5. BIODIVERSITY

5.1 Introduction

This chapter assesses the likely significant effects that the Proposed Development may have on Biodiversity and mitigates any potential effects that are identified. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976, as amended, EU Habitats Directive and the EU Birds Directive among other relevant legislation. Where potential effects are identified, mitigation is prescribed and residual impacts on biodiversity are assessed. The full description of the Proposed Development is provided in Chapter 3 of this EIAR.

The chapter is structured as follows:

- The Introduction provides a description of the legislation, guidance and policy context regarding Biodiversity, Flora and Fauna.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided. This is followed by an Assessment of Effects which are described with regard to each phase of the development: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Biodiversity.

The following defines terms utilised in this chapter:

- "Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- "Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned following best available guidance and adopting a precautionary approach.

5.1.1 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act 1976 (as amended) is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild creatures and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife Act. These sites do not form part of the Natura 2000 network of European sites and the AA process, or screening for same, does not apply to NHAs or pNHAs. Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily

proposed or designated[1] However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future.

The Flora (Protection) Order 2022 S.I. No. 235 lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under Flora Protection Order. It is illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

National Policy

Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives. The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Wildlife Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

- **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.
- **Objective 2: Meet Urgent Conservation and Restoration Needs.** Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.
- **Objective 3: Secure Nature's Contribution to People.** Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.
- **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.
- **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives:** Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.

Such objectives have informed the evaluation of ecological features recorded within the EIAR Study Boundary and the ecological assessment process.

Such policies have informed the evaluation of ecological features recorded within the Site and the ecological assessment process. Pollinator friendly measures have been incorporated into the Proposed Development as part of the proposed landscape plan/mitigation plan (Figure 6-5).

European Legislation

The EU Habitats Directive (92/43/EEC) (together with the Birds Directive (79/409/EEC), as subsequently codified by Council Directive 2009/147/EC on the conservation of wild birds) forms the

[1] https://www.npws.ie/protected-sites/nha

cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites (hereafter referred to as European sites[2]) and the strict system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive and Birds Directive, which were transposed into Irish law through Part XAB of the Planning and Development Acts 2000 (as amended) (from a land use planning perspective) recognise the significance of protecting rare and endangered species of flora and fauna, and more importantly, their habitats.

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed on both Annex II and Annex IV. The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this EIAR.

Council Directive 2009/147/EC on the conservation of wild birds (the "**Birds Directive**") instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this Ecological Impact Assessment. A detailed assessment of the likelihood of the Proposed Development having either a significant effect or an adverse impact on any relevant European Sites (i.e. SACs, cSACs, SPAs or cSPAs) has been carried out in the Appropriate Assessment Screening Report and Natura Impact Statement. A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

In addition to the above, the following legislation applies with respect to habitats, fauna, invasive species and water quality in Ireland and has been considered in the preparation of this chapter:

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).
- The following legislation applies with respect to non-native species - Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

[2] *The term Natura 2000 network was replaced by 'European site' under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011.*

5.1.2 Review of Relevant Guidance and Sources of Consultation

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM 2018).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2022).
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).

5.1.3 Statement of Authority

Baseline ecological surveys of the site were undertaken on the 30th of March 2023, 25th of April 2023, 18th of May 2023, 28th of August 2023 and 17th of April 2024 by Brónagh Boylan (BSc. Env), Rachel Minogue (BSc. Env), Aran von der Geest Moroney (BSc. Eco), and David Culleton (BSc. Zoology, M.Sc. Conservation Behaviour). Sara Fissolo (BSc. Eco) and David Culleton (BSc., M.Sc.) undertook bat surveys of the site. All surveyors have extensive experience in ecological assessment and surveying. Brónagh Boylan (BSc. Env) and Cora Twomey (B.Sc. Eco) are the authors of this report. Rachel Walsh (B.Sc. Env) has reviewed this report. Rachel has over 4 years of experience in ecological consultancy.

5.2 Proposed Development

5.2.1 Site Location

The Proposed Development site comprises land in the townlands of Ballyquin More, Leitrim, Woodpark and Fahy More North, Co. Clare. It is located approximately 8 kilometres southwest of the town of Killaloe and 1.5 kilometres to the northwest of the village of Bridgetown, Co. Clare. The site comprises a quarry void area which has been used for sand and gravel extraction since c. 1954. The Grid Reference co-ordinates for the approximate centre of the site are X 562651, Y 669425 in Irish Transverse Mercator (ITM).

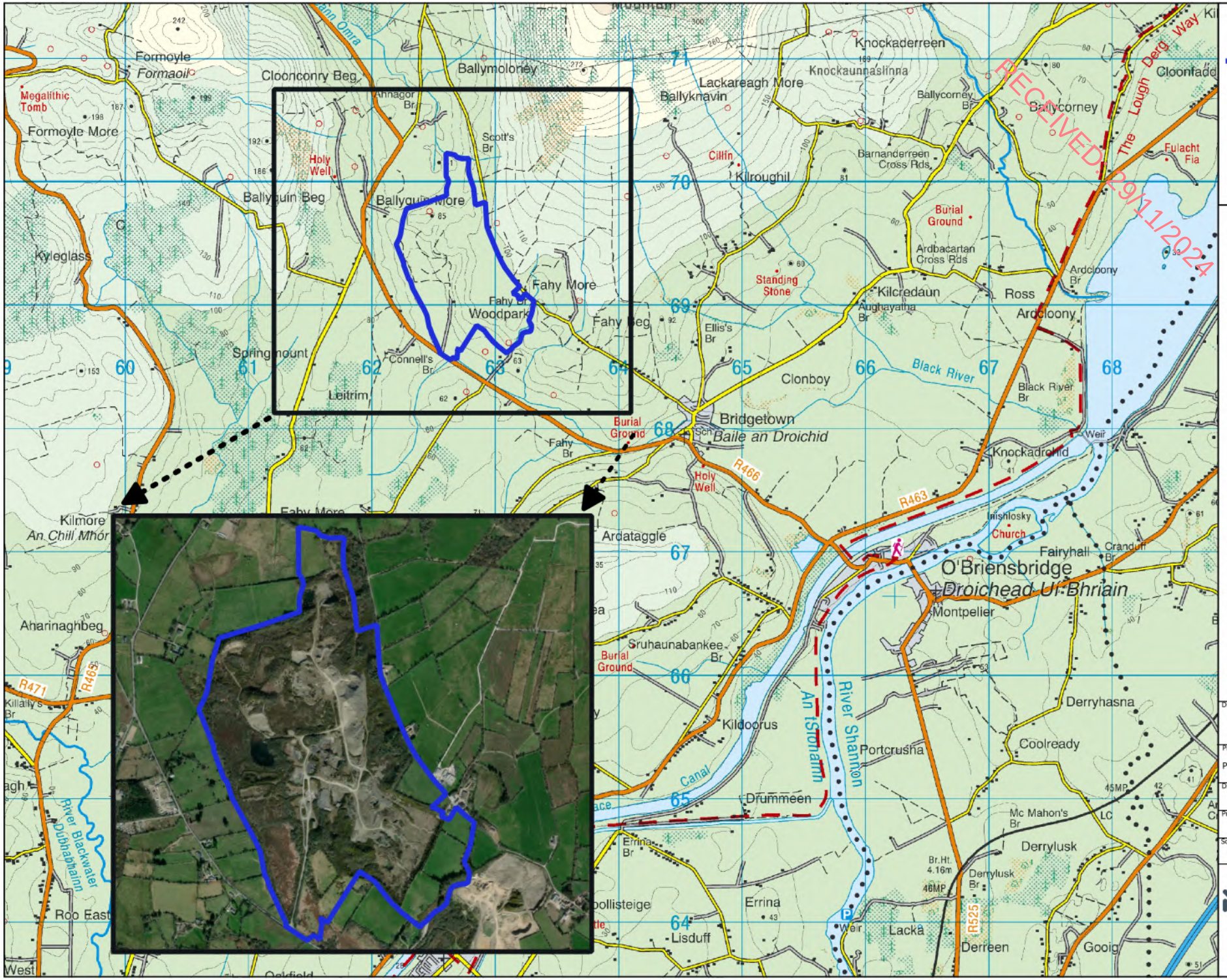
The site location is shown in Figure 5-1.

5.2.2 Brief Summary of the Proposed Development

The Proposed Development being applied for under this planning application includes for the construction of a soil inspection shed, refuelling area, settlement ponds, road improvements, drainage network and environmental berms. The Proposed Development also includes for the extraction, processing and washing of sand and gravel from an area measuring approximately 16.3 hectares (ha) which will allow for the extraction of approximately 1,428,571 tonnes of material.

The development proposals also include for the infilling and restoration of an existing and future quarry void back to original land contour levels. It is proposed to fill the void with either inert soil and stone waste (imported inert greenfield and non-greenfield soils and stone, and river dredge spoil) which will be a soil recovery facility and require a waste management licence or soil and stone by-product (i.e., essentially virgin soil or equivalent to virgin soil and stone, and river dredge spoil) which will be notified to the Environmental Protection Agency (EPA) as an Article 27 by-product. The quantity of soil and stone material required for restoration has been estimated to be approximately 4,471,200 tonnes.
A layout of the Proposed Development is provided in Figure 5-2.

