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GRAND CANAL BRIDGES- BONYNGE AND LOWTOWN BRIDGES

Ecological Impact Assessment

Prepared for:

Kildare County Council

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Date: **February 2025**

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Ecological Impact Assessment

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

User is responsible for Checking the Revision Status of This Document

Rev. No.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
1	For Issue	KOR/NSC	RM	RM	27/02/2025

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1. INTRODUCTION

This assessment is an Ecological Impact Assessment (EcIA) which examines the potential effects of two proposed footbridges to the Grand Camal Greenway Phase 2 scheme one located in Lowtown and the second adjacent to Healy's/Bonynge Bridge in Co. Kildare. This EcIA has been prepared in accordance with CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.2 (Updated April 2022). An EcIA is not a statutory requirement, however, it is a best practice evaluation process. This EcIA is provided to assist the Competent Authority with its decision-making in respect of the Proposed Development. An EcIA is the process of identifying, quantifying and evaluating the potential effects of a Proposed Development on ecological features based on an objective assessment of the best information available (CIEEM, 2018). An ecological feature is defined as a species, habitat, or ecosystem that has the potential to be affected by a Proposed Development.

The purpose of this EcIA is to:

- Establish an understanding of the baseline ecological conditions at the Proposed Development site;
- Identify, quantify, and evaluate potential effects of development-related actions on habitats, species, and ecosystems;
- Identify flora and fauna (and/or their breeding and resting places) of ecological value, including those protected under the Wildlife Act (and under Flora Protection Order) or the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) which could be impacted by the Proposed Development;
- Evaluate the ecological significance of the receiving environment Botanical species were assessed in accordance with their occurrence on the Flora Protection Order (2022) and The Ireland Red List No. 10: Vascular Plants (Wyse et al. 2016). Other species records were assessed according to the Irish Red Data Lists);
- Consider measures to mitigate the potential negative impact(s) of the Proposed Development on the ecology of the receiving environment;
- Clearly and concisely present the findings of the assessment.

The specific objectives of the assessment were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site of the Proposed Development;
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the Proposed Development during its lifetime;
- Where possible, propose mitigation measures to remove or reduce those impacts at the appropriate stage of development;
- Identify opportunities for biodiversity gain and enhancement.

1.1 Project Description

The Grand Canal Greenway consists of two phases. Phase 1 stretches from Aylmers Bridge on the Kildare-Dublin border to the proposed pedestrian bridge in Sallins, Co. Kildare. Phase 2 stretches from Sallins to Clonkeen on the Offaly border. Phase 1 of the greenway route is completed and has been open to the public since late 2023. Phase 2 has previously received Part VIII consent and is currently at the detailed design stage.

Kildare County Council (KCC) are seeking Part VIII planning approval for the addition of two pedestrian bridges to the scheme. The proposed additional bridges seek to improve on the safety and user experience for all.

In the first location a new pedestrian bridge has been proposed at Lowtown circa 1km west of Robertstown, Co. Kildare. In this location the original route for the Grand Canal forced greenway users to cross the canal in Robertstown at Binns Bridge and continue on the northern bank along the L7073, before turning off and heading west toward Lowtown on the L7073-5 still on the northern canal bank.

A new pedestrian bridge is proposed just west of the connection between the old barrow line and the grand canal. The new bridge at Lowtown will allow users to cross the old barrow line, where they may then cross the existing Fenton's bridge before continuing their journey westwards using the previously consented route along the north (north east) canal bank. The proposed bridge at Lowtown will greatly improve the safety of this area of the Greenway by segregating greenway users from the traffic on the L3073 and avoiding the dangerous crossing at Binns bridge. In addition, the proposal will also provide improved connectivity between the Grand Canal Greenway and the Barrow Blue Way as well as providing additional recreational spaces for users to enjoy.

In the second location east of Robertstown, the new pedestrian footbridge is proposed circa 180m east of the existing Healy's/Bonynge bridge. The proposed bridge will allow greenway users travelling west to cross the canal and continue their journey into Robertstown on the south bank by passing under the L7081 at Healy's/Bonynge bridge. This proposed change will significantly increase the safety and sense of security of greenway users and is considered a necessary amendment to the originally proposed route of the Grand Canal Greenway. While a one way traffic light system and traffic calming measures at the bridge were considered the proposal outlined below was considered to be by far the safer and more appropriate option for this location as the proposed arrangement will completely separate greenway and road users in this location, significantly increasing both safety and sense of security.

The proposed pedestrian bridges will be of similar form of construction as the pedestrian bridge recently constructed on the Grand Canal Greenway phase I in Sallins. The proposed bridge will have a minimum 3.5m clearance to the canal water level below to allow for safe passage of canal boats. The pedestrian ramps required to allow greenway users to get up to the correct height above the canal will be constructed from reinforced earth and shall have a grass surface finish. The ramp width and gradient shall be designed to allow for universal access. The proposed bridge decking shall be a high friction buff coloured epoxy type surfacing. A 1.45m high painted steel parapet shall be provided to protect greenway users from the exposed edge.

1.1.1 Lowtown Bridge

At Lowtown the proposed bridge shall be located just west of the confluence between the Grand Canal and the Old Barrow Line. The proposed bridge will be of similar form to the pedestrian bridge in Sallins. Approach ramps will be constructed from steepened earthworks with a grassed surface finish to blend in with the surrounding landscape. A minimum 3.5m clearance shall be maintained below the bridge to allow unimpeded passage of canal boats beneath the bridge. The approach ramp will be constructed to 3.0m width and to a gradient suitable to allow for universal access.

A significant overhead high voltage power line is located in this area. The bridge has been positioned to the west of this line to avoid issues with constructability. The construction methodologies proposed shall follow the appropriate code of practice for avoidance of danger from overhead power lines and shall be developed in consultation with ESB/EirGrid.

The location of the proposed bridge in Lowtown will facilitate a change in greenway route. The greenway will no longer follow the L7037 or L7037-5 on the northern canal bank and will instead be located on the south canal bank which is currently unused. The south bank is for the most part a maintained grass bank. For the final 200m of the route on the south bank as we approach the bridge from the east, some vegetation clearance will be required. See full project layout in Drawing P20-278-ST03-P-0004.

- To facilitate the works, vegetation clearance on northern and southern bank in the area of the new pedestrian bridge and ramps will be undertaken using hand tools and light machinery. Site clearance will be limited to the area necessary to undertake the works only.
- On the southern bank the existing topsoil will be excavated and placed to one side, before a layer of granular stone is laid on the canal bank to create a solid formation level for the greenway and to act as a temporary access track for construction equipment. A geotextile separation layer will be used to provide separation between the cohesive soil and the granular material for the greenway.
- At the bridge site an exclusion zone will be set up underneath the high voltage electricity lines which traverse the site.
- The existing drain running parallel to the canal on the southern bank will be piped over a length of circa 60m to allow additional space for construction.
- The reinforced concrete foundation for the proposed pedestrian bridge will be excavated down to a suitable formation level and constructed on site. Approximately 100m^3 of concrete pour will be required. No instream work will be required. Subject to further ground investigation works it is assumed that piles will be needed to support the bridge foundation.
- The bridge steel work will be fabricated off site. Upon completion of the bridge foundations and substructure the bridge will be transported to site and lifted into position. Due to the limited width of approach roads the bridge may be fabricated in sections and assembled site.
- The bridge will be lifted into position over a short period of 1-2 days. The canal will need to be closed to marine traffic during this period. It is expected that the bridge will be lifted into position from the northwest side. No lifting equipment will be allowed to operate within, or within falling distance of the hazard zone associated the electricity lines.
- Once the bridge has been installed, earthworks will be completed on southern bank to create the bridge approach ramps. The ramps will be circa 25m in length and raise bank level by circa 3m. A green reinforced earth system with a grassed finished will be used.
- Earthworks will also be completed on northern bank to create the bridge approach ramps. The ramps will be circa 40m in length and raise bank level by circa 3m. A green reinforced earth system with a grassed finished will be used.
- A small section of earthworks ramps will be constructed below the electricity lines. The construction of this section will be completed using restricted height equipment to ensure that no equipment encroaches into the exclusion zone around the electricity cables.
- As noted on the drawings the area adjacent to the northern bank will be landscaped for further use as a trial head or recreational area.
- On the northern bank additional earthworks will be required to create a maintenance access track for future Waterways Ireland use and to reduce the gradients to existing access tracks and trails.

- Minor improvement works will be undertaken at Fentons bridge to improve the surfacing and reduce the current gradient.
- The new bridge deck and ramp surface will receive a high friction bridgemaster or similar approved surfacing.
- Bridge parapets will be installed over the new pedestrian bridge and on the approach ramps to provide edge protection to greenway users.
- Upon completion of the bridge the revised greenway route on the southern bank will be completed. A quarry dust surface finish will be applied over the granular subbase.
- The excavated topsoil shall be used to dress the sides of the greenway. The existing seed bed will be reused and allowed to regenerate. The canal verge will be preserved with a typical buffer zone of 1m allowed between the edge of greenway and the canal.
- On approach to the Robertstown the existing footway will be widened and changed to a shared use cycle and pedestrian facility.
- The existing car park on the west side of Robertstown will be modified. The eastern entrance will be closed to allow for improved greenway user access and a segregated cycle track will be provided on the canal side.
- Chicane Gates, colour contrast surfacing, road signage, road markings and other finishes shall be applied to complete the works.

1.1.2 Bonynge Bridge

The proposed Bonynge bridge location has been selected circa 175m east of the existing Bonynge/Healy's Bridge. In this location there is an existing clearing in the vegetation, thus reducing the level of vegetation clearance and associated environmental impact. See full project layout in Drawing P20-278-ST05-P-0002.

