Does not contain wet mud, puddles, debris to indicate a high-water mark).

[1] - A ditch which contains water or has obvious signs of containing water previously (i.e., wet mud).

The landscape criterion was combined with the tree/shrub diversity criterion as done by Blackthorn Ecology (2021) because it has only one ecologically relevant target (i.e. the presence of mature trees). As a result, five criteria were included in analysis: historical significance, connectivity, ground flora diversity, tree/shrub diversity (including landscape value) and structures and features.

The hedgerow ecological significance ranking is detailed in Table G-2.

Table G-2: Hedgerow ecological significance ranking (Blackthorn Ecology, 2021)

Rank	Score	Score Applies to	Included in analysis
County value	12 - 20	Cumulative score	Yes
	4	***For any one criterion***	***Yes***
Moderate (local) value	***6 - 11***	***Cumulative score***	***Yes***
Low (local) value	0 - 5	Cumulative score	Yes

The scoring bands were taken from Blackthorn Ecology (2021) and justification for the deviation from the scoring bands suggested by Foulkes et al. (2013) is to achieve a balance of scores. This was done, i.e. bands originally considered (0-7, 8-12, 13+) were found to be too strict when compared with the actual data: only 2.4% of hedges would have been ranked of County Value and more than 60% would have been ranked as Low Value (Blackthorn Ecology (2021). This report follows the Blackthorn Ecology methodology.

G.1 Hedgerow Ecological Condition

Data collected during fieldwork was used to calculate and assess the condition of a hedgerow. Table G- details the criteria and targets for hedgerow condition as set out by Foulkes et al. (2013).

As shown in Table G-3, there are three criteria (structure, continuity, and viability) used to assess hedgerow condition. A score for each criterion was calculated by averaging the score produced for each characteristic. Following the example of Blackthorn Ecology (2021), "*scores were rounded to the nearest whole number, but with values of x.5 rounded down to x-1*". The score for each criterion was then averaged to produce a single hedgerow condition score and rounded as above. Additionally, a score of 0 in any criteria represents an overall condition score of 0.

Table G-3: Hedgerow appraisal criteria, characteristics, targets and scores for the calculation of ecological condition (Blackthorn Ecology, 2021), the targets and scores in bold italics are those relevant to the hedgerow of the project

Criterion	Characteristic	Target	Score	Criterion Assessed
Structure	Height	< 1.5m	0	Yes
		1.5 - 2.5m	1	Yes
		2.5 - 4m	2	Yes
		> 4m	***3***	Yes
	Width	< 1m	0	Yes
		1 - 2m	1	Yes
		2- 3 m	2	Yes
		> 3m	***3***	Yes

Criterion	Characteristic	Target	Score	Criterion Assessed
	Profile	Relict or derelict	0	Yes
		Wind shaped or losing base structure	1	Yes
		Straight sided or boxed/A - shaped	2	Yes
		Overgrown or top heavy / undercut or outgrowths at base	***3***	Yes
	Base	Open	0	Yes
		Semi open	1	Yes
		Semi dense	***2***	Yes
		Dense	3	Yes
Continuity	Percent gaps	>10%	0	Yes
		5 - 10 %	***1***	Yes
		< 5%	2	Yes
		Continuous	3	Yes
	Specific gaps	***Individual gap >5m***	***0***	Yes
		Individual gap <5m	1	Yes
		No gap	2	Yes
Viability	Bank/wall degradation	> 20% degraded	0	Yes
		< 20% degraded	1	Yes
		Minor degradation	***2***	Yes
		No degradation	3	Yes
	Ivy abundance in canopy	***> 25%***	***0***	Yes
	Unfavourable species composition	***>10% woody growth volume***	***0***	Yes
	Herbicide use	> 20% of ground layer showing evidence	0	Yes
	Eutrophication	> 20% abundance of nutrient-rich species	0	Yes
	Invasive species	Presence of non-native invasive species	0	Yes
	Margin	***Ploughing or poaching up to base of hedge***	***0***	Yes
		[no target given]	1	Yes
		Margin 2 m+ on one side of hedge	2	Yes
		Margins 2 m+ on both sides of hedge	3	Yes