A detailed description of the Proposed Development is provided in Chapter 3 of this EIAR.


RECEIVED: 29/11/2024
Map Legend
Proposed Development boundary
Microsoft product screen shots reprinted with permission from Microsoft Corporation
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Drawing Title
Site Location Map
Project Title
Proposed Quarry Extraction and Restoration at Roadstone Ballyquin, Co. Clare
Drawn By
CT
Checked By
RW
Project No.
211137
Drawing No.
Figure 5-1
Scale
1:40,000
Date
15.10.24
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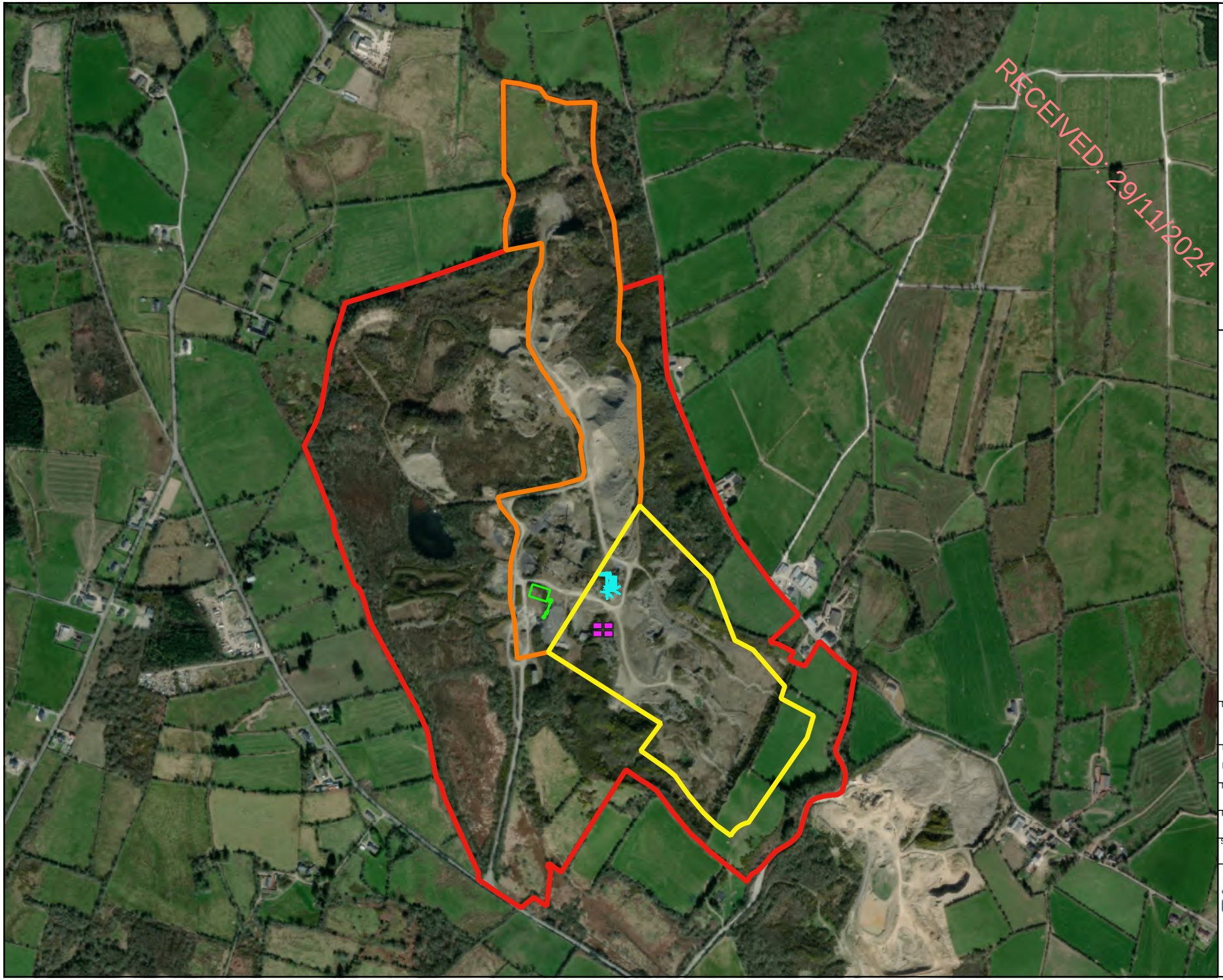
Formaoil
Megalithic Tomb
Formoyle More
Cloonconry Beg
Ballymoloney
Knockaderreen
Knockaunnaslinna
Lackareagh More
Ballyknavin
Ballycorney
Cloonfadd
The Lough Derg Way
Fulacht Fia
Barnanderreen Cross Rds.
Cillín
Kilroughil
Ballyquin Beg
Ballyquin More
Holy Well
Scott's Br
Fahy More
Fahy Br
Woodpark
Fahy Beg
Kyleglass
Springmount
Connell's Br
Leitrim
Burial Ground
Standing Stone
Ardbacartan Cross Rds
Kilcredaun
Ross
Ardcloony
Ardcloony Br
Aughayatha Br
Ellis's Br
Clonboy
Black River
Black River Br
Bridgetown
Baile an Droichid
Knockadroid
Weir
R466
R463
Kilmore
An Chill Mhór
Ardataggle
Church
Fairyhall
Cranduff Br
O'Briensbridge
Droichead Uí Bhriain
Montpelier
Aharinaghbeg
R471
R463
Killaly's Br
Sruhaunabankee Br
Kildoorus
River Shannon
An tSionainn
Canal
Portcrusha
Derryhasna
Coolready
Drummeen
Mc Mahon's Br
Derrylusk
Br.Ht. 4.16m
Derrylusk Br
Errina Br
Errina
Lacka
Derreen
Gooig
R525
Lisduff
River Blackwater
Dubhabhainn
Roo East
West



Map Legend

- Proposed Development boundary
- Proposed Extraction boundary
- Proposed Restoration boundary
- Proposed New Inspection Shed & Soakway
- Proposed Settlement Pond Area
- Proposed Washplant Location

N

Drawing Title

Proposed Site Layout

Project Title

Proposed Quarry Extraction and Restoration at Roadstone Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	**Drawing No.**
211137	Figure 5-2
Scale	**Date**
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5.3 Methodology

The following sections describe the methodologies followed to establish the baseline ecological condition of the Proposed Development site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

5.3.1 Desk Study Methodology

The desk study undertaken for this assessment included a thorough review of the available ecological data associated with the study area of the Proposed Development. Sources of data included the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS). Environmental Protection Agency (EPA) and Water Framework Directive (WFD).
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Data on potential occurrence of protected bryophytes in the NPWS; recently launched Flora Protection Order Map Viewer – Bryophytes.
- Inland Fisheries Ireland (IFI) reports, where relevant/available.
- Records from the NPWS web-mapper.
- Review of NPWS Article 17 metadata and GIS database files.

5.3.2 Field Survey Methodology

5.3.2.1 Multi-disciplinary ecological walkover surveys

Multidisciplinary ecological walkover survey of the Proposed Development site were conducted on the 30th of March 2023, 25th of April 2023, 18th of May 2023, 28th of August 2023 and 17th of April 2024 by Brónagh Boylan (BSc.), Rachel Minogue (BSc.), Aran von der Geest Moroney (BSc.), and David Culleton (BSc.)

Habitats were identified in accordance with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.*, 2011). Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010), while mosses and liverworts nomenclature follows '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

The multi-disciplinary walkover survey was designed to detect the presence, or likely presence, of a range of protected habitats and species. Incidental sighting/observations of birds and additional fauna were noted during the site visit. Surveys were undertaken in accordance with best practice guidance (NRA 2008: *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*). During the multi-disciplinary ecological walkover surveys the potential for the study area to support protected mammals listed in the Wildlife Acts, such as pine marten, red squirrel, Irish hare, pygmy shrew, Irish stoat etc. was assessed.

5.3.2.2 Badger survey

A dedicated badger survey was conducted in order to determine the presence or absence of badger signs within and outside the development footprint and within the applicant's land ownership boundary. This involved a search for all potential badger signs as per NRA (2009) standard best practice guidance

(latrines, badger paths and setts) and following CIEEM best practice competencies for species surveys (CIEEM, 2013)[3].

5.3.2.3 Otter survey

The Bridgetown(Clare)_010 watercourse flows along the southeast boundary of the Proposed Development site. The watercourse is heavily encroached by vegetation with no flowing water present, however it does offer connectivity to the Lower River Shannon SAC and as a result was surveyed for the present of otter. This habitat was suboptimal; however, a search of the area surrounding this feature for evidence of otter activity was conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. There was no suitable riparian habitat within 10m of the watercourse which is generally considered to comprise part of the otter habitat when surveying rivers (NPWS 2009). The otter survey also followed the guidance as set out in NRA (2008) '*Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes*' and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

5.3.2.4 Bat surveys

A detailed bat survey report is provided in Appendix 6-2 of this EIAR. This document provides a detailed description of all survey methodologies as undertaken at the site during 2023. Full details of the survey times and dates and the methodologies followed are provided in the Bat Survey Report, included as Appendix 6-2, along with details of all the surveyors.