- 2.5m of vegetation clearance on northern bank over distance of approx. 110m, clearance begins at existing hedge line.
- General earthworks on northern bank over distance of 110m to raise bank by 1m, slope of raised bank to be at 70-degree angle using green terramesh system or similar.
- Raised area to slope down to meet existing canal bank over distance of 24m at 1:24 slope
- 3m wide greenway to east, min. 1m wide grass verge to be protected to south of greenway
- 3m wide access track for Waterways Ireland to be provided to west, 50mm quarry dust surfacing, 150mm 804 sub-base
- At base of ramps, permanent steel traffic bollards to be used to restrict vehicle access
- Approach ramp surfacing to be high friction surfacing on top of concrete footway, 1:24 slope for universal access
- Suitable fill material to bridge embankments, embankment slope of 70 degrees using green Terramesh system or similar
- Proposed bridge deck surface is to be steel plate with high friction bridgemaster or similar approved
- Steel bridge structure and parapets
- Greenway to narrow under existing bridge due to existing under bridge conditions
- Existing masonry under bridge to be repaired and extended for approx. 25m either side of bridge, repointing of coping stones required
- Timber post and rail fencing to boundary of vacant dwelling on southern canal bank

- Vegetation clearance required to facilitate greenway adjacent to vacant dwelling boundary
- Colour contrast surfacing, road signs and road markings where greenway passes under existing bridge (see drawing 0107 attached)
- Approx. 1m high green terramesh system to be used to widen area adjacent to bridge for greenway.

2. METHODOLOGY

2.1 International Directives

The following International Directives are of relevance to environmental assessment and planning in the Republic of Ireland.

2.1.1 Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) (The Habitats Directive)

The Habitats Directive legislation incorporates the requirements of 92/43/EEC into domestic law. The Directive aims to protect a wide range of species and habitat types and requires member states to take measures to maintain or restore them to favourable conservation status. The Regulations provide the legal framework for the implementation of the Habitats Directive in Ireland, including the designation and protection of Special Areas of Conservation (SACs) and the appropriate assessment of plans and projects to prevent adverse impacts on Natura 2000 sites, which consist of SACs and Special Protection Areas (SPAs). The Regulations also set out the conservation objectives for European (Natura 2000) sites and the measures to be taken to avoid significant adverse effects on such sites.

2.1.2 Council Directive on the Conservation of Wild Birds (2009/147/EC) (The Birds Directive)

The Council Directive on the Conservation of Wild Birds (2009/147/EC), also known as the Birds Directive, aims to conserve all wild bird species in the EU by establishing rules for their protection, conservation, management, and control, and provides a comprehensive framework for this purpose. The Directive covers birds, their eggs, nests, and habitats. It was first adopted by the European Council in 1979. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the EU in a wild context. It also includes provisions for the establishment of a general scheme of protection of all wild birds and the management of hunting including the prohibition of large scale and non-selective means of bird killing. Additionally, the Directive requires the identification and classification of Special Protection Areas (SPAs) for certain bird species listed in Annex I of the Directive, which form part of the Natura 2000 network of designated and protected sites. The EU requires member states to submit reports to the European Commission every 6 years on the measures and impacts relevant to that state. The most recent amendment is Regulation (EU) 2019/1010.

2.1.3 Water Framework Directive (WFD)

The EU WFD 2000/60/EC aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The WFD was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles; the second cycle ran from 2016 – 2021, and the current (third) cycle runs from 2022-2027. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' ecological status, through River Basin Management Plans (RBMP), by 2027.

2.1.4 Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced to give protection to migratory species across borders in Europe.

2.1.5 Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,995 Ha.

2.2 National Legislation

2.2.1 European Communities (Birds and Natural Habitats) Regulations 2011

The European Communities (Birds and Natural Habitats) Regulations 2011, as amended is part of the legislation that transposes the Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEC) into Irish law. The Regulations and their amendments provide the legal framework for the protection, management, and control of wild birds and their habitats in Ireland, and place obligations on all public authorities to have regard to the requirements of the Habitats Directive beyond the realms of planning related consents issues under the Planning and Development Act 2000, as amended. The Regulations also provide for the protection of species of European importance.

2.2.2 Wildlife Acts 1976

The Wildlife Act 1976 is the principal national legislation that aims to protect and conserve wild fauna and flora, regulate the exploitation of game resources, and afford protection to all wild species of fauna. The Wildlife Act 1976 as amended addresses various aspects of wildlife protection and conservation, including the regulation of hunting, the protection of habitats, and the enforcement of wildlife regulations.

The Wildlife Act protects species from injury, disturbance and damage to breeding and resting sites. All species listed in the Wildlife Acts must, therefore, be a material consideration in the planning process.

The Flora (Protection) Order, (2022) gives legal protection to certain species of wild flora, i.e., vascular plants, mosses, liverworts, lichens and stoneworts. Under the Order, it is an offence to uproot, damage, alter, or interfere with any species listed species listed within the Order, or to damage or alter their supporting habitats.

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Acts, 1976–2012. NHAs are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest. Proposed NHAs (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated.

2.2.3 Fisheries (Consolidation) Act 1959

Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as not only any substance that is liable to injure fish but is also liable to damage their spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.

2.2.4 Local Government (Water Pollution) Act

The Local Government (Water Pollution) Act 1977 is an Irish piece of legislation that aims to protect and improve water quality in Ireland. The act provides for the regulation of wastewater treatment and discharge, as well as the management of water resources. Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters.

2.2.5 Kildare County Development Plan 2023-2029

Kildare CDP, under objective BI O38 "Require the preparation and submission of an Ecological Impact Assessment (EcIA) including, but not limited to, bat and otter surveys for developments along river or canal corridors. This EcIA includes inter alia bat and otter survey.

2.3 Zone of Influence

CIEEM guidelines on EcIA recognises the requirement for a proportionate approach to the ecological assessment for a proposed project, noting that *"the level of detail required in an EcIA will inevitably be proportionate to the scale of the development and complexity of its potential impacts*". In this regard the guidelines prescribe that the zone of influence (ZoI) of the proposed project should be established i.e. the area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities. The guidelines also state that *"ecologists undertaking EcIAs should determine whether an ecological feature within the zone of influence of a development should be 'scoped out' (excluded) and justify the reasons for doing so".*

Each ecological feature will have different zones of influence, depending on its ecological characteristics and sensitivity to an environmental change.

Consideration is given to the following in determining the spatial and temporal scale of potential biophysical changes in the environment which might occur as a result of the development:

- The characteristics, size and location of the Proposed Project; and,
- whether there could be landscape[1] or ecological connectivity[2] to any ecological receptor.

[1] Landscape connectivity is a combined product of structural and functional connectivity, i.e. the effect of physical landscape structure and the actual species use of the landscape.
[2] Ecological connectivity is defined as a measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.

As such the scale of the EcIA extends beyond the footprint of the works and associated development boundary for the proposed pavilion project and considers potential for direct and indirect links to ecological receptors and associated ecological structure and function. From this, the key ecological receptors (KER)[3] are identified and are considered further in terms of their Zones of Influence (ZoI) i.e. the pathway for an effect on the KER (as determined through source-pathway-receptor model[4]) and the sensitivity of the KER to the effect as informed by best available guidance / data. In this regard, the following is noted:

- The potential disturbance zone for birds is considered as 500m beyond the footprint of onsite activities having regard to Cutts et al (2013)5 and NatureScot (2022)[6;]
- the potential disturbance zone for mammals is considered as 150m beyond the footprint of onsite activities having regard to NRA, (2006) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes and NRA, (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes; and
- for bats, regard was had to Bat Conservation trust (2020)[7] core sustenance zone guidance.

2.4 Desktop study

A desk study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. These sources included:

- OSI Aerial photography and 1:50000 mapping;
- National Parks and Wildlife Service (NPWS) Floral Protection Order (FPO) map viewer - Bryophytes (http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e);
- NPWS FPO map viewer - Vascular Plants (https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e);
- NPWS Habitats Directive - Article 17 GIS and Metadata map viewer (https://storymaps.arcgis.com/collections/1a721520030d404f899d658d5b6e159a);
- NPWS Birds Directive - Article 12 GIS and Metadata map viewer (https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data a);
- Geological Survey Ireland (GSI) area maps (https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx);

[3] According to the National Roads Authority guidelines (NRA 2009), key ecological receptors are features of sufficient value to be material in the decision-making process for which potential effects are likely. According to the NRA Guidelines, key ecological receptors are therefore defined as features of Local (Higher Value), County, National, or International Importance.
[4] Based on the guidance provided in the Office of the Planning Regulator: Office of the Planning Regulator (OPR) (2021) Practice Note PN01 Appropriate Assessment Screening for Development Management and Office of the Planning Regulator (OPR) (2021) Practice Note PN02 Environmental Impact Assessment Screening.
[5] Cutts N, Hemingway K and Spencer J (2013). The Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects. Produced by the Institute of Estuarine and Coastal Studies (IECS). Version 3.2.
[6] Goodship, N.M. and Furness, R.W. 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.
[7] BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London. https://www.bats.org.uk/resources/guidance-for-professionals/bat-species-core-sustenance-zones-and-habitats-for-biodiversity-net-gain

- EPA website datasets (soil, surface water quality, ground water quality, designated sites) (https://gis.epa.ie/EPAMaps/);
- National Biodiversity Data Centre (NBDC) maps (Maps - Biodiversity Maps);
- Inland Fisheries Ireland Data hub: https://opendata-ifigeo.hub.arcgis.com/
- European Breeding Bird Atlas (https://ebba2.info/);
- Map of Irish Wetlands (https://www.wetlandsurveys.ie/miw-intro);
- Botanical Society of Britain and Ireland 10 square hectares (https://bsbi.org/maps)
- Information on landscape suitability for bats was obtained from the NBDC at www.maps.biodiversityireland.ie and http://maps.biodiversityireland.ie/metadata/Landscape_Conservation_for_Irish_Bats_metadata(v.3).pdf

The following records were excluded:

- Records more than 20 years old (i.e., earlier than 2005) were considered to be historical and discarded from the assessment; and
- Records of species identified as Regionally Extinct in national red lists;

2.5 Field Study

2.5.1 Habitats

Ecological walkover surveys were conducted on 13th January 2025 by two qualified Fehily Timoney and Company ecologists, Éimear Stephenson and Shannon Burke. This included a habitat assessment of the canal banks within 200m stretches upstream and downstream of the two proposed bridge locations. The habitats were identified and classified according to 'A Guide to Habitats in Ireland' (Fossitt, 2000). The flora species present in each habitat type was recorded using the DAFOR scale.