An example of the hedgerow condition score calculations is given by Blackthorn Ecology (2021);

1. *"A sample hedgerow was assigned a scores of 2 under hedge height and hedge width, a score of 3 for base, and a score of 0 for profile. These scores were averaged for a combined score of 2 for the Structure criterion.*

2. *It was assigned a score of 0 for percent gaps, and as this was the only characteristic able to be assessed, the overall Continuity criterion was also scored 0.*
3. *For the Viability criterion, the hedgerow was assigned a score of 1 for bank/wall degradation, 0 for unfavorable species composition, and 3 for margin, averaged for a combined score of 1.3, which was rounded down to 1.*
4. *The overall condition score was calculated as 1, i.e. (2+0+1)/3, but was reassigned to 0 since the Continuity criterion was 0*."

Table G-4 below details what each condition score represents.

Table G-4: Hedgerow condition scores and ranking

Hedgerow Condition Score	Ranking
0	Unfavourable
1	***Adequate***
2	Favourable
3	Highly favourable

G.2 Ecosystem Services Scoring

Ecosystem Services Scoring (ESS) was developed as part of the National Ecosystem Service Mapping Pilot (Parker et al., 2016). An adaption of the ESS scheme was used to assign a score for all hedgerows in Dun Laoghaire-Rathdown County.

The assessment of hedgerows conducted by Blackthorn Ecology (2021) made adjustments to this methodology to calculate the ESS of individual hedgerows within Dun Laoghaire-Rathdown County Council. The methodology for calculating ESS outlined below is consistent with the methodology developed by Blackthorn Ecology (2021).

Data collected from this hedgerow appraisal allowed for the scores of three ecosystem services to be assigned based on the greater level of detail collected during the survey, namely: Water Quality, Vegetation Carbon, and Terrestrial Biodiversity. The scores for these three ecosystem services were then added to the remaining ecosystem services scores, namely: Soil Carbon (100), Food Terrestrial (50) and Temporary water storage (250) during data analysis.

With all six ecosystem services scores added up this allowed for a minimum score of 775 and a maximum score of 1200 for an individual hedgerow.

G.2.1 Water Quality

Table G-5 details the ESS for water quality. A score was given to each hedgerow depending on the type of ditch that was associated with that hedgerow as is consistent with the ESS methodology developed by Blackthorn Ecology (2021). Following this methodology hedgerows along a waterway were given a score of 250 instead of 200. All hedgerows that did not run along a waterway were then given a score of 200.

Table G-5: ESS for water quality

Feature	Description	Score
Hedgerows not running alongside streams/rivers	***High***	***200***
Stream / River	High - Very high	250

G.2.2 Vegetation Carbon

An ESS was assigned to the hedgerow based on the size and continuity (gappiness) of hedgerows by (Blackthorn Ecology, 2021). This was calculated by adding the structure and continuity scores in Table G-3. See Table G-6 for how an ESS was assigned to each hedgerow.

Table G-6: Adjusted ESS for Vegetation Carbon (Blackthorn Ecology, 2021)

Sum of Structural and Continuity condition score	Description	Score
0-1	Moderate	150
2-3	***Moderate - high***	***175***
4	High	200
5-6	High - Very high	250

G.2.3 Terrestrial Biodiversity

An ESS for Terrestrial Biodiversity was calculated by adding the Tree/shrub diversity score and ground flora diversity score in Table G-7 for each hedgerow as is consistent with the ESS methodology developed by Blackthorn Ecology (2021).