Habitat suitability for bats was assessed according to Collins (2016[4]), which provides a grading protocol for roosting habitats and for commuting and foraging areas. All further bat activity and roost surveys were undertaken in strict accordance with those prescribed in SNH (2019) '*Bats and onshore wind turbines: survey, Assessment and mitigation*'. This is in line with standard best practice industry guidelines.

Bat Habitat Suitability Appraisal

Habitats within the EIAR Study Boundary were surveyed on the 27th of July 2023 by Sara Fissolo (B.Sc.) and evaluated for their suitability to support roosting, foraging and commuting bats. Connectivity with the wider landscape was also considered. Suitability was evaluated following Collins (2016) which provides suitability categories for habitats. The categories are described fully in Collins (2016) and are broken down into *High, Moderate, Low* and *Negligible*, suitability. New Collins guidelines were published in September 2023 (Collins, 2023)[5], after the bat habitat appraisals was undertaken. The new protocol includes the *None* category, where no uncertainty exists on the lack of potential roost features (PRFs) on a tree or structure. Trees where further assessment is required are marked as FAR, and trees with obvious PRF are marked PRF, which can be assessed as either PRF-I, which corresponds to the previous *Negligible* and *Low* categories, or PRF-M, which marks a sizeable feature suitable to host a maternity roost. The assessment and scope of surveys carried out with reference to the previous edition are considered in line with the updated guidelines and appropriate for the site.

Preliminary Roost Assessment

A search for roosts was undertaken within the boundary of the proposed site by two licenced ecologists to identify any PRFs. The licence, issued by NPWS, is intended for professionals carrying out surveys with the potential to disturb roosting bats. The aim of the survey was to determine the presence of roosting bats, potential access points, roosting locations and the need for further survey work or mitigation.

[3] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 11.11.2019*
[4] *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Collins, 2016)*
[5] *Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition). The Bat Conservation Trust, London.*

The site was visited on the 27th of July 2023. All structures identified within the site were assessed for their potential to support roosting bats. A systematic search of all accessible interiors, including all attic spaces, was undertaken. The exterior of each building was inspected first from ground level and included all accessible windowsills, walls, eaves, roof ridge and roof slates. Inspections were carried out with the aid of torches, a ladder, and binoculars, and searched for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises, as well as potential access points into the structure.

The Proposed Development site contains a number of trees spread within woodland and treeline habitats. Roosting suitability was assessed in clusters and at feature level, and areas were marked in accordance with Bat Conservation Trust (BCT) Guidance (Collins, 2016) during the initial walkover surveys to inform need for further surveys and assessment.

Trees present within the Proposed Development site were examined from ground level for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other PRFs identified by Andrews (2018[6]). Notes were initially compiled on any trees marked as PRF and FAR, including location and species.

Activity Surveys

Manual Surveys

Manual activity surveys included roost surveys of any feature identified as a potential roost, as well as a night-time bat walkover (NBW). For the survey, surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g., numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications, as detailed in Section 5.4.3.3. The survey effort is summarised in Table 5-1.

Table 5-1 Bat Activity survey effort

Date	Surveyors	Type	Sunrise /Sunset	Weather
27/07/2023	David Culleton & Sara Fissolo	Roost Emergence & NBW	21:35	14°C, Dry-Light Drizzle, Calm-Gentle Breeze

Roost Surveys

One structure identified during the bat habitat appraisal as having potential to host roosting bats was subject to a roost emergence survey due to inability to fully inspect the structure. Rationale for survey effort was based on guidelines proposed by Collins in Tables 7.1 and 7.2 (Collins, 2016). Other structures identified as roosts during the inspections were not subject to further assessment. All structures will be retained.

Surveyors were located across the site with a focus on potential access point and roosting features identified during the daylight walkover surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within each the PRF structure.

Surveys were carried out in favourable weather conditions (Table 5-1). Roost emergence surveys commenced at least 15 minutes before sunset and concluded approximately 1.5 hours after sunset.

Night-time Bat Walkover

Manual activity surveys also comprised a walked transect at dusk, which was carried out on the 27th of July 2023. The aim of this survey was to observe bat species using the site and visually assess bat behaviour and important features used by bats within the site.

[6] *Bat Tree Habitat Key, 2018.* Bat Roosts in Trees: A guide to identification and assessment for tree-care and ecology professionals. *Pelagic Publishing Ltd.*

The transect was walked by two surveyors, recording bats in real time. It followed the manual roost survey and was completed within 3 hours after sunset. Surveyors were equipped with one active full spectrum bat detector, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland). The transect route was prepared with reference to the desktop and walkover survey results, as well as any health and safety considerations and access limitations. As such, it followed existing roads and tracks.

Static Detector Surveys

Six full spectrum SM4 bat detectors (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity for a minimum 10-day period. Three detectors were initially deployed on 17th July 2023 by Aran van der Geest Moroney during the ecological walkover survey. They were moved on 27th July 2023 to three new locations and were finally collected on 15th August 2023. The six locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats.

Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with Global Positioning System (GPS) coordinates. Static detector locations are shown in Figure 5-3 and presented in Table 5-2.

Table 5-2 Static Detector Location

Detector ID	IG Reference	Habitat	Deployment	Collection
D01	R 63129 68824	Treeline	17/07/2023	27/07/2023
D02	R62884 69402	Wet Grassland	17/07/2023	27/07/2023
D03	R62794 69100	Wet Grassland/ Immature Willow woodland	17/07/2023	27/07/2023
D04	R 63014 69195	Treeline and scrub	27/07/2023	15/08/2023
D05	R 62597 69398	Edge of willows	27/07/2023	15/08/2023
D06	R 62678 69993	Open tipping pit, recolonising bare ground	27/07/2023	15/08/2023

Map Legend

- Proposed Development boundary
- Bat Detector Locations

Drawing Title

Static Detector Locations

Project Title	Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare
Drawn By: CT	Checked By: RW
Project No.: 211137	Drawing No.: Figure 5-3
Scale: 1:10,000	Date: 16.10.24

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5.3.2.5 Barn Owl Survey

During the manual bat surveys, the presence of barn owl on site was recorded. As a result, a barn owl survey was carried out, to determine the use of the site by barn owl and the potential breeding success of the species within the Proposed Development site. The survey was carried out under licence from the National Parks and Wildlife Service and followed best practice guidelines in line with *Raptors: a field guide for surveys and monitoring* (Hardy et. al, 2013[7]).

5.3.2.6 Invasive species survey

During the multi-disciplinary walkover survey, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2015 (As Amended) (S.I. 477 of 2015).

5.3.2.7 Survey limitations

Seasonal factors that affect distribution patterns and habitats of species were taken into account when conducting the surveys. All surveys conducted to inform this assessment were carried out during the optimal time of year (Smith *et al.* 2011[8]). It is considered that a comprehensive and accurate assessment of the habitats present within the site was achieved.

5.3.3 Methodology for Assessment of Effects

5.3.3.1 Identification of Target Receptors and Key Ecological Receptors/Features

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, Version 1.3, 2018).

5.3.3.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the NRA guidelines. These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

The guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best

[7] *Hardy, J, Crick, H, Wernham, C, Riley, H, Etheridge, B and Thompson, D. (2009). Raptors: A field guide for surveys and monitoring. Scottish Natural Heritage (SNH), Inverness, UK.*
[8] *Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E., 2011. Best practice guidance for habitat survey and mapping.* Heritage Council, Kilkenny.

examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in NRA (2009) are considered to be KERs for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be KERs.

5.3.3.3 Characterisation of Impacts and Effects

The Proposed Development has the potential to result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (2018). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- Positive or Negative. Assessment of whether the Proposed Development results in a positive or negative effect on the ecological receptor.
- Extent. Description of the spatial area over which the effect has the potential to occur.
- Magnitude Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- Duration is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- Frequency and Timing. This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- Reversibility. This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

5.3.3.4 Determining the Significance of Effects

The ecological significance of the effects of the Proposed Development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features.
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

5.3.3.5 Limitations

The information provided in this EcIA accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the Proposed Development; prescribes best practice and mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visit. No significant limitations in the scope, scale or context of the assessment have been identified.

5.4 Establishing the Ecological Baseline

5.4.1 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline of the ecology known to occur in existing environment. Material reviewed includes the Site Synopses for designated sites within the zone of influence, as compiled by the NPWS of the Department of Culture, Heritage and the Gaeltacht, bird and plant distribution atlases and other research publications.

5.4.1.1 Designated Sites

5.4.1.1.1 *Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Development*

The potential for the Proposed Development to impact on sites that are designated for nature conservation was considered in this Biodiversity Chapter.