The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011) published by the Heritage Council. The FieldMaps GIS app was used for mapping habitats. Scientific and common names for plants follow Stace (2010). In addition to habitat identification, each habitat was assessed for its ecological significance, based on CIEEM, 2018. Habitats were appraised and evaluated according to their occurrence as protected habitats under Annex I of the EU Habitats Directive (92/43/EEC) and for their ecological value.

2.5.2 Mammals

A mammal walkover survey was undertaken on the 13th January 2025 by FT Ecologists. All field sightings and field signs observed on the day were recorded using FieldMaps, such as tracks, trails, droppings, resting places or other marking signs. Survey techniques followed the following best practice guidance:

- NRA (2009) 'Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes'
- NRA, (2006). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes
- NRA, (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes
- JNCC (2004) 'Common Standards Monitoring Guidance for Mammals'
- Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1
- Reid (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76

2.5.3 Bats

Bat Survey was carried out in accordance with Collins (2018)[8] and Bat Tree Roost ID Key (Rotherham, 2018).

Bats will use different habitats at different times of year. The Collins, 2018 guidelines specify that 'surveys should always be tailored to the predicted, specific impacts of the proposed activities'. As such the scope of bat survey was determined having regard to information about the proposed bridge crossings in terms of the reasonable likelihood that bats could be impacted i.e. the zone of influence. As such the following surveys were carried out on 13th January 2025:

- Daytime Bat Walkover (DBW) - of the proposed projects and associated ZoI to observe, assess and record any habitats suitable for bats to roost, identify and record any structures, trees and other features that could be suitable for bats to roost in and any habitats that could be suitable for bats to commute, forage or swarm in/at.
- Ground level tree assessment (GLTA) - detailed inspection during daylight hours of the exterior of trees that are within the ZoI of the proposed projects from the ground level to look for features that bats could use for roosting (potential roost features - PRFs).

No PRFs were identified within the ZoI of the proposed projects and as such more intrusive inspection surveys and/or emergence and re-entry surveys were not required.

2.5.4 Avifauna

All birds observed during the ecological site walkover on the 13th January 2025 and habitat suitability to support bird species was carried out.

[8] Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London. ISBN-978-1-7395126-0-6

2.6 Ecological Evaluation Process

The value of the ecological resources and features or receptors was determined using the ecological evaluation guidance given in the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) This evaluation scheme seeks to provide value ratings for ecological receptors, with values ranging from internationally to locally important.

Internationally important receptors would include Special Areas of Conservation (SAC) or Special Protected Areas (SPA) while those of national importance would include Natural Heritage Areas (NHA).

This evaluation scheme is aimed at assessing the ecological value of sites focusing on habitats, flora and fauna within the site. The value of habitats is assessed based on condition, size, rarity, conservation and legal status. The value of flora and fauna are assessed on its national distribution, abundance or rarity, and associated trends (biodiversity value), legal status and conservation status.

Some of the habitats and species identified were selected as key ecological receptors. The NRA (NRA, 2009) refer to key ecological receptors as those ecological features which are evaluated as Locally Important (higher value) or higher and are likely to be impacted significantly by the proposed project. The features that were evaluated as being of Local Importance (higher value) and higher in this study were selected as key ecological features and the impact significance on each of these features was assessed.

2.6.1 Ecological Resource Evaluation

Ecological resources are evaluated using the criteria outlined in Appendix 1.

2.7 Process for Assessing Impact Significance

Once the value of the identified key ecological receptors (species, habitats, features and resources) was determined, the next step was to assess the potential effect or impact of the proposed works on the identified key ecological receptors. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009; CIEEM, 2018 and revisions). The impacts were assessed under a number of parameters such as magnitude, extent, duration and reversibility. The EPA (2022) evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. These criteria are included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022). Section 4 outlines the impacts identified from the proposed solar development.

3. BASELINE ENVIRONMENT

3.1 Sites of International and National Importance

3.1.1 Special Area of Conservation and Special Protected Areas (SAC'S and SPA'S)

An Appropriate Assessment (AA) Screening report has been prepared for the two proposed additional bridges which concluded that given the scale and nature of the activities there are no likely significant effects identified to any European sites with regard to the s-p-r model. The AA Screening report accompanies this EcIA.

3.1.2 Natural Heritage areas and proposed Natural Heritage Areas (NHAs and pNHAs)

Bonynge Bridge

There are no NHAs within the ZoI of the proposed project.

The proposed Bonynge bridge is within the Grand Canal pNHA (002104). The Grand Canal is an artificial waterway that links the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The NHA encompasses the canal channel and the banks on either side. Habitats along the boundaries include hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. Otter are known to use the canal. Rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order species) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin. The two proposed bridges are located within this stretch.

Ballynafagh Bog pNHA (000391) is 1.9km north of the proposed Bonynge bridge. Ballynafagh Lake pNHA (001387) is 3.3km north of the proposed Bonynge bridge. Both are beyond the zone of influence of the proposed bridge crossing.

Lowtown Bridge

The proposed Lowtown bridge is within the Grand Canal pNHA (002104). Description same as above.

Ballynafagh Bog pNHA (000391) and Ballynafagh Lake pNHA (001387) are similarly beyond the zone of influence of the proposed Lowtown bridge crossing.

3.2 Habitats

See Appendix 2 for full species lists and DAFOR scale. Habitat maps for the bridges are presented in Figure 3-3 Figure 3-5.

Lowtown

3.2.1 Canal (FW3)

The canal is an artificial waterway that forms part of the navigable waterway system. Aquatic and swamp communities within the canal are well developed with reed swamp dominated by Phragmites extensive along the canal margins. In stream species include a variety of pondweeds (*Potamogeton spp*) and water lilly (*Nuphar spp.).*

3.2.2 Dry Meadows and Grassy verges (GS2)

Dry meadows and grassy verges (GS2) with frequent meadow brome *Bromus commutatus* was the dominant habitats along the north bank, running between the canal boat docks and the existing road. Other species recorded occasionally include cow parsley, creeping buttercup ribwort plantain and meadow buttercup.

This habitat type also immediately borders the canal on the south bank dominated by Poaceae species and frequent brambles, *Rubus fruticosus.* Reed and Large Sedge Swamps (FS1)

There is a stretch of approximately 100m common reed *Phragmites australis* dominant reed and large sedge swamps (FS1) further west adjacent to the grassy verge and bordering the canal.

3.2.3 Drainage Ditches (FW4)

On the north side of the existing road, there is a FW4 drainage ditch separating the road and an ash dominant treeline.

3.2.4 Treelines (WL2)

An ash *Fraxinus excelsior* dominant WL2 treeline border the north of existing road, along the north bank. This treeline also consists of abundant ivy *Hedera helix*, frequent brambles *Rubus fruticose*, occasional hawthorn *Crataegus monogyna*.

The WL2 treeline running along the western border of this field consists of abundant ash *Fraxinus excelsior* and white willow *Salix alba.*

3.2.5 Mixed broadleaved/conifer woodland (WD2)

Mixed broadleaved/ conifer woodland (WD2) consists of abundant ash *Fraxinus excelsior*, frequent silver birch *Betula pendula* with Scots pine *Pinus sylvestris* recorded rarely.

3.2.6 Wet Grassland (GS4) and Neutral Grassland (GS1) mosaic

The field lying north of the proposed Lowtown bridge and west of the existing Robertstown bridge encompasses wet grassland GS4 in the centre of the field surrounded by GS1 neutral grassland at a higher elevation. This GS4 wet grassland is of low ecological value with low species diversity (hard rush *Juncus inflexus*) recorded and evidence of disturbance with vehicle tracks within the habitat.

Figure 3-1:Canal with northern bank comprising treeline and southern bank of grassy verge