Table G-7: Adjusted ESS for Terrestrial Biodiversity (Blackthorn Ecology, 2021)

Sum of Tree/shrub diversity and ground flora diversity	Description	Score
0	Low	75
1	Low-moderate	100
2-3	Moderate	150
4	Moderate-high	175
5-6	High	200
7	High-Very high	250
8	***Very High***	***300***

G.3 Land Use Categorisation

The surrounding land use was recorded for the hedgerow on site, and categorised as being "Urban". "Urban" hedgerows were those classified as hedgerows bordering residential housing, construction, commercial and industrial sites.

G.4 Priority Hedgerow Systems

Following the methodology set out by Blackthorn Ecology (2021), priority status was assigned to hedgerows if:

- They are of County Value for ecological significance,
- Within an area of international, national, or county importance (i.e., SAC, SPA, pNHA and locally important biodiversity sites)
- Are associated with a significant watercourse (i.e., a watercourse of 2nd or higher order according to EPA data),
- Acting as a corridor between areas of biological importance and/or significant watercourses, or,
- Acting as corridors between significant areas of woodland or scrub.

When assessing the function of a hedgerow as a corridor, small gaps such as field gates or minor roads were permitted (Blackthorn Ecology, 2021).The hedgerow

F.5 Priority Hedgerow Systems

Following the appraisal of the hedgerow on the site, the hedgerow along the boundary of the site was designated to be of Moderate value, and not of priority status in relation to its significance, while it was considered to be of high ecosystem service score, attaining a value of 1075 due to its high vegetative biodiversity and makeup.

References

Blackthorn Ecology (2021). DLR Hedgerow Review and Evaluation. Unpublished.

Blake, D., Hutson, A.M., Racey, P.A., Rydell, J., Speakman, J.R., 1994. Use of lamplit roads by foraging bats in southern England. J. Zool. 234, 453–462.

Charles, P., Edwards, P. (Eds.), 2015. Environmental Good Practice on Site Guide, Fourth edition. ed, CIRIA C, CIRIA: London.

CIEEM, 2018. 'Guidelines For Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine'.

CIEEM, 2019. Advice note on the lifespan of ecological reports and surveys. Advice-Note.pdf. Available online at: cieem.net

DoHPLG, 2018. 'River Basin Management Plan for Ireland 2018-2021'. Available online at: https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf

EA, 2011. Managing concrete wash waters on construction sites: good practice and temporary discharges to ground or to surface waters. Environmental Agency UK.

EPA, 2022a. EPA Catchments.ie [online], Catchments.ie, Available online at: https://www.catchments.ie/maps/

EPA, 2022b. EPA Maps [online], Next Generation EPA Maps, Available online at: https://gis.epa.ie/EPAMaps/

EPA, 2017. Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports DRAFT, Environmental Protection Agency. Available: http://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf

Fossitt, J.A., 2000. A Guide to Habitats in Ireland, Heritage Council of Ireland series, Heritage Council/Chomhairle Oidhreachta: Kilkenny.

Foulkes, N., Fuller, J., McCourt, S. and Murphy, P. (2013). Hedgerow Appraisal System: Best Practise Guidance on Hedgerow Surveying, Data Collation and Appraisal. [Online] Available at: hedgerow_appraisal_system.pdf (irishriverproject.com) [accessed 08/09/2023].

Four Districts Woodland Habitat Group & ors v An Bord Pleanála & ors (June 2023) IEHC 335

GSI, 2023. Geological Survey Ireland Spatial Resources: Map Viewer. Geological Survey Ireland. Available online at: https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

IAQM (2023) Institute of Air Quality Management Guidance on the assessment of dust from demolition and construction available: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

IFI, 2022 - Water Framework Directive Fish Ecological Status 2008-2021 Open Data Portal, available https://opendata-ifigis.hub.arcgis.com/datasets/IFIgis::water-framework-directive-fish-ecological-status-2008-2021/explore?location=53.365757%2C-6.414157%2C14.00 [accessed 08 Sept 2023

JBA, 2023 The Development of 88 Dwellings, Kilcarbery Co. Dublin - AA Screening

Kelly, F.L., Matson, R., Connor, L., Feeney, R., Morrissey, E., Coyne, J. and Rocks, K., 2015. Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland. JBA, 2021. Briggs Equipment, Ratoath, Co. Meath - Appropriate Assessment Screening Report. JBA Consulting Ireland.