SACs and SPAs for Birds are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 5.4.1.1.1of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites. In summary, two European site was identified to be within the ZoI of the Proposed Development, namely:

- Lower River Shannon SAC [002165]
- River Shannon and River Fergus Estuaries SPA [004077]

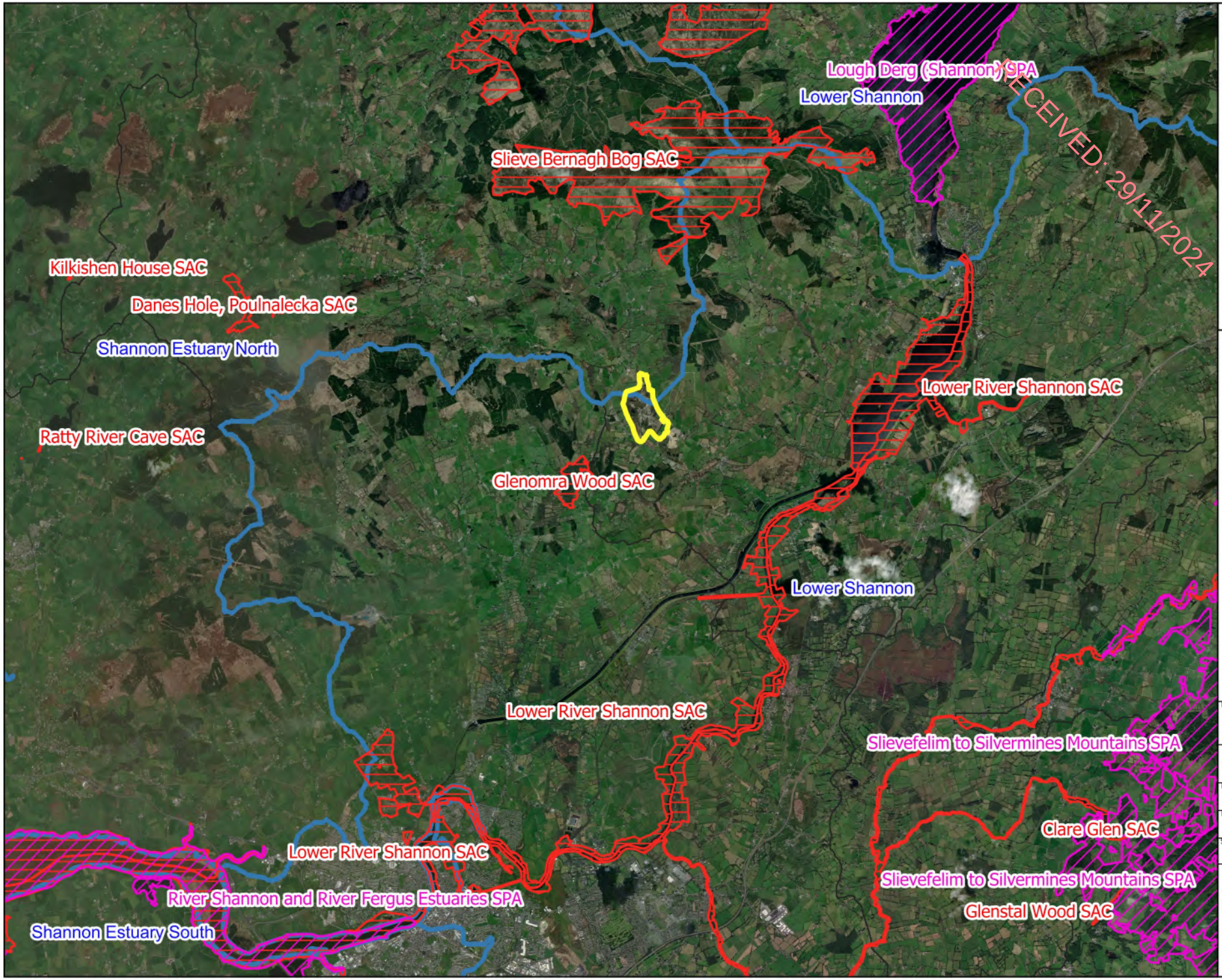
Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this Biodiversity Chapter.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this Biodiversity Chapter.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the Proposed Development:

- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie). The datasets were utilised to identify Designated Sites which could feasibly be affected by the Proposed Development.

- All European and National Sites that could potentially be affected were identified using a source-pathway- receptor model. To provide context for the assessment, European and Nationally Designated Sites surrounding the EIAR Study Boundary are shown on Figure 5-4 and Figure 5-5 respectively.
- Table 5-3 provides details of all relevant National Sites as identified in the preceding steps and assesses which are within the likely Zone of Influence. All European Designated Sites are fully described and assessed in the Natura Impact Statement submitted as part of this planning application.
- The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Influence and further assessment is required.



RECEIVED: 29/11/2024

Map Legend

- Proposed Development boundary
- Special Area of Conservation (SAC)
- Speacial Protection Area (SPA)
- Hydrological Catchments (WFD)
- Hydrological Subcatchments (WFD)

Drawing Title
EU Sites Within the Likely Zone of Influence

Project Title
Proposed Quarry Extraction and Restoration at Roadstone Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	Drawing No.
211137	Figure 5-4
Scale	Date
1:120,000	15.10.24

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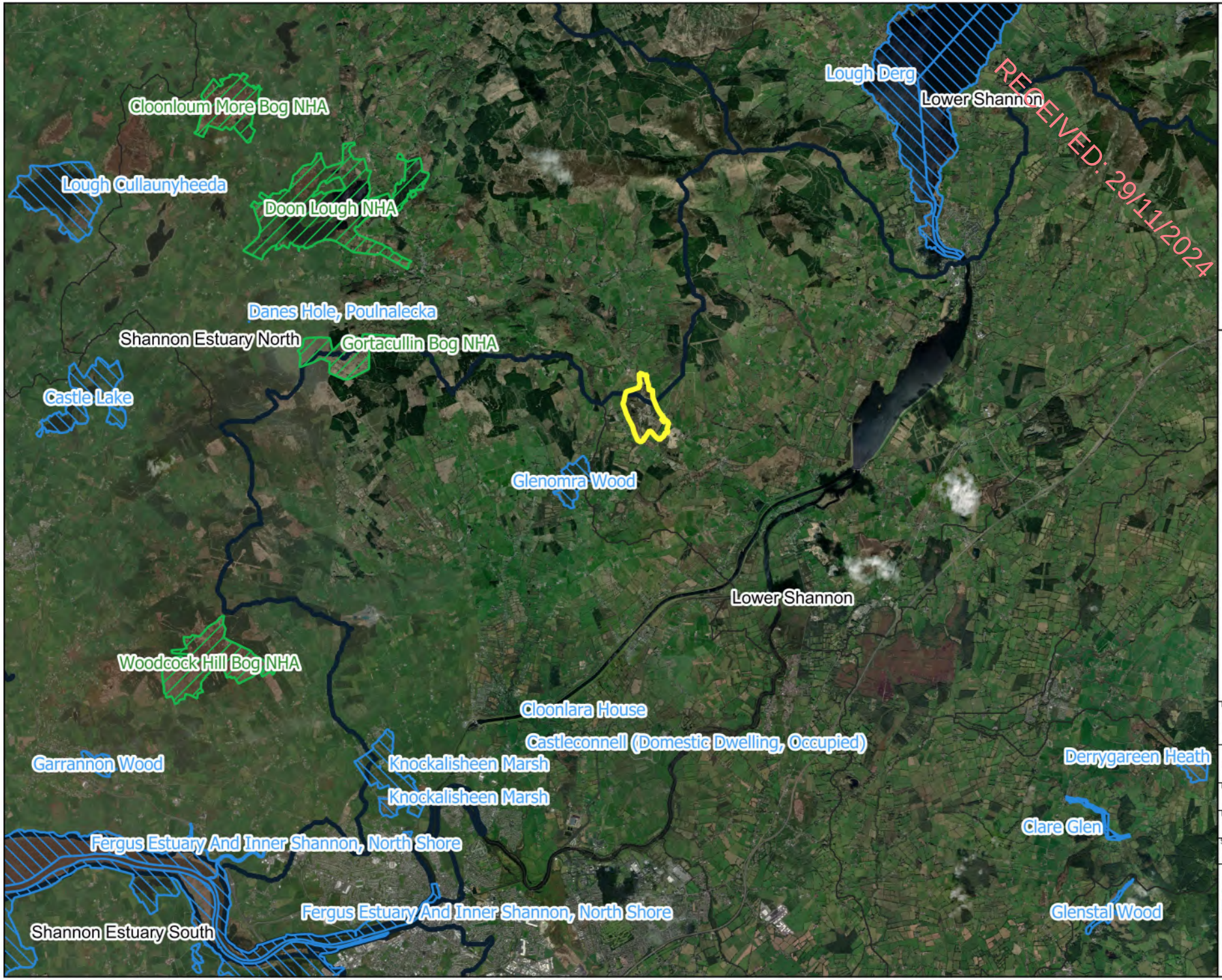

Map Legend

- Proposed Development boundary
- National Heritage Area (NHA)
- Proposed National Heritage Area (pNHA)
- Hydrological Catchments (WFD)
- Hydrological Subcatchments (WFD)

N

Drawing Title: Nationally Designated Sites Within the Likely Zone of Influence

Project Title: Proposed Quarry Extraction and Restoration at Roadstone Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	Drawing No.
211137	Figure 5-5
Scale	Date
1:120,000	15.10.24