Figure 3-2: Wet grassland field to north of proposed bridge

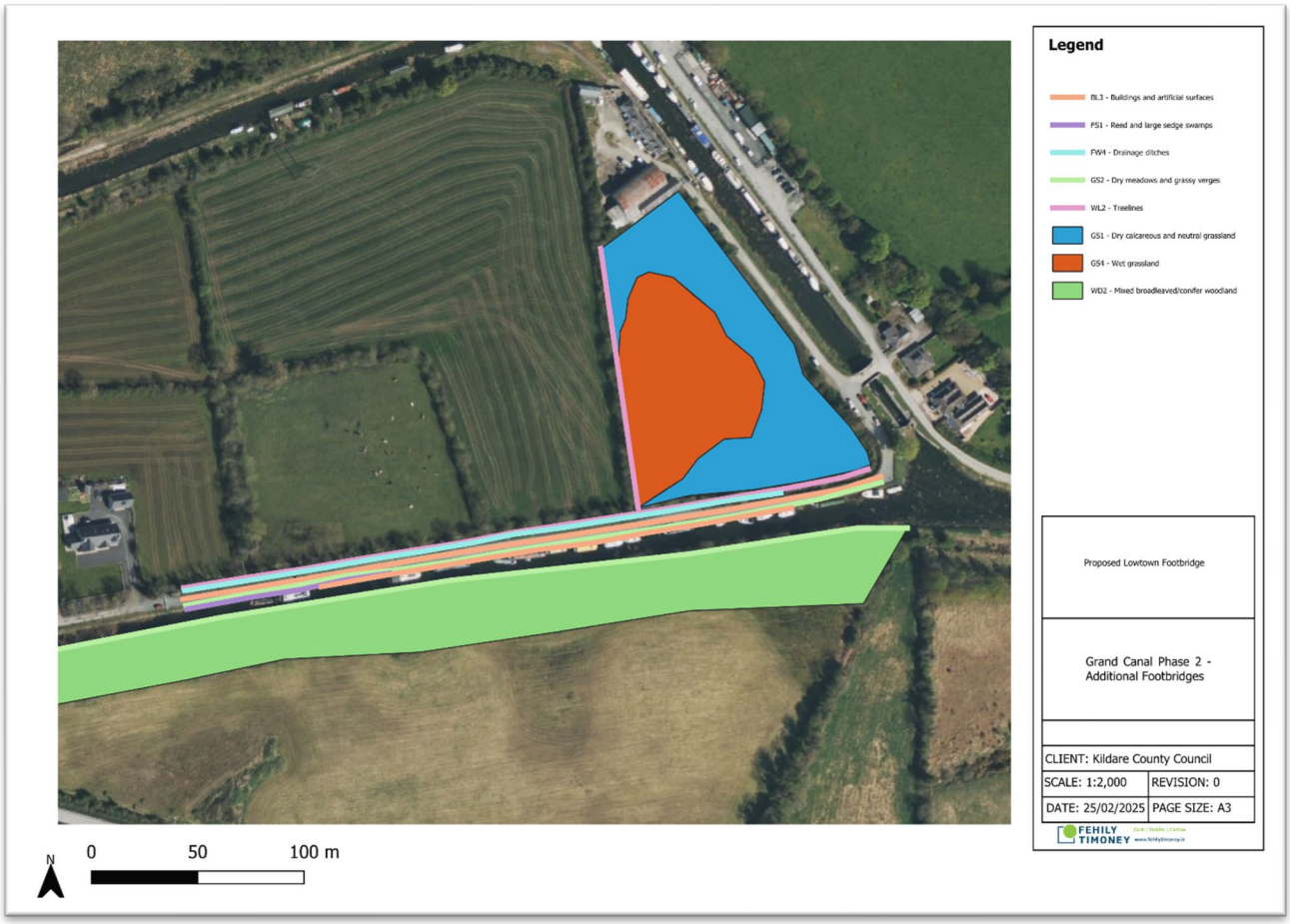

Figure 3-3: Lowtown Bridge - Habitat Map

Bonynge

3.2.7 Canal (FW3)

The canal is an artificial waterway that forms part of the navigable waterway system. Aquatic and swamp communities within the canal are well developed with reed swamp dominated by Phragmites extensive along the canal margins. In stream species include a variety of pondweeds (*Potamogeton spp*) and water lilly (*Nuphar spp.).*

3.2.8 Reed and Large Sedge Swamps (FS1)

Habitats north of the bridge include common reed *Phragmites australis* dominant reed and large sedge swamps (FS1) immediately bordering the canal.

3.2.9 Scrub (WS1)

Blackthorn *Prunus spinosa* dominant WS1 Scrub stretches along the north bank immediately adjacent and at an elevation up from the reed habitat (FS1).

3.2.10 Treeline (WL2)

An ash *Fraxinus excelsior* dominated treeline lies opposite the scrub divided by the existing road on the north bank. Hawthorn *Crataegus monogyna* is abundant within this treeline. A planted beech treeline was recorded immediately north of the ash treeline.

3.2.11 (Mixed) Broadleaved woodland (WD1)

The treeline (WL2) discussed in 3.2.10 extends west into a small area of (Mixed) broadleaved woodland (WD1) further west before the existing of Bonynge/Healy's Bridge (east of existing bridge). This was a hawthorn dominated woodland that was approximately 100m in length and 10m in width.

3.2.12 Dry calcareous and neutral grassland (GS1)

Due to land access issues, this area of land was surveyed through observations from the north bank. As such and combined with the time of year, accurate grass species identification could not be obtained.

3.2.13 (Mixed) broadleaved woodland (WD1)

Land south of the proposed bridge encompasses an area grassland surrounded by ash *Fraxinus excelsior dominated* WD1 (Mixed) broadleaved woodland.

Figure 3-4:Representative habitat at proposed bridge crossing

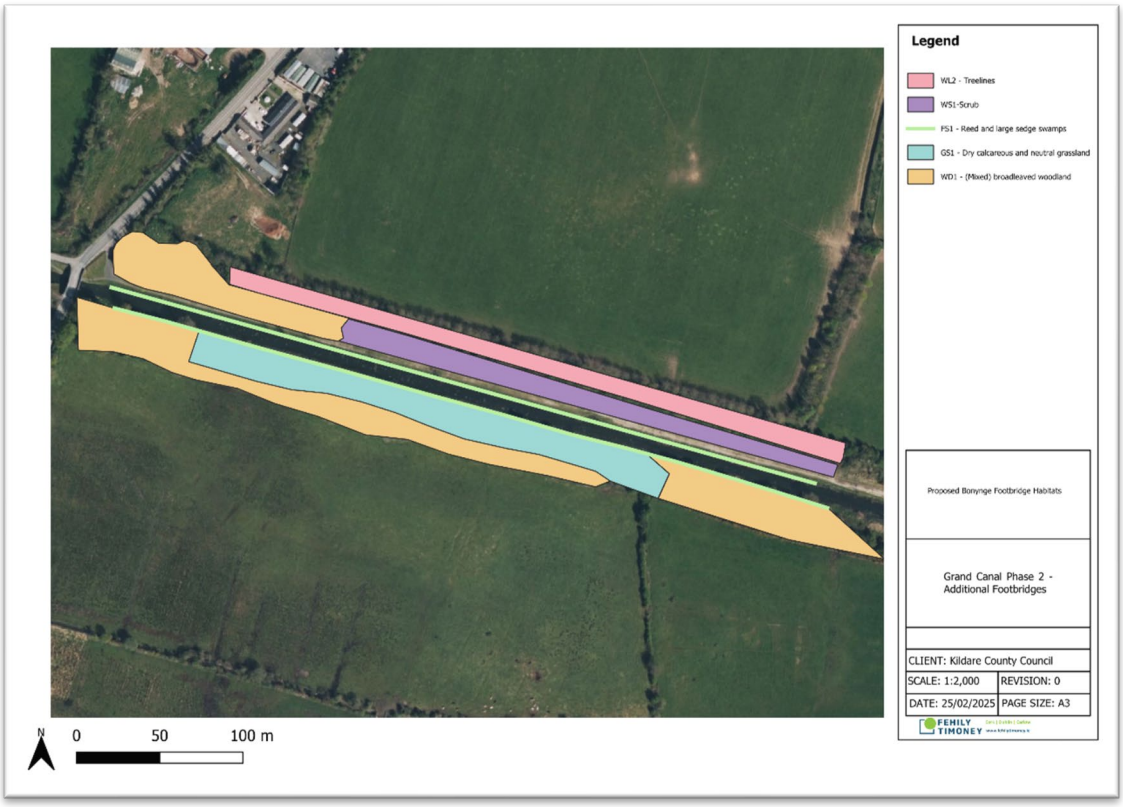

Figure 3-5: Bonynge Bridge - Habitat Map

Table 3-1: Evaluation of habitats within the footprint of works for the two proposed bridges

Habitat	Evaluation	Rationale	Selections as Key Ecological Receptor
Lowtown			
Dry Meadows and Grassy verges (GS2)	Local (Lower Value)	This habitat has low diversity of flora, typically containing very common species.	No
Reed and Large Sedge Swamps (FS1)	Local (higher Value)	This habitat has low diversity of flora, typically containing very common species. Be of local importance to amphibian species such as common frog and birds that has been recorded within the area according to the desktop study.	Yes
Treelines (WL2)	Local (Higher value)	Important to local wildlife (invertebrates, birds, mammals) and can act as ecological corridors.	Yes
Wet Grassland (GS4)	Local (Higher value)	Likely locally important for bird and amphibian species and small mammals.	Yes
Dry Calcareous and neutral grassland (GS1)	Local (Higher value)	Likely locally important for bird and amphibian species and small mammals.	Yes
Mixed broadleaved/conifer woodland (WD2)	Local (Higher value)	Important to local wildlife (invertebrates, birds, mammals) and can act as ecological corridors.	
Bonynge			
Reed and Large Sedge Swamps (FS1)	Local (Higher Value)	This habitat has low diversity of flora, typically containing very common species. Of local importance to amphibian species such as common frog and birds.	Yes
Scrub (WS1)	Local (higher Value)	Important to local wildlife (invertebrates, birds, mammals) and can act as ecological corridors.	Yes
Treeline (WL2)	Local (Higher value)	Important to local wildlife (invertebrates, birds, mammals) and can act as ecological corridors.	Yes
(Mixed) Broadleaved woodland (WD1)	Local (Higher value)	Important to local wildlife (invertebrates, birds, mammals) and can act as ecological corridors.	Yes
Dry calcareous and neutral grassland (GS1)	Local (Higher value)	Locally important to bird and mammal species.	Yes

3.3 Flora

3.3.1 Protected or Rare Flora

Opposite-leaved Pondweed *Groenlandia densa i*s known from several locations on the Grand Canal and is subject to extensive ongoing monitoring by Waterways Ireland. There are no records for this species at the proposed new bridge crossing locations and field survey did not indicate presence at the crossing locations.

3.3.2 Invasive or Non-native Flora

There are no records of Third Schedule Invasive species subject to restrictions under Regulations 49 and 50 fir the area and field survey indicated no invasive species at the proposed bridge locations.

3.4 Fauna

3.4.1 Avifauna

Bird records for the area (NBDC 10km grid squares N72 and N82) include carrion crow, common redpoll, great spotted woodpecker, Northern wheatear, barn owl *Tyto alba*, black-headed gull *Larus ridibundus*, common coot *Fulica atra*, common sandpiper *Actitis hypoleucos*, Eurasian wigeon *Anas penelope*, great cormorant *Phalacrocorax carbo*, jack snipe *Lymnocryptes minimus*, lesser black-backed gull *Larus fuscus*, tufted duck *Aythya fuligula*, water rail *Rallus aquaticus*, kingfisher *Alcedo atthis*, merlin *Falco columbarius*, little egret *Egretta garzetta*, peregrine falcon *Falco peregrinus*, European golden plover *Pluvialis apricaria*, Eurasian curlew *Numenius arquata*, yellowhammer *Emberiza citrinella*, common kestrel *Falco tinnunculus*, common snipe *Gallinago gallinago*, common swift *Apus apus*.