NBDC, 2023. Biodiversity Maps - Map Viewer [online], National Biodiversity Data Centre Biodiversity

NPWS, 2019a. Conservation Objectives: Carriggower Bog SAC 000716. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Available online at: https://www.npws.ie/protected-sites/sac/000716

NPWS, 2019b. Natura 2000 – Standard Data Form: Carriggower Bog SAC. Available online at: https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0000716

NPWS, 2019c. Natura 2000 – Standard Data Form: The Murrough Wetlands SAC. Available online at: https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0002249

NPWS, 2020a. Conservation Objectives: Glen of the Downs SAC 000719. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available online at: https://www.npws.ie/protected-sites/sac/000719

NPWS, 2020b. Natura 2000 – Standard Data Form: Glen of the Downs SAC. Available online at: https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0000719

NPWS, 2020c. Natura 2000 – Standard Data Form: The Murrough SPA. Available online at: https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004186

NPWS, 2021. Conservation Objectives: The Murrough Wetlands SAC 002249. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available online at: https://www.npws.ie/protected-sites/sac/002249

NPWS, 2022. Conservation objectives for The Murrough SPA [004186]. Generic Version 9.0. Department of Housing, Local Government and Heritage. Available online at: https://www.npws.ie/protected-sites/spa/004186

NRA, 2009. Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes, National Roads Authority, available: http://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf

OPR, 2004. Quarries and Ancillary Activities Guidelines for Planning Authorities. Available https://www.opr.ie/wp-content/uploads/2019/08/2004-Quarries-and-Ancillary-Activities.pdf

Parnell, J. & Curtis, T., 2012. Webb's An Irish Flora [online], 8th ed, Trinity College Dublin. Available: http://www.corkuniversitypress.com/product-p/9781859184783.htm.

RBMP, 2018. River Basin Management Plan for Ireland 2018 -2021. Department of Housing, Planning and Local Government.

Russ, J.M. & Montgomery, W.I., 2002. Habitat associations of bats in Northern Ireland: implications for conservation. Biological Conservation 108: 49–58.

Russ, J.M., Briffa, M. & Montgomery, W.I., 2003. Seasonal patterns in activity and habitat use by bats (Pipistrellus spp. and Nyctalus leisleri) in Northern Ireland, determined using a driven transect. Journal of Zoology 259: 289–299.

Rydell J and Racey, P. A.,1993. Street lamps and the feeding ecology of insectivorous bats. Recent Advances in Bat Biology Zool. Soc. Lond. Symposium abstracts.

Smith, G.F., O'Donoghue, P., O'Hora, K., Delaney, E., 2011. 'Best practice guidance for habitat survey and mapping', The Heritage Council: Ireland

Spoelstra, K., van Grunsven, R.H., Donners, M., Gienapp, P., Huigens, M.E., Slaterus, R., Berendse, F., Visser, M.E. and Veenendaal, E., 2015. Experimental illumination of natural habitat—an experimental set-up to assess the direct and indirect ecological consequences of artificial light of different spectral composition. Philosophical Transactions of the Royal Society B: Biological Sciences, 370(1667), p.20140129

Spoelstra, K., van Grunsven, R.H., Ramakers, J.J., Ferguson, K.B., Raap, T., Donners, M., Veenendaal, E.M. and Visser, M.E., 2017. Response of bats to light with different spectra: light-shy and agile bat presence is affected by white and green, but not red light. Proceedings of the Royal Society B: Biological Sciences, 284(1855), p.20170075.

Stone, E.L., Wakefield, A., Harris, S., Jones, G., 2015. The impacts of new street light technologies: experimentally testing the effects on bats of changing from low-pressure sodium to white metal halide. Philos. T. R. Soc. B. 370, 20140127

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