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Table 5-3 Identification of Nationally designated sites within the Likely Zone of Influence

Designated Sites and distance from the Proposed Development site	Likely Zone of Influence Determination
Gortacullin Bog NHA [002401] **Distance: 5.8km**	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Site Boundary. This NHA is located within the same sub catchment as the NHA (Owenogarney_SC_010), however the NHA is hydrologically upstream of the Proposed Development. The NHA is located within the same groundwater body as a small section of the Proposed Development site, however no works are proposed for this area of the Site that is contained within the 'Tulla-Newmarket on Fergus' groundwater body. **The designated site is not within the likely Zone of Influence; therefore, no further assessment is required.**
Doon Lough NHA [000337] **Distance: 6.1km** **Hydrological Distance downstream:** 7.8km	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Development site boundary. There is hydrological connectivity between the Proposed Development site and this NHA as the Broadford River (ID: IE_SH_27B020300) flows from the northern boundary of the site into this NHA. A small portion of the NHA is located within the same groundwater body (Broadford Gravels) as the Proposed Development site. As a result, there is a potential pathway for indirect effects to occur in the form of deterioration in water quality as a result of the Proposed Development. **This Nationally Designated Site is *within* the Likely Zone of Influence and requires further assessment.**
Woodcock Hill Bog NHA [002402] **Distance: 10.3km**	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Development site boundary. The NHA is located hydrologically upstream of the Proposed Development and is located within a separate sub catchment. The Proposed Development and this NHA are located within the same groundwater body (Tulla-Newmarket on Fergus). According to the Tulla-Newmarket on Fergus Groundwater Body Description[9], the groundwater flow within this aquifer follows topography. Therefore, there will be no indirect effects on this NHA. This designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Cloonloum More Bog NHA [002307] **Distance: 11km**	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Development site boundary. The NHA is located within the same sub catchment, however, is located hydrologically upstream of the Proposed Development Site. The Proposed Development and NHA are located in separate groundwater bodies. This designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Loughanilloon Bog NHA **Distance: 12.9km**	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Development site boundary.

[9] *Draft 1 Tulla – Newmarket-on-Fergus GWB Description – 24 November 2003*

	No hydrological connectivity between the Proposed Development site and the NHA exists, as the sites are located in a separate sub catchment and groundwater body. The NHA catchment (Graney[Shannon]_SC_010) is located upstream of the catchments that the Proposed Development is in (Owenogarney_SC_010, and Shannon[Lower]-SC_080). Given the lack of hydrological connectivity via a source-pathway-receptor pathway, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Aye Lower Bog NHA **Distance: 14.7km**	There will be no direct effects on this NHA as it is located entirely outside of the Proposed Development site boundary. No hydrological connectivity between the Proposed Development site and the NHA exist, as the sites are located in a separate sub catchment, and groundwater body. The NHA catchment (Graney[Shannon]_SC_010) is located upstream of the catchments that the Proposed Development is in (Owenogarney_SC_010, and Shannon[Lower]-SC_080). Given the lack of hydrological connectivity via a source-pathway-receptor pathway, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Proposed Natural Heritage Areas (pNHA)	
Glenomra Wood pNHA [001013] **Distance: 1.3km**	There will be no direct impact on this pNHA as it is located entirely outside of the Proposed Development site boundary. There is no hydrological connectivity between the Proposed Development site and this pNHA. Due to the terrestrial nature of this pNHA, there is no potential source-pathway-receptor chain identified for effect. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Glenomra Wood pNHA [001013] **Distance: 1.3km**	There will be no direct impact on this pNHA as it is located entirely outside of the Proposed Development site boundary. There is no hydrological connectivity between the Proposed Development site and this pNHA. Due to the terrestrial nature of this pNHA, there is no potential source-pathway-receptor chain identified for effect. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Cloonlara House pNHA [000028] **Distance: 6.6km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. The Proposed Development site is located within the Core Sustenance Zone for this species (10km[10]) and suitable foraging habitat is present in the Proposed Development site for which this pNHA is designated (Leisler bat *Nyctalus leisler)* however, this habitat onsite will be retained and given the availability of suitable habitat for this species in the surrounding areas, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**

[10] Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London.

Castleconnell (Domestic Dwelling, Occupied) pNHA [000433] **Distance: 7.3km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. The Proposed Development site is located within the Core Sustenance Zone for bat species in Ireland (10km) and suitable foraging habitat onsite will be retained and given the availability of suitable habitat for this species in the surrounding areas, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Lough Derg pNHA [000011] **Distance: 7.8km**	There will be no direct impact on this pNHA as it is located entirely outside of the Proposed Development site boundary. There will be no indirect effects on this Site as the Proposed Development is located hydrologically downstream of the pNHA, within a separate sub catchment. The pNHA and Proposed Development site overlap in the same groundwater body, however only one field within the Proposed Development site overlaps into the Lough Graney groundwater body. There are no proposed works with the areas that overlap with this groundwater body. The habitats present within the Proposed Development site offer some suitable foraging habitat to the wading bird species of this pNHA; however, the Site is outside all known core foraging ranges for the bird species. The habitats onsite are not deemed as significant suitable habitat due to the presence of a main road and active quarry located adjacent to the site, and more suitable areas for foraging are present within the wider landscape. Therefore, there is no loss of potential significant suitable nesting and foraging habitat for the species, and no potential disturbance to the bird species is predicted due to the nature and distance of the Proposed Development to the pNHA. This designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Knockalisheen Marsh pNHA [002001] **Distance: 9.2km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. There is no hydrological connectivity between the Proposed Development and this pNHA. The pNHA is located hydrologically downstream of the Proposed Development site, in a separate sub catchment and groundwater body. this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Danes Hole, Poulnalecka pNHA [000030] **Distance: 9.3km**	There will be no direct impact on this pNHA as it is located entirely outside of the Proposed Development site boundary. The Proposed Development site is located 8.5km southeast of the pNHA. Therefore, the site is located outside the 2.5km core forging range for the Lesser Horseshoe Bat roosts (NPWS, 2018). No potential pathway for indirect impact on this species exists. Indirect effects on the terrestrial QIs of the SAC can be ruled out due to the terrestrial nature of the habitats/species, the distance from the Proposed Development site and the absence of a complete source-pathway-receptor chain for effect. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**

Fergus Estuary and Inner Shannon, North Shore pNHA [002048] **Distance: 11.8km** **Hydrological Distance downstream via the Fahey More River:** 30.1km **Hydrological Distance downstream via the Broadford River:** 27.5km	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. Hydrological connectivity between the Proposed Development site and the pNHA exists, as the pNHA is located within a separate sub catchment but hydrologically connected via two watercourses which border the Proposed Development site. The pNHA is hydrologically 30.1km downstream via Bridgetown River Waterbody (ID: IE_SH_25B230100), and 27.5km downstream via the Broadford River Waterbody (IE_SH_27b020300). The Proposed Development is located within the same groundwater body, Tulla-Newmarket on Fergus aquifer, however no works are proposed for this portion of the site that overlaps with this groundwater body. The Proposed Development utilises a closed system of settlement ponds, a man-made pond that is groundwater fed, and a wetland lagoons system. There will be no overflow to watercourses as a result of the closed system. However, taking a precautionary approach there is potential for deterioration of water quality during the construction and operational phases of the Proposed Development. Potential pathways for indirect effects on the aquatic dependent habitats and species of the pNHA exist, in the form of water quality deterioration. **In the absence of mitigation, a complete source-pathway-receptor was found, and this pNHA is *within* the Likely Zone of Influence and is considered further.**
Castle Lake pNHA [000239] **Distance: 12.1km** **Hydrological Distance Downstream via the Broadford River:** 17.5km	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. The pNHA is located within a separate sub catchment than the Proposed Development site, however it is located 17.5km downstream of the Proposed Development via the Broadford River at the North of the Proposed Development site boundary. The Proposed Development is located within the same groundwater body, Tulla-Newmarket on Fergus aquifer, however no works are proposed for this portion of the site that overlaps with this groundwater body. This designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Lough O'Grady pNHA [001019] **Distance: 12.7km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. The pNHA is located within a separate sub catchment than the Proposed Development site and is located hydrologically upstream of the Proposed Development site. The Proposed Development is located within the same groundwater body, Lough Graney aquifer, however no works are proposed for this portion of the site that overlaps with this groundwater body. This designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Clare Glen pNHA [000930] **Distance: 13.1km**	There will be no direct impact on this pNHA as it is located entirely outside of the Proposed Development site boundary. There is no hydrological connectivity between the Proposed Development site and this pNHA. The Site is located in a separate sub catchment and is located hydrologically upstream of the Proposed Development site. The Site and the Proposed Development are located within separate groundwater bodies. Therefore, there are no potential pathways for indirect effects on the terrestrial and aquatic species and habitats for which this pNHA is designated exists, due to the absence of a complete source-pathway-receptor chain for effect. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**