Of note, kingfisher is confirmed breeding along the Grand Canal, however field survey indicated no suitable kingfisher nesting habitat within 200m upstream and downstream of the proposed bridge crossing locations.

Avian species recorded during the ecology walkover conducted on 13th January 2025, include passerines such as amber-listed goldcrest *Regulus regulus* and green-listed bullfinch *Pyrrhula pyrrhula* and two amber-listed mute swans *Cygnus olor* along the canal.

3.4.2 Mammals (Excluding bats)

National Biodiversity Data Centre (NBDC) and NPWS datasets were studied for mammal records, which include European otter *Lutra lutra*, listed under Annex IV of the EU Habitats Directive, usage within the Grand Canal with spraint noted approximately 2km upstream of the existing Robertstown bridge.

There are records of pine marten *Martes martes*, Eurasian Badger *Meles meles*, West European Hedgehog *Erinaceus europaeus*, Eurasian Red Squirrel *Sciurus vulgaris*, and Eurasian Pygmy Shrew *Sorex minutus* within in 10km grid squares N72 and N82.

During the ecological walkover carried out on 13th January 2025, an otter slide was identified within 200m of the proposed Bonynge location. No other mammal signs were observed.

3.4.3 Bats

The NBDC maps landscape suitability for bats, based on Lundy et al., (2011) were assessed. This map divides the country into 1km grid squares and ranks the habitat within the squares according to its suitability for various bat species and provides a visual map of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species.

The two proposed bridges lie within an area that carries an overall bat suitability score of 28.56 out of 100. The species with the highest individual suitability scores for the area include common pipistrelle *Pipistrellus pipistrellus* (47), soprano pipistrelle *Pipistrellus pygmaeus* (42) and Leisler's bat *Nyctalus leisleri* (40).

Following a review of the Biodiversity Ireland Database, the following seven bat species have been recorded within the 10km grid squares; N72 (Lowtown Bridge) and N82 (Bonynge Bridge).

- Brown Long-eared Bat (Plecotus auritus)
- Common Pipistrelle (Pipistrellus pipistrellus)
- Daubenton's Bat (Myotis daubentonii)
- Lesser Noctule (Nyctalus leisleri)
- Nathusius's Pipistrelle (Pipistrellus nathusii)
- Natterer's Bat (Myotis nattereri)
- Soprano Pipistrelle (Pipistrellus pygmaeus)

The All Ireland Daubenton's Bat Waterways Survey monitoring programme indicates that Daubenton's Bat (*Myotis daubentonii*) is present on the grand Canal, roosting in stone bridge structures which cross the canal. While the existing the existing Robertstown bridge (located c. 150m west of the proposed Bonynge Bridge) is not included in the All Ireland Daubenton's Bat Waterways Survey. However, the bridge structure is a single stone arch with moderate suitability to support Daubenton's bats.

During the ecological walkover carried out on 13th January no potential bat roost features were identified within the zone of influence of the proposed bridge crossings. However, the treelines along the banks of the canal and patches of broadleaved woodland are suitable for bat foraging and provide commuting corridors along the canal and to larger areas of woodland in the wider hinterland.

3.4.4 Aquatic Fauna

The two bridges are situated in the Barrow surface water catchment (WFD ID_14). The proposed bridges are situated along the Grand Canal Barrow Line (Barrow) (IE_14_AWB_GCBL) artificial water body and classified as having a 'good' water status according to Water framework directive surface water programme 2016-2021.

The Grand Canal runs in an easterly direction and holds records of white-clawed crayfish *Austropotamobius pallipes*, listed under Annex II of Habitats Directive. eDNA sampling carried out on the Grand Canal as part of the National Crayfish Plague Surveillance Programme, Ireland – 2020-2021 confirms the presence of white clawed crayfish and confirms that the crayfish population is not contaminated by crayfish plague. The most recent crayfish record proximal to the proposed bridge developments in from 2022 (captured as part of the National Crayfish Plague Survelliance Programme - MOU-NPWS and Marine Institute). This record was located at the Aquaduct over Slaney, ~500m upstream of the existing Robertstown Bridge.

From a fisheries perspective, the dominant fish present are coarse fish: predominantly pike, with bream, rudd and perch also present. The canal also has a large European eel population.

The Slate_040 river is culverted under the Grand Canal. The Grand Canal crosses over the Slate_040 at ITM co-ordinates 677013.9, 725230.7, ~0.8km W of the proposed Lowtown bridge. These waterbodies are hydrologically isolated from one another.

3.4.5 Other Fauna

The NBDC holds records of Desmoulin's whorl snail (*Vertigo (Vertigo) moulinsiana*) listed under Annex II of the EU Habitats Directive within the N72 10km grid square which encompasses the proposed Lowtown bridge and N82 where the proposed Bonynge bridge is proposed. This species is a Qualifying Interest (QI) of the 001387 Ballynafagh Lake SAC, located ~195m NW of the proposed Bonynge bridge. A dedicated Desmoulin's survey was carried out at 20 sampling points where potentially suitable habitat was identified on the 29th June and 26th July 2023. Most of the survey effort was concentrated on the Western side of Bonynge Bridge, where more potentially suitable habitat was found. Habitat along most of the Blackwood feeder was unsuitable, consisting mainly of scrub and bracken. This species is primarily associated with tall marginal vegetation in calcareous lowland wetlands, swamps, fens and marshes. No Desmoulin whorl snails were recorded within any sampling points near the canal. The nearest record was >250m from the proposed Bridge locations.

The NBDC holds records of marsh fritillary (*Euphydryas aurinia*), protected under Annex II of the EU Habitats Directive from hectads N72 (most recently in 2021) and N82 (most recently in 2022). However, the lands within the footprint of works associated with the two proposed bridges do not provide suitable breeding habitat for this species due to the absence of its essential foodplant, Devil's-bit Scabious, *Succisa pratensis*.

See Table 3-2 for full detailed list of species recorded within N72 and N82.

Table 3-2: Other fauna recorded within 10k grid squares N72 and N82

Species group	Species name	Grid Square (Year)	Title of dataset	Designation
amphibian	Common Frog (*Rana temporaria*)	N72(2020); N82(2023)	Amphibians and reptiles of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
amphibian	Smooth Newt (*Lissotriton vulgaris*)	N72(2012); N82(2019)	Newt Survey 2010-2014	Protected Species: Wildlife Acts
crustacean	Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	N72(2022); N82(2021)	General Biodiversity Records from Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
insect - butterfly	Dingy Skipper (*Erynnis tages*)	N72(2021); N82(2020)	5-visit Butterfly Monitoring Scheme	Threatened Species: Near threatened

Species group	Species name	Grid Square (Year)	Title of dataset	Designation
insect - butterfly	Large Heath (*Coenonympha tullia*)	N72(2023); N82(2020)	Butterflies of Ireland post 2021	Threatened Species: Vulnerable
insect - butterfly	Marsh Fritillary (*Euphydryas aurinia*)	N72(2021); N82(2022)	Butterflies of Ireland pre-2022	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable
insect - butterfly	Small Heath (*Coenonympha pamphilus*)	N72(2023); N82(2020)	Butterflies of Ireland post 2021	Threatened Species: Near threatened
insect - butterfly	Wall (*Lasiommata megera*)	N72(2021)	Butterflies of Ireland pre-2022	Threatened Species: Endangered
insect - hymenopteran	Andrena (*Andrena*) praecox	N82(2023)	Bees of Ireland	Threatened Species: Vulnerable
insect - hymenopteran	Gooden's Nomad Bee (*Nomada goodeniana*)	N82(2020)	Bees of Ireland	Threatened Species: Endangered
insect - hymenopteran	Large Red Tailed Bumble Bee (Bombus (*Melanobombus) lapidarius*)	N82(2023)	Bees of Ireland	Threatened Species: Near threatened
insect - hymenopteran	Moss Carder-bee (Bombus (*Thoracombus) muscorum*)	N82(2023)	Bees of Ireland	Threatened Species: Near threatened
insect - hymenopteran	Common Garden Snail (*Cornu aspersum*)	N82(2006)	All Ireland Non-Marine Molluscan Database	Medium Impact Invasive Species
mollusc	Desmoulin's Whorl Snail (*Vertigo (Vertigo) moulinsiana*)	N72(2006); N82(2006)	All Ireland Non-Marine Molluscan Database	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: Wildlife Acts || Threatened Species: Endangered
mollusc	Glutinous Snail (*Myxas glutinosa*)	N82(2006)	All Ireland Non-Marine Molluscan Database	Threatened Species: Endangered
mollusc	Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	N72(2017); N82(2016)	A national macroinvertebrate dataset collected for the	Medium Impact Invasive Species

Species group	Species name	Grid Square (Year)	Title of dataset	Designation
			biomonitoring of Ireland's river network, 2007–2018 (EPA)	
mollusc	*Physella acuta*	N82(2006)	All Ireland Non-Marine Molluscan Database	Medium Impact Invasive Species
reptile	Common Lizard (*Zootoca vivipara*)	N72(2019); N82(2019)	Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts

Table 3-3: Evaluation of flora and fauna within the footprint of the two bridges (NRA, 2009)

Species	Evaluation	Rationale	Selections as Key Ecological Receptor (KER)
Avifauna	Local (Higher Value)	The treelines, scrub, (mixed) broadleaved woodland and aquatic nature of the Grand Canal may provide suitable nesting and foraging habitat for several bird species present in the area, Annex I kingfisher have been recorded previously using and breeding within the Grand Canal with possible breeding recorded approximately 4km from the proposed Lowtown bridge. There is suitable foraging and wintering habitat for Annex I little egret along the banks of the Grand Canal and in wet grassland.	Yes
Otter	Local (Higher Value)	A potential otter slide was recorded during the ecological walkover survey at 200m of the proposed Bonynge location. This species listed under Annex IV of the EU Habitats	Yes

Species	Evaluation	Rationale	Selections as Key Ecological Receptor (KER)
		Directive may be subjected to disturbance during the construction phase.	
Bats	Local (Higher Value)	The treelines and scrub are suitable commuting and foraging habitat for several bat species which may be present in the area.	Yes
Aquatic Fauna	County Importance	White-clawed crayfish is an Annex II species which is sensitive to water pollution and at risk from crayfish plague. Common frog, listed under Annex V of the EU Habitats Directive and protected under the Irish Wildlife Act are known to be present.	Yes
Other Fauna	Local (higher value)	The habitats to be affected by the proposed development are not core habitats for other fauna.	No
Protected Flora	County Importance	Records of opposite-leaved Pondweed *Groenlandia densa,* listed under the Floral Protectio Order are found within the Grand Canal, but there are no records at the proposed bridge locations.	No

4. POTENTIAL IMPACTS

4.1 Construction Phase

4.1.1 Designated Sites

An Appropriate Assessment (AA) Screening report has been prepared for the two proposed bridges which concluded that given the scale and nature of the activities there are no likely significant effects identified to any European sites with regard to the s-p-r model. The AA Screening report accompanies this EcIA.

The construction of the two proposed bridges may lead to surface water runoff into the aquatic environment of the Grand Canal which it itself is a pNHA.

There is no connectivity to the Ballynafagh bog pNHA.

4.1.2 Habitats/Flora

4.1.2.1 Lowtown Bridge

Alteration to the greenway route, connecting the existing Robertstown bridge to the proposed Lowtown bridge and the adjoining maintenance access road, will cut through the dry calcareous grassland (GS1) in the northern field, resulting in minor degradation to this habitat. These works will also require removal of some ash treeline.

Areas of the (mixed) broadleaved woodland (WL2) on the south bank will be removed where the alternative greenway route cuts through this habitat, east of the proposed bridge location. This will result in loss of habitat for local wildlife (invertebrates, birds and mammals).

4.1.2.2 Bonynge Bridge

2.5m of ash dominated WL2 treeline clearance is required on the northern bank. Earthworks will result in the removal of vegetation in the area of WD1 (Mixed) broadleaved vegetation. This will result in loss of habitat for local wildlife (invertebrates, birds and mammals).

Where alteration to the Greenway route is proposed along the south bank, vegetation clearance required to facilitate alterations to the greenway route along the south bank in a westerly direction, will involve degradation to ash dominant WL2 (Mixed) broadleaved woodland and GS1 dry calcareous and neutral grassland. location. This will result in loss of habitat for local wildlife (invertebrates, birds and mammals).

4.1.3 Avifauna

Avian species utilising the treelines, grassland and woodland areas will be subjected to temporary disturbance during the construction phase and minor habitat loss.

Impacts on Kingfisher are not anticipated given the absence of nesting habitat for this species at the bridge locations. Similarly, feeding perches are not prevalent near the bridges.

The canal provides habitat for other species such as Annex I little egret and amber-listed mute swans (two observed during the ecological walkover survey on 13th January). These species will be subjected to disturbance during the construction phase of the two proposed bridges over the canal. However, there is abundant available habitat upstream and downstream of these proposed bridge locations and therefore the effect of disturbance is considered to be of temporary and of slight significance in a local context.

Treeline/ scrub nesting species (such as goldcrest, yellowhammer, bullfinch) may be affected by habitat loss, injury or disturbance as a result of the proposed works. In particular, if works were to take place during the breeding season, disturbance to these species could be significant at a local level in the absence of mitigation measures (e.g. disturbance during the nesting season between 1st March and 31st August). The removal of (mixed) woodland broadleaved habitat may result in nesting habitat loss for some avian species. Due to the small scale of woodland removal, this is considered a permanent slight effect of significance on woodland avian species in a local context.

4.1.4 Otter

An otter slide was recorded during the ecological walkover survey at 200m of the proposed Bonynge location. This species listed under Annex IV of the EU Habitats Directive may be subjected to disturbance during the construction phase. Otter is mainly crepuscular, and works would take place mainly during daytime hours, thus minimizing the potential for disturbance to otter feeding activities.

Potential water pollution from surface runoff during construction works could result in a reduced carrying capacity of the canal for otter through impact on fisheries. Such effects are deemed negative, temporary, moderate in a local context if unmitigated.

4.1.5 Bats

Although no potential roost features were identified, the treelines along the banks of the canal may provide foraging and commuting corridors for bat species. The removal of treeline and patches of broadleaved woodland will result in habitat loss for bats equating to a permanent slight negative effect on a local context.

4.1.6 Aquatic Fauna/Flora

Vegetation clearance and earthworks required for the two proposed bridges, on the north and south banks of both proposed bridges will result in increased levels of suspended sediments susceptible to entering the Grand Canal and causing surface water contamination. Despite the bridge abutment and foundations being set back from the canal, there is potential for concrete runoff to enter the Grand Canal during the in situ pouring of concrete foundations. The effects on aquatic fauna e.g. European eel and white-clawed crayfish are deemed to be temporary slight negative.

4.2 Operational Phase

4.2.1 Designated Sites

No effects on designated sites are envisaged post-construction of the two proposed bridges.

4.2.2 Habitats/Flora

No effects on habitat or fauna will occur post construction.

4.2.3 Avifauna

No effects on birds will occur post construction.

4.2.4 Otter

No effects on otter or fauna will occur post construction.

4.2.5 Bats

No effects on bats will occur post construction.

4.2.6 Aquatic Fauna

No effects the aquatic environment will occur post construction.

4.3 Cumulative Impacts

A planning search was carried out (within the past five years) using the Kildare County Council Planning Application Database. A search of developments within 1 km of the bridge locations was carried out. Projects include single dwelling houses and extensions to agricultural buildings, and none of these projects have any notable environmental effects which might act cumulatively with the proposed bridges.

5. MITIGATION AND ENHANCEMENT MEASURES

Environmental impacts identified relate to the construction phase - these relate to loss of habitat, disturbance, and hydrological interactions. The following mitigation measures are to be implemented for both bridges in order to minimise the potential impacts on the existing ecology which are discussed below.

5.1 Site Clearance

Vegetation clearance shall be carried out outside to the bird breeding season (i.e. outside of 01st March to 31st August). In the event that vegetation clearance during the bird breeding season is unavoidable, an ECoW will be appointed to examine the area of construction/clearance for nests no more than 48 hours in advance of works. They will have the authority to include a buffer zone if needed until birds have fledged or breeding has been confirmed as failed.

A minimum of buffer zone of 1m to the canal edge shall be maintained to preserve this portion of the habitat which is considered to be of high value. Site clearance will be limited to the area necessary to undertake the works only.

The bridge abutments and foundation will be set back from the canal. No instream work will be carried out.

Felled trees will be left laying in situ for 24 hours before removal for mulching / disposal in order to allow fauna to disperse.

5.2 Site Supervision

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise will be employed to supervise vegetation clearance and to perform pre-works surveys for mammals and birds.

The Project Ecologist/ECoW will be awarded the authority to stop construction activity if there is potential for adverse ecological effects to occur.

5.3 Surface Runoff Control Measures

Water Quality of the river should be monitored throughout the repair works to prevent any increases in siltation or pollution. Chemical and physio-chemical water testing will be undertaken to help ensure any pollution arising surface runoff is prevented.

Inland Fisheries Ireland guidance on protection of fisheries during repair works will be adhered to (IFI, 2016).

The following surface water pollution control measures will be adhered to. Considering that there are no instream works required, these measures will ensure that there will be no effect of significance on aquatic species, most importantly FPO species opposite-leaved pondweed.

5.3.1 Crayfish Plague

A check, clean, dry protocol will be used to prevent the spread of crayfish plague.

All equipment which has been used in water should be treated with a disinfectant or a strong saline solution and then thoroughly dried (ideally over 24 hours) before being used in water again.

Strict biosecurity measures should be following in accordance within protocol outline by IFI (http://www.fisheriesireland.ie/Biosecurity/biosecurity-protocol-for-field-survey-work.html) to prevent the spread of crayfish plague and introduction of other alien species

5.3.2 Control of Water Pollution

Best practice construction methods will be used to avoid potential for effects on water quality and hydrology following the documents and guidelines listed below:

- Water Run-Off from Construction Sites - SEPA - (WAT-SG-75)
- The SUDS Manual - CIRIA C697. ISBN 0 86017 697 5
- Site Handbook for the Construction of SUDS - CIRIA C698 ISBN 0 86017 698 3.
- Works and maintenance in or near water - PPG5 - (October 2007)
- Environmental good practice on site guide (fourth edition) (C741)
- Guidance for Pollution Prevention, dealing with spills: GPP 22-(October 2018)
- Temporary Construction Methods - SEPA -(WAT-SG-29)
- Guidelines on protection of Fisheries During Construction Works in and Adjacent to Waters - Inland Fisheries Ireland - (IFI 2016)
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes - TII Publications (2008)

5.3.2.1 Fuelling

Fuelling of mobile plant during construction will be carried out by mobile fuel tanks equipped with pressure relief valves, built-in vents, handles for easy transportation, pumps, hoses and meters to facilitate fuel transfer operations. Any additional fuel containers and for smaller equipment (such as generators, lights etc.) used on site will be positioned on appropriately sized plant nappy/bund and stored within additional secondary containment e.g. bund for static tanks or drip trays for smaller mobile containers. Taps/nozzles for fuels and storage containers for oils will be fitted with locks to ensure their use is controlled. Only designated trained and competent operatives will be authorised to refuel plant on site.

All plant and equipment will be in good working order, checked regularly and maintained when necessary and a maintenance log maintained.

Fuels, lubricants and hydraulic fluids will be carefully handled to avoid spillage, properly secured and provided with appropriate type of spill containment kits in case of incident.

All spill-kits will be inspected on a weekly basis by the EnCoW to ensure they are maintained as fit for purpose.

Welfare / hygiene facilities will be located within the construction compounds only.

5.3.2.2 Concrete Works

On-site batching of concrete will not be permitted. Concrete will instead be transported to the Site by concrete truck. Concrete trucks will not be washed out on Site. Where chutes, hoppers/skips and equipment (e.g. vibrating wands) associated with concrete works need to be washed down this will be done into a sealed mortar bin / skip with the appropriate capacity and which has been examined in advance for any defects. The location of wash down areas will be set back as far as practically possible from any drain or watercourse, and a minimum of 50m.