Inner Shannon Estuary, South Shore pNHA [000435] **Distance: 13.4km** **Hydrological Distance downstream via the Fahey More River:** 28.3km **Hydrological Distance downstream via the Broadford River:** 29.8km	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. Hydrological connectivity between the Proposed Development site and the pNHA exists, as the pNHA is located within a separate sub catchment but hydrologically connected via two watercourses which border the Proposed Development site. The pNHA is hydrologically 28.3km downstream via the Bridgetown River Waterbody (ID: IE_SH_25B230100), and 29.3km downstream via the Broadford River Waterbody (IE_SH_27b020300). The Proposed Development is located within the same groundwater body, Tulla-Newmarket on Fergus aquifer, however no works are proposed for this portion of the site that overlaps with this groundwater body. The Proposed Development utilises a closed system of settlement ponds, a man-made pond that is groundwater fed, and a wetland lagoons system. There will be no overflow to watercourses as a result of the closed system. However, taking a precautionary approach there is potential for deterioration of water quality during the construction and operational phases of the Proposed Development. Potential pathways for indirect effects on the aquatic dependent habitats and species of the pNHA exist, in the form of water quality deterioration. **In the absence of mitigation, a complete source-pathway-receptor was found, and this pNHA is *within* the Likely Zone of Impact and is considered further.**
Lough Cullaunyheeda pNHA [001017] **Distance: 13.6km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. No hydrological connectivity exists as the pNHA is located hydrological upstream in a separate sub catchment and groundwater body as the Proposed Development. Therefore, the lack of hydrological connectivity between the site and the NHA, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Derrygareen Heath [000931] **Distance: 14.4km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. No hydrological connectivity exists as the pNHA is located hydrological upstream in a separate sub catchment and groundwater body as the Proposed Development. Therefore, the lack of hydrological connectivity between the site and the NHA, this designated site is not considered further. **The designated site is not within the likely Zone of Influence, therefore, no further assessment is required.**
Garrannon Wood [001012] **Distance: 14.9km**	There will be no direct effects on this pNHA as it is located entirely outside of the Proposed Development site boundary. The pNHA is located within a separate sub catchment than the Proposed Development site and is located hydrologically upstream. The Proposed Development is located within the same groundwater body, Tulla-Newmarket on Fergus aquifer, however no works are proposed for this portion of the site that overlaps with this groundwater body. This designated site is not considered further. **The designated site is not within the likely Zone of Influence; therefore, no further assessment is required.**

The AA Screening Assessment that accompanies this application identifies the following European Sites as being within the Likely Zone of Impact:

- Lower River Shannon SAC [002165]
- River Shannon and River Fergus Estuaries [004077]

These EU designated sites have been assessed in the accompanying NIS and are considered in of this report.

The following Nationally Designated Sites have been identified as being within the Likely Zone of Influence of the Proposed Development and are assessed in Section 5.5 of this report

- Doon Lough NHA [000337]
- Inner Shannon Estuary, South Shore pNHA [000435]
- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]

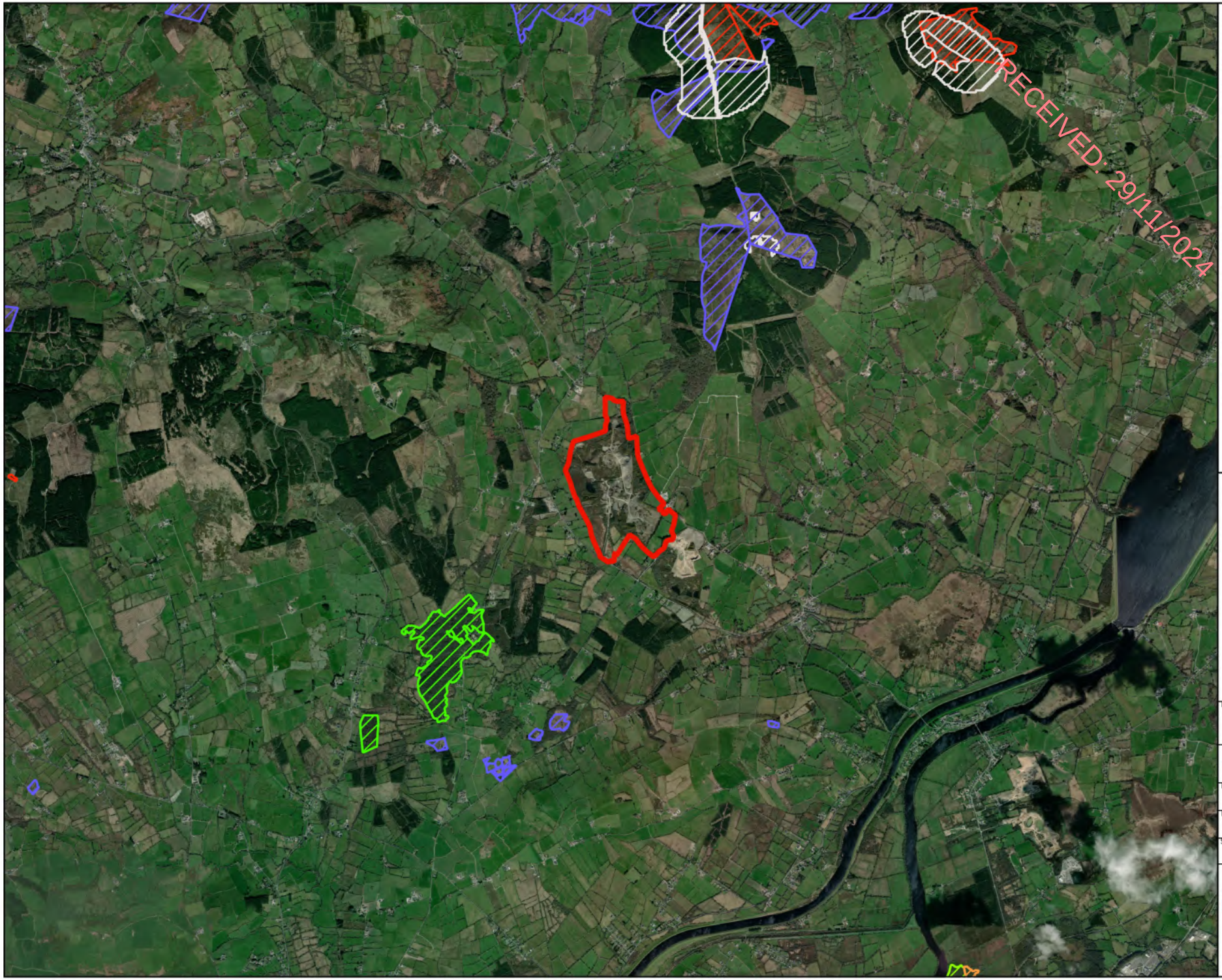
5.4.1.2 NPWS Article 17 Reporting

Areas of EU Annex I habitats were not recorded within or immediately adjacent to the Proposed Development site boundary. The closest area of Annex 1 habitat is an area of Blanket bog [7130] with Wet Heath [4010] and Dry Heath [4010] present, located approximately 1.6km north-east of the Proposed Development site. An area of Old Oak Woodland [91A0] is located approximately 2km south-west of the proposed site.

A map of all Annex I habitats in the surrounding area of the proposed site is shown on Figure 5-6.

5.4.1.3 Vascular plants

A search was carried out on the NPWS web-mapper for records for Vascular Plants, Charophytes and Lichens listed in and legally protected under the Flora (Protection) Order 2022. A search was made in the New Atlas of the British and Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book of



Map Legend

- Proposed Development boundary
- Active Blanket Bog
- Alpine and Subalpine Heath
- Dry Heath
- Hydrophilous Tall Herb
- Molinia Meadows
- Old Oak Woodlands
- Wet Heath

N

Drawing Title

Annex I Habitats

Project Title

Proposed Quarry Extraction and Restoration at Roadstone Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	**Drawing No.**
211137	Figure 5-6
Scale	**Date**
1:50,000	15.10.24

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Vascular Plants (Wyse Jackson et al. 2016)[11] or the Flora (Protection) Order 2022 had been recorded in the relevant 10km squares in which the study site is situated (R66 & R67). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 5-4.

Table 5-4 Plant species of conservation concern recorded within hectads R66 & R67

Common name	Latin name	Designation & Hectad
Heath Cudweed	*Gnaphalium sylvaticum*	Endangered (EN) (R67)
Opposite-leaved Pondweed	*Groenlandia densa*	Near Threatened (NT) (R67)
Annual Knawel	*Scleranthus annuus*	Vulnerable (VU) (R66)
Fragrant Agrimony	*Agrimonia procera*	Near Threatened (NT) (R66)
Meadow Brome	*Bromus commutatus*	Near Threatened (NT) (R66)
Slender-tufted sedge	*Carex acuta*	Near Threatened (NT) (R66)
Northern Dead-nettle	*Lamium confertum*	Near Threatened (NT) (R66)
Brown Beaksedge	*Rhynchospora fusca*	Near Threatened (NT) (R66)
Wildflower Field-speedwell	*Veronica agrestis*	Near Threatened (NT) (R66)

5.4.1.4 Bryophytes

A search of the NPWS online data map for bryophytes (NPWS 2018a) was also undertaken with no protected bryophytes recorded within or adjacent to the Proposed Development site.