Any shuttering / formwork installed to contain the concrete during pouring will be installed to a high standard with minimal potential for leaks. Additional measures will be taken to ensure this, for example the use of plastic sheeting, foams or other sealing products at joints.

Pouring of concrete into standing water within excavations will not be undertaken. Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the treatment train and buffered surface water discharge systems in place. Where the isolated working area requires constant dewatering to maintain a dry works area, pumps will be turned off during the concrete pour, and remain off until it can be ensured that the discharge will not result in a change in pH of +/-0.5 units for any nearby watercourse or drain. Alternatively, any dewatering from these areas during the concrete pour will be taken off site for disposal at a licensed waste facility for disposal. Once concrete has cured the pH of any water required to be dewatered will be checked and none of that water allowed to enter the environment unless it is back to within the normal baseline range of the local network.

The EnCoW / ECoW will continually monitor the pH of the canal upstream and downstream of the works areas during concrete works. Should any change in pH +/-0.5 be detected, concrete works will immediately be ceased. Steps will then be taken to identify the entry point to the and measures will be implemented to prevent further escape to the environment e.g. by isolating the works are or use of spill kits.

Spill kits will be readily available at the location of concrete works and will be appropriate for the containment and control of concrete spills and/or runoff.

The Community Water Officer for the Western Region, National Parks and Wildlife Services and Inland Fisheries Ireland will be notified immediately of any concrete spills / runoff into a watercourse.

5.3.2.3 Sediment Control

Waters arising from dewatering during excavation works will be diverted into the surface water management system e.g. using settlement areas, sedimentation tanks, filter bags, filter mats or natural vegetation. This will be determined by the EnCoW / ECoW. Water quality in the canal will be monitored in real time for turbidity during excavation and earthworks. Where turbidity equals or exceeds 28 Nephelometric Turbidity Units (NTU) the works will be stopped and an investigation into cause carried out and measures taken as appropriate which may include improved sediment control.

Daily visual monitoring of the canal for visible signs of construction impact will be carried out and will include assessment for evidence of oil/fuel slick, sediment plumes, fish kill.

Silt fences will be established downslope along the perimeter of source areas of surface water runoff. Silt fences will be installed close to source (as opposed to close to receptor). Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh or terram. The base of the silt fence will be bedded at least 15- 30 cm into the ground. Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains and periodically thereafter. The integrity of the silt fencing will be checked daily by the EnCoW and after poor weather conditions (rain or wind) and any failures rectified immediately. Any build-up of sediment along the fence will be removed as deemed necessary by the EnCoW and in accordance with manufacturers requirements. The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment). Silt fences will not be removed during heavy rainfall. The silt fence will not be pulled from the ground but cutaway at ground level and posts removed. A record of when it was installed, inspected and removed will be maintained by the EnCoW.

5.4 Bats

Tree felling will be in accordance with the NRA Guidelines for the Treatment of Bats During the Construction of National Road Schemes, and will be undertaken in the period late August to late October/early November.

Two bat bricks will be installed to the underside of each of the new bridge crossings (i.e. two bricks under each bridge) (see Image 5-2) to provide additional roosting opportunity for bats. The bricks will be installed under the supervision of an ecologist.

Bat boxes (3 nr. near each bridge crossing location) will be placed on trees in the woodland parallelling the canal. This will help to provide further roosting/breeding habitat for bats. The appropriate locations for same will be selected on-site by an ecologist to ensure they are sheltered from prevailing winds and exposed to the sun for part of the day. Bat boxes will be placed at least 4m above ground with a clear flight path free from overhanging branches and away from artificial light sources.

Marnell, Kelleher & Mullen 2022 recommend woodcrete (cement and sawdust) bat boxes over wooden boxes as they are more durable and need less maintenance, as well as a mixture of bat box types per tree should to cater for seasonal and species requirements. A combination of crevice type boxes (for Pipistrelle spp. and Leisler's bat) and cavity type boxes (for Myotis spp. and brown-long eared bat), or those designed for both crevice and cavity dwellers.

Image 5-1: Schwegler woodcrete bat box for cavity and crevice dwelling bats

Image 5-2: Example Schwegler bat Brick

5.5 Pollinator Habitat Management

The scheme landscape planting and habitat management shall be in accordance with the NBDC (2019) All Ireland Pollinator Plan guidance "Pollinator-friendly management of: TRANSPORTCORRIDORS" and 'Councils: actions to help pollinators. All-Ireland Pollinator Plan, Guidelines 4' and will ensure reduced cutting, mowing and spraying.

5.5.1 Bee nest box

Nest boxes for above-ground cavity nesting bees are created by drilling 10-30 holes in a piece of a wood and hanging this on a tree, at least 1m above ground facing east, south or west. The holes should be between 4 and 10mm in width and 10cm in depth. The boxes will be placed on trees near grassy verges and will require annual cleaning.

Source: Pollinators.ie (accessed Nov 2023)

Figure 5-1: Bee nest box hung on tree

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APPENDIX 1

Avian Species recorded within 10km grid squares N72 and N82

Species name	Grid Square (Year)	Title of dataset	Designation
Barn Owl (*Tyto alba)*	N82 (2018)	Birds of Ireland	Red-Listed
Barn Swallow (*Hirundo rustica*)	N72(2022); N82(2023)	Birds of Ireland	Amber-Listed
Black-billed Magpie (*Pica pica*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Blackcap (*Sylvia atricapilla*)	N72(2020); N82(2023)	Birds of Ireland	Green-Listed
Black-headed Gull (*Larus ridibundus*)	N82(2023)	Birds of Ireland	Red-listed
Blue Tit (*Cyanistes caeruleus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Brambling (*Fringilla montifringilla*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Green-Listed
Carrion Crow (*Corvus corone*)	N72(2011)	Bird Atlas 2007 - 2011	Green-Listed
Chaffinch (*Fringilla coelebs*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Coal Tit (*Periparus ater*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Common Blackbird (*Turdus merula*)	N72(2022);N82(2023)	Birds of Ireland	Green-Listed
Common Bullfinch (*Pyrrhula pyrrhula*)	N72(2023); N82(2023)	Birds of Ireland	Green-Listed
Common Buzzard (*Buteo buteo*)	N72(2023); N82(2023)	Birds of Ireland	Green-Listed
Common Chiffchaff (*Phylloscopus collybita*)	N72(2020); N82(2023)	Birds of Ireland	Green-Listed

Species name	Grid Square (Year)	Title of dataset	Designation
Common Coot (*Fulica atra*)	N82(2019)	Birds of Ireland	Amber-listed
Common Cuckoo (*Cuculus canorus*)	N72(2020); N82(2020)	Birds of Ireland	Green-Listed
Common Grasshopper Warbler (*Locustella naevia*)	N72(2011);N82(2015)	Bird Atlas 2007 - 2011	Green-Listed
Common Kestrel (*Falco tinnunculus*)	N72(2023); N82(2021)	Birds of Ireland	Red-listed
Common Kingfisher (*Alcedo atthis*)	N72(2017); N82(2023)	Birds of Ireland	Annex I/ Amber-listed
Common Linnet (*Carduelis cannabina*)	N72(2017);N82(2022)	Birds of Ireland	Amber-Listed
Common Moorhen (*Gallinula chloropus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Common Pheasant (*Phasianus colchicus*)	N72(2022);N82(2022)	Birds of Ireland	Green-Listed
Common Raven (*Corvus corax)*	N72(2023); N82(2021)	Birds of Ireland	Green-Listed
Common Redpoll (*Carduelis flammea*)	N72(2010)	Birds of Ireland	Green-Listed
Common Sandpiper (*Actitis hypoleucos*)	N82(2011)	Bird Atlas 2007 - 2011	Green-Listed
Common Snipe (*Gallinago gallinago*)	N72(2023);N82(2023)	Birds of Ireland	Red-listed
Common Starling (*Sturnus vulgaris*)	N72(2022); N82(2023)	Birds of Ireland	Amber-Listed
Common Swift (*Apus apus*)	N72(2023); N82(2023)	Swifts of Ireland	Red-listed
Common Whitethroat (*Sylvia communis*)	N72(2022); N82(2019)	Birds of Ireland	Green-Listed
Common Wood Pigeon (*Columba palumbus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Eurasian Collared Dove (*Streptopelia decaocto*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed

Species name	Grid Square (Year)	Title of dataset	Designation
Eurasian Curlew (*Numenius arquata*)	N72(2023); N82(2019)	Birds of Ireland	Red-Listed
Eurasian Jackdaw (*Corvus monedula*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Eurasian Jay (*Garrulus glandarius*)	N72(2020); N82(2018)	Birds of Ireland	Green-Listed
Eurasian Siskin (*Carduelis spinus*)	N72(2011); N82(2022)	Bird Atlas 2007 - 2011	Green-Listed
Eurasian Sparrowhawk (*Accipiter nisus*)	N72(2022); N82(2022)	Birds of Ireland	Green-Listed
Eurasian Teal (*Anas crecca*)	N72(2011);N82(2011)	Bird Atlas 2007 - 2011	Amber-Listed
Eurasian Tree Sparrow (*Passer montanus*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Amber-Listed
Eurasian Treecreeper (*Certhia familiaris*)	N72(2022); N82(2021)	Birds of Ireland	Green-Listed
Eurasian Wigeon (*Anas penelope*)	N82(2011)	Bird Atlas 2007 - 2011	Amber-listed
Eurasian Woodcock (*Scolopax rusticola*)	N72(2011); N82(2023)	Bird Atlas 2007 - 2011	Red-listed
European Golden Plover (*Pluvialis apricaria*)	N72(2023); N82(2018)	Birds of Ireland	Annex I/Red-Listed
European Goldfinch (*Carduelis carduelis*)	N72(2023);N82(2023)	Birds of Ireland	Green-Listed
European Greenfinch (*Carduelis chloris*)	N72(2018); N82(2023)	Birds of Ireland	Green-Listed
European Robin (*Erithacus rubecula*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Fieldfare (*Turdus pilaris*)	N72(2022); N82(2011)	Birds of Ireland	Green-Listed
Goldcrest (*Regulus regulus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Great Cormorant (*Phalacrocorax carbo*)	N82(2018)	Birds of Ireland	Amber-listed
Great Spotted Woodpecker (*Dendrocopos major*)	N72(2023)	Birds of Ireland	Green-Listed