5.4.1.5 Birds

Data received from the NPWS scientific data unit was reviewed as part of this assessment, following a formal data request. A number of sources were assessed to determine the likely usage of the site by both breeding and wintering bird species, including Bird Atlases, National Biodiversity Data Centre (NBDC) and Conservation Objectives Supporting Documents from the NPWS for nearby SPAs. The following sub sections provide a breakdown of the sources used and results obtained.

5.4.1.5.1 *Breeding and Wintering Bird Atlases*

The *Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland* (Balmer *et al.*, 2013) provides the most up-to-date information regarding the distribution and relative abundance of bird species in Britain and Ireland, based on surveys carried out between 2007 and 2011.

The atlases show data for breeding and wintering birds respectively in individual 10 km x 10 km squares (hectads). Table 5-5 shows those species found in the relevant hectads (R66 & R67), which are recorded as breeding in the most recent atlas. It also provided species that have been recorded within the relevant hectad on National Biodiversity Data Centre (NBDC) datasets as well as those listed in Annex I of the EU Birds Directive recorded on the BoCCI Red List. Birds listed under Annex I are offered special protection by the EU Birds Directive. Those listed on the Birds of Conservation Concern in Ireland (BoCCI) Red List meet one or more of the following criteria:

- IUCN: Global conservation status (Critically Endangered (CE), Endangered (E) or Vulnerable (V), but not Near Threatened. These species are recognised as the highest priorities for action at a global scale and are thus priorities at an all-Ireland level.
- European conservation status. The conservation status of all European species was assessed most recently by Birdlife International (2004), one of the main changes in the revision being to include the IUCN criteria. These species are those of global conservation concern (including those classified as Near Threatened) and are Red-listed.

[11] *Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.*

- The Irish breeding population has undergone significant historical decline since 1800.
- The Irish breeding population or range has declined by 50% or more in the thirteen years from 1998-2011 (BDp1) or the 25 years from 1980-2013 (BDp2).
- The Irish non-breeding population has undergone a significant decline of 50% in the last 25 years.
- The Irish breeding range has undergone a decline of 70% or more in the last 25 years.

Species listed under Annex I of the EU Birds Directive and red-listed birds of conservation concern that have been recorded within the relevant hectad (R66 & R67) are listed in Table 5-5: B.

Table 5-5: Bird Atlas Data records for hectads R66 & R67

Common name	Scientific name	Designation	Breeding Evidence	Season
Common Kingfisher	*Alcedo atthis*	Birds of Habitats Directive Annex I	Present	Winter
Dunlin	*Calidris alpina*		Present	Winter
Ruff	*Philomachus pugnax*		Present	Winter
Common Tern	*Sterna hirundo*		Confirmed	Breeding
Eurasian Golden Plover	*Pluvialis apricaria*		Present	Winter
Hen Harrier	*Circus cyaneus*		Present	Winter
Corn crake	*Crex crex*		*NR*	*NR*
Little egret	*Egretta garzetta*		Present	Winter
Peregrine Falcon	*Falco peregrinus*		Possible	Breeding
Merlin	*Falco columbarius*		*NR*	*NR*
Whooper Swan	*Cygnus cygnus*		Present	Winter
Barn Owl	*Tyto alba*	Birds of Conservation Concern in Britain and Ireland - Red List	*NR*	Confirmed
Dunlin	*Calidris alpina*		Present	Winter
Meadow Pipit	*Anthus pratensis*		Confirmed	Breeding
Swift	*Apus apus*		*NR*	*NR*
Goldeneye	*Bucephala clangula*		Present	Winter
Stock Dove	*Columba oenas*		*NR*	*NR*
Corn Crake	*Crex crex*		*NR*	*NR*

Common name	Scientific name	Designation	Breeding Evidence	Season
Yellowhammer	*Emberiza citronella*		*NR*	*NR*
Kestrel	*Falco tinnunculus*		Probable	Breeding
Snipe	*Gallinago gallinago*		Present	Winter
Oystercatcher	*Haematopus ostralegus*		Present	Winter
Red Grouse	*Lagopus lagopus*		Present	Winter
Curlew	*Numenius arquata*		Present	Winter
Woodcock	*Scolopax rusticola*		*NR*	*NR*
Redshank	*Tringa tetanus*		Present	Winter
Redwing	*Turdus iliacus*		Present	Winter
Lapwing	*Vanellus vanellus*		Present	Winter

Table contains records from NBDC data and Bird Atlas 2007-2011.
NR – Not recorded

Eleven species listed under Annex I of the EU Birds Directive have been recorded within the relevant hectads. An additional fifteen red listed birds of conservation concern have been recorded within the relevant hectads.

5.4.1.6 National Biodiversity Data Centre (NBDC) Records

A search of the NBDC records for the relevant hectads R66 & R67, provided details on a number of fauna species of conservation concern. These are provided in Table 5-6.

Table 5-6: NBDC records for species of conservation interest in hectads R66 & R67

Common Name (Relevant hectad)	Scientific Name	Status
Terrestrial Mammals		
Brown Long-eared Bat (R66 & R67)	*Plecotus auritus*	HD Annex IV, WA
Daubenton's Bat (R66 & R67)	*Myotis daubentonii*	HD Annex IV, WA
Eurasian Badger (R66 & R67)	*Meles meles*	WA
Eurasian Pygmy Shrew (R66 & R67)	*Sorex minutus*	WA
Eurasian Red Squirrel (R66 & R67)	*Sciurus vulgaris*	WA
European Otter (R66 & R67)	*Lutra lutra*	HD Annex II & IV, WA
Lesser Horseshoe Bat (R66)	*Rhinolophus hippisideros*	HD Annex II & IV, WA
Lesser Noctule (R66 & R67)	*Nyctalus leisleri*	HD Annex IV, WA

Common Name (Relevant hectad)	Scientific Name	Status
Pine Marten (R66 & R67)	*Martes martes*	HD Annex V, WA
Common Pipistrelle (R66 & R67)	*Pipistrellus pipistrellus sensu lato*	HD Annex IV, WA
Soprano Pipistrelle (R66 & R67)	*Pipistrellus pygmaeus*	HD Annex IV, WA
West European Hedgehog (R66 & R67)	*Erinaceus europaeus*	WA
Red Deer (R67)	*Cervus elaphus*	HD Annex IV, WA
Amphibians & Reptiles		
Common Frog (R66 & R67)	*Rana temporaria*	HD Annex IV, WA
Smooth Newt (R66)	*Lissotriton vulgaris*	WA

HD = EU Habitats Directive; BD = EU Birds Directive; WA = Wildlife Acts (Ireland).

5.4.1.7 Bat Records

The NBDC records were searched to identify bat species within the hectads R66 & R67; records of seven out of Irelands nine resident bats were returned within the hectads. The results of the database search are provided in Table 5-7 below:

Table 5-7 Bat Records within hectads R66 & R67

Common Name	Scientific Name	Record Count	Last Record	Designation
Brown Long Eared Bat	*Plecotus auritus*	R66: 1 R67: 3	R66: 17/11/2006 R67: 24/08/2009	Annex IV; WA
Daubenton's Bat	*Myotis daubentonii*	R66: 5 R67: 1	R66: 10/08/2009 R67: 28/07/2008	Annex IV; WA
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	R66: 6	R66: 31/08/2006	Annex II, IV: WA
Lesser Noctule Bat	*Nyctalus leisleri*	R66: 5 R67: 4	R66: 31/07/2011 R67: 27/08/2009	Annex IV; WA
Pipistrelle Bat	*Pipistrellus pipistrellus*	R66: 1 R67: 8	R66: 15/07/2009 R67: 27/09/2009	Annex IV; WA
Soprano Pipistrelle Bat	*Pipistrellus pygmaeus*	R66: 4 R67: 11	R66: 10/09/2009 R67: 11/06/2021	Annex IV; WA

Annex II, IV – of EU Habitats Directive; WA - Protected species: Irish Wildlife Acts (1976-2017)

5.4.1.8 NPWS

Rare and protected species data was obtained from the National Parks and Wildlife Service on the 23rd of February 2023 following a formal data request. Records are provided in Table 5-8.