Species name	Grid Square (Year)	Title of dataset	Designation
Great Tit (*Parus major*)	N72(2022);N82(2023)	Birds of Ireland	Green-Listed
Grey Heron (*Ardea cinerea*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Grey Wagtail (*Motacilla cinerea*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Hedge Accentor (*Prunella modularis*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Hen Harrier (*Circus cyaneus*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Annex I/ Amber List
Herring Gull (*Larus argentatus*)	N72(2011); N82(2022)	Bird Atlas 2007 - 2011	Amber-listed
Hooded Crow (*Corvus cornix*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
House Martin (*Delichon urbicum*)	N72(2022); N82(2022)	Birds of Ireland	Amber-Listed
House Sparrow (*Passer domesticus*)	N72(2022); N82(2023)	Birds of Ireland	Amber-Listed
Jack Snipe (*Lymnocryptes minimus*)	N82(2016)	Birds of Ireland	Green-Listed
Lesser Black-backed Gull (Larus fuscus)	N82(2011)	Bird Atlas 2007 - 2011	Amber-listed
Lesser Redpoll (*Carduelis cabaret*)	N72(2022); N82(2022)	Birds of Ireland	Green-Listed
Little Egret (*Egretta garzetta*)	N72(2011); N82(2023)	Bird Atlas 2007 - 2011	Annex I/ Green-listed
Little Grebe (*Tachybaptus ruficollis*)	N72(2011); N82(2022)	Bird Atlas 2007 - 2011	Green-Listed
Long-eared Owl (*Asio otus*)	N72(2020); N82(2021)	Birds of Ireland	Green-Listed

Species name	Grid Square (Year)	Title of dataset	Designation
Long-tailed Tit (*Aegithalos caudatus*)	N72(2023); N82(2023)	Birds of Ireland	Green-Listed
Mallard (*Anas platyrhynchos*)	N72(2023); N82(2023)	Birds of Ireland	Amber-listed
Meadow Pipit (*Anthus pratensis*)	N72(2020); N82(2020)	Birds of Ireland	Red-listed
Merlin (*Falco columbarius*)	N72(2011); N82(2022)	Bird Atlas 2007 - 2011	Annex I/ Amber-listed
Mew Gull (*Larus canus*)	N72(2011)	Bird Atlas 2007 - 2011	NA
Mistle Thrush (*Turdus viscivorus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Mute Swan (*Cygnus olor*)	N72(2017); N82(2023)	Birds of Ireland	Amber-Listed
Northern Lapwing (*Vanellus vanellus*)	N72(2023); N82(2020)	Birds of Ireland	Red-Listed
Northern Wheatear (*Oenanthe oenanthe*)	N72(2023)	Birds of Ireland	Amber List
Peregrine Falcon (*Falco peregrinus*)	N72(2015); N82(2011)	Birds of Ireland	Annex I/Green-listed
Pied Wagtail (*Motacilla alba subsp. yarrellii*)	N72(2022); N82(2023)	Birds of Ireland	Green Listed
Redwing (*Turdus iliacus*)	N72(2016); N82(2018)	Birds of Ireland	Green Listed
Reed Bunting (*Emberiza schoeniclus*)	N72(2022); N82(2011)	Birds of Ireland	Green Listed
Rock Pigeon (*Columba livia*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Green Listed
Rook (*Corvus frugilegus*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Sand Martin (*Riparia riparia*)	N72(2017); N82(2018)	Birds of Ireland	Amber-Listed
Sedge Warbler (*Acrocephalus schoenobaenus*)	N72(2019); N82(2018)	Birds of Ireland	Green Listed
Sky Lark (*Alauda arvensis*)	N72(2023); N82(2020)	Birds of Ireland	Amber-Listed

Species name	Grid Square (Year)	Title of dataset	Designation
Song Thrush (*Turdus philomelos*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Spotted Flycatcher (*Muscicapa striata*)	N72(2011);N82(2020)	Bird Atlas 2007 - 2011	Amber-Listed
Stock Pigeon (*Columba oenas*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Green-Listed
Stonechat (*Saxicola torquata*)	N72(2023); N82(2016)	Birds of Ireland	Green-Listed
Tufted Duck (*Aythya fuligula*)	N82(2018)	Birds of Ireland	Green-Listed
Water Rail (*Rallus aquaticus*)	N82(2022)	Birds of Ireland	Green-Listed
Whinchat (*Saxicola rubetra*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Red-listed
White Wagtail (*Motacilla alba*)	N72(2011); N82(2011)	Bird Atlas 2007 - 2011	Green-Listed
Willow Warbler (*Phylloscopus trochilus*)	N72(2023); N82(2023)	Birds of Ireland	Green-Listed
Winter Wren (*Troglodytes troglodytes*)	N72(2022); N82(2023)	Birds of Ireland	Green-Listed
Yellowhammer (*Emberiza citrinella*)	N72(2022); N82(2021)	Birds of Ireland	Red-Listed

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APPENDIX 2

Habitats Species Lists

Lowtown Bridge

Dry Meadows and Grassy Verges (GS2)

North Bank

Species	DAFOR
Meadow Brome - ***Bromus commutatus***	Frequent
Cow Parsley - ***Anthriscus sylvestris***	Occasional
Creeping Buttercup - ***Ranunculus repens***	Occasional
Meadow Buttercup - ***Ranunculus acris***	Occasional
Dandelion spp. - ***Taraxacum*** spp.	Occasional
Ribwort Plantain - ***Plantago lanceolata***	Occasional
Common Knapweed - ***Centaurea nigra***	Rare
Common Nettle - ***Urtica dioica***	Rare

South Bank

Species	DAFOR
Brambles - ***Rubus sp.***	Frequent
Common Reed - ***Phragmites australis***	Occasional
Ivy - ***Hedera helix***	Abundant
Hard-fern - ***Blechnum spicant***	Occasional
Hart's-tongue Fern - ***Asplenium scolopendrium***	Frequent

Reed and large sedge swamps (FS1)

Species	DAFOR
Common Reed - ***Phragmites australis***	Dominant
Creeping Buttercup - ***Ranunculus repens***	Occasional
Ribwort Plantain - ***Plantago lanceolata***	Occasional
Hogweed - ***Heracleum sphondylium***	Rare

Treeline (WL2)

Species	DAFOR
Ash - ***Fraxinus excelsior***	Dominant
Ivy - ***Hedera helix***	Abundant
Brambles - ***Rubus fruticosus***	Frequent
Common Nettle - ***Urtica dioica***	Occasional
Hawthorn - ***Crataegus monogyna***	Occasional
Blackberry spp. - ***Rubus*** spp.	Occasional
Common Knapweed - ***Centaurea nigra***	Occasional
Creeping Buttercup - ***Ranunculus repens***	Occasional
Ribwort Plantain - ***Plantago lanceolata***	Rare
Hogweed - ***Heracleum sphondylium***	Rare
White Willow - ***Salix alba***	Abundant

Wet Grassland (GS4)

Species	DAFOR
Hard Rush - ***Juncus inflexus***	Frequent
Common Reed - Phragmites australis***lis***	Frequent
Willowherb spp. - ***Epilobium*** spp.	Abundant
Alder - ***Alnus glutinosa***	Rare

Dry calcareous and neutral grassland (GS1)

Due to the time of year, accurate identification of grass species was not possible. Occasional thistle sp. Was recorded within this habitat.

Mixed broadleaved/conifer woodland (WD2)

Species	DAFOR
Ash - ***Fraxinus excelsior***	Abundant
Ivy - ***Hedera helix***	Abundant
Silver Birch - ***Betula pendula***	Frequent
Scots Pine - ***Pinus sylvestris***	Rare

Bonynge Bridge

Reed and large sedge swamps (FS1)

Species	DAFOR
Common Reed - ***Phragmites australis***	Dominant
Parrot's Feather - ***Myriophyllum aquaticum***	Rare
Water-violet - ***Hottonia palustris***	Rare
Bulrush - ***Schoenoplectus lacustris***	Rare

Scrub (WS1)

Species	DAFOR
Blackthorn - ***Prunus spinosa***	Dominant
Gorse - ***Ulex europaeus***	Dominant
Common Nettle - ***Urtica dioica***	Abundant
Brambles - ***Rubus fruticosus***	Dominant
Red Clover - ***Trifolium pratense***	Occasional
False Oat Grass - ***Arrhenatherum elatius***	Occasional
Moss spp. - ***Bryophyta*** spp.	Occasional
Hawthorn - ***Crataegus monogyna***	Occasional
Broad-leaved Dock - ***Rumex obtusifolius***	Occasional
Yarrow - ***Achillea millefolium***	Occasional
Oxeye Daisy - ***Leucanthemum vulgare***	Rare
Common Knapweed - ***Centaurea nigra***	Frequent

Treeline (WL2)

Species	DAFOR
Ash - ***Fraxinus excelsior***	Dominant
Hawthorn - ***Crataegus monogyna***	Abundant
Ivy - ***Hedera helix***	Abundant

(Mixed) broadleaved woodland (WD1)

North Bank

Species	DAFOR
Hawthorn - ***Crataegus monogyna***	Dominant
Ivy - ***Hedera helix***	Abundant
Hogweed - ***Heracleum sphondylium***	NA
Common Nettle - ***Urtica dioica***	NA
Yarrow - ***Achillea millefolium***	NA

South Bank

Species	DAFOR
Ash - ***Fraxinus excelsior***	Dominant

Dry calcareous and neutral grassland (GS1)

Due to land access issues, this area of land was surveyed through observations from the north bank. As such and combined with the time of year, accurate grass species identification could not be obtained.

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