Table 5-8 NPWS records for rare and protected species

Common Name	Scientific Name	Status
Higher plants, bryophytes and lichens		
Heath Cudweed	*Gnaphalium sylvaticum*	FPO
Annual Knawel	*Scleranthus annuus*	FPO
Opposite-leaved Pondweed	*Groenlandia densa*	FPO
Small Cudweed	*Filago minima*	FPO

Common Name	Scientific Name	Status
Meadow Brome	*Bromus commutatus*	FPO
Smooth Brome	*Bromus racemosus*	RL: NL
Northern Dead-nettle	*Lamium confertum*	RL: NL
Mammals		
Irish Hare	*Lepus timitdus subsp. hibernicus*	HD Annex V; WA
Fallow Deer	*Dama dama*	WA, RL: NL
Otter	*Lutra lutra*	HD Annex II, IV; WA
Red Deer	*Cervs elaphus*	WA, RL: NL
Pine Marten	*Martes martes*	HD Annex V; WA
Badger	*Meles meles*	WA
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	HD Annex II & IV, WA
Irish Stoat	*Mustela erminea subsp. hibernica*	WA, RL: LC
Fish		
Allis Shad	*Alosa alosa*	Annex II & IV
Sea Lamprey	*Petromyzon marinus*	Annex II
Invertebrates		
White-clawed Crayfish	*Austropotamobius pallipes*	Annex II & IV, WA
Amphibians & Reptiles		
Common Frog (5)	*Rana temporaria*	HD Annex V; WA
Birds		
Barn Owl (R66 & R67)	*Tyto alba*	BoCCI Red List, WA
Barn Swallow (R66 & R67)	*Hirundo rustica*	BoCCI Amber List, WA
Black-headed Gull (R66 & R67)	*Larus ridibundus*	BoCCI Red List, WA
Common Coot (R66 & R67)	*Fulica atra*	HD Annex II & Annex III, BoCCI Amber List, WA
Common Goldeneye (R66 & R67)	*Bucephala clangula*	HD Annex II, BoCCI Amber List, WA
Common Grasshopper Warbler (R66 & R67)	*Locustela naevia*	BoCCI Amber List, WA
Common Kestrel (R66 & R67)	*Falco tinnunculus*	BoCCI Amber List, WA
Common Kingfisher (R66 & R67)	*Alcedo atthis*	HD Annex I, BoCCI Amber List, WA
Common Linnet (R66 & R67)	*Carduelis cannabina*	BoCCI Amber List, WA
Common Pheasant (R66 & R67)	*Phasianus colchicus*	HD Annex II & III, WA
Common Pochard (R66 & R67)	*Aythya farina*	HD Annex II & III, BoCCI Amber List, WA
Common Redshank (R66 & R67)	*Tringa tetanus*	BoCCI Red List, WA
Common Sandpiper (R66 & R67)	*Actitus hypoleucos*	BoCCI Amber List, WA

Common Name	Scientific Name	Status
Common Shelduck (R66)	*Tadorna tadorna*	BoCCI Amber List, WA
Common Snipe (R66 & R67)	*Gallinago gallinago*	HD Annex II & III, BoCCI Amber List, WA
Common Starling (R66 & R67)	*Sturnus vulgaris*	BoCCI Amber List, WA
Common Swift (R66 & R67)	*Apus apus*	BoCCI Amber List, WA
Common Tern (R67)	*Sterna hirundo*	HD Annex I, BoCCI Amber List, WA
Common Wood Pigeon (R66 & R67)	*Columba palumbus*	HD Annex II & III, BoCCI Red List, WA
Corn Crake (R66 & R67)	*Crex crex*	HD Annex I, BoCCI Red List, WA
Dunlin (R66 & R67)	*Calidris alpina*	HD Annex I, BoCCI Amber List, WA
Eurasian Curlew (R66 & R67)	*Numenius arquata*	HD Annex II, BoCCI Red List, WA
Eurasian Oystercatcher (R66)	*Haematopus ostralegus*	BoCCI Amber List, WA
Eurasian Teal (R66 & R67)	*Anas crecca*	HD Annex II & III, BoCCI Amber List, WA
Eurasian Wigeon (R66)	*Anas Penelope*	HD Annex II & III, BoCCI Amber List, WA
Eurasian Woodcock (R66 & R67)	*Scolopax rusticola*	HD Annex II & III, BoCCI Amber List, WA
Gadwall (R66)	*Anas strepera*	HD Annex II,BoCCI Amber List, WA
European Golden Plover (R67)	*Pluvialis apricaria*	HD Annex I, II & III, BoCCI Red List, WA
Goosander (R66)	*Mergus merganser*	HD Annex II, BoCCI Amber List, WA
Great Black-backed Gull (R66 & R67)	*Larus marinus*	BoCCI Amber List, WA
Great Cormorant (R66 & R67)	*Phalacrocorax carbo*	BoCCI Amber List, WA
Great Crested Grebe (R66 & R67)	*Podiceps cristatus*	BoCCI Amber List, WA
Greater Scaup (R66 & R67)	*Aythya marila*	HD Annex II & III, BoCCI Amber List, WA
Greater White-fronted Goose (R66)	*Anser albifrons*	HD Annex I, II & III, BoCCI Amber List, WA
Greylag Goose (R66)	*Anser anser*	HD Annex II & III, BoCCI Amber List, WA
Hen Harrier (R66 & R67)	*Circus cyaneus*	HD Annex I, BoCCI Amber List, WA
House Martin (R66 & R67)	*Delichon urbicum*	BoCCI Amber List, WA
House Sparrow (R66 & R67)	*Passer domesticus*	BoCCI Amber List, WA
Lesser Black-backed Gull (R66 & R67)	*Larus fuscus*	BoCCI Amber List
Little Egret (R66)	*Egretta garzetta*	HD Annex I, WA
Little Grebe (R66 & R67)	*Tachybaptus ruficollis*	BoCCI Amber List, WA

Common Name	Scientific Name	Status
Mallard (R66 & R67)	*Anas platyrhynchos*	HD Annex II & III, WA
Merlin (R66)	*Falco columbarius*	HD Annex I, BoCCI Amber List, WA
Mew Gull (R66 & R67)	*Larus canus*	BoCCI Amber List, WA
Mute Swan (R66 & R67)	*Cygnus olor*	BoCCI Amber List, WA
Northern Lapwing (R66 & R67)	*Vanellus vanellus*	HD Annex II, BoCCI Red List, WA
Northern Wheateater (R66 & R67)	*Oenanthe oenanthe*	BoCCI Amber List, WA
Red Grouse (R66 & R67)	*Lagopus lagopus*	HD Annex II & III, BoCCI Red List, WA
Red-breasted Merganser (R66 & R67)	*Mergus serrator*	HD Annex II, WA
Ringed Plover (R66)	*Charadrius hiaticula*	BoCCI Amber List, WA
Ruff (R67)	*Philomachus pugnax*	HD Annex I, BoCCI Amber List, WA
Sand Martin (R66 & R67)	*Riparia riparia*	BoCCI Amber List, WA
Sky Lark (R66 & R67)	*Alauda arvensis*	BoCCI Amber List, WA
Spotted Flycatcher (R66 & R67)	*Muscicapa striata*	BoCCI Amber List, WA
Stock Pigeon (R66)	*Columba oenas*	BoCCI Amber List, WA
Tufted Duck (R66 & R67)	*Aythya fuligula*	HD Annex II & III, BoCCI Amber List, WA
Water Rail (R67)	*Rallus aquaticus*	BoCCI Amber List, WA
Whooper Swan (R66 & R67)	*Cygnus cygnus*	HD Annex I, BoCCI Amber List, WA
Yellowhammer (R66 & R67)	*Emberiza citrinella*	BoCCI Red List, WA

RL = Red List; LC= least Concern, NT = Near Threatened; FPO = Flora Protection Order; HD = EU Habitats Directive; WA = Wildlife Acts (Ireland); BoCC = Birds of Conservation Concern.

5.4.1.9 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The NPWS *Margaritifera* Sensitive Area map (Updated March 2018) was consulted during the desk study. The nearest *Margaritifera* sensitive area is located within the Shannon-Grany/Scarrif catchment area, located over 10 km to the north of the site. The Proposed Development site does not lie within a freshwater pearl mussel (*Margaritifera margaritifera*) sensitivity area. The Proposed Development is located within both the Lower Shannon Estuary South and Shannon Estuary North hydrological catchments, which has not been identified as being occupied by the species.

5.4.1.10 Inland Fisheries Ireland Data

The Broadford River Waterbody (ID: IE_SH_27B020300) flows in a western direction along the northeastern boundary of the site, while the headwater stream of the Bridgetown River Waterbody (ID: IE_SH_25B230100) is located to the south-east of the site flowing in a southwest direction. A search of the Inland Fisheries Ireland (IFI) online database was carried out to determine the species richness of the rivers surrounding the Proposed Development site. The closest watercourse with IFI data is the Broadford River.

The only WFD Fish Ecological Status 2008-2021 data available in the vicinity of the Proposed Development site was from the Broadford River to the north of the site.

The results from the identified IFI study sites are presented in Table 5-9.

Table 5-9 IFI data and associated Q values

Station Name (Site Code)	Species	Draft Fish Ecological Status	Assessment Year
Just u/s South Branch confl_B	Brown trout (*Salmo trutta*), Salmon (*Salmo salar*) Three-spined stickleback (*Gasterosteus aculeatus*)	Good	2008
Just u/s South Branch confl_B	Brown trout (*Salmo trutta*), European eel (*Anguilla anguilla*), Salmon (*Salmo salar*), Three-spined stickleback (*Gasterosteus aculeatus*)	Good	2008

5.4.1.11 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectads: R66 & R67. Records of invasive species present in the relevant hectads is provided in Table 5-10.

Table 5-10 NBDC records for invasive species (Hectad R66 & R67)

Common Name (Relevant hectad)	Scientific Name
Greylag Goose (R66 & 67)	Anser anser
Common Carp (R66)	*Cyprinus carpio*
American Mink (R66 & R67)	*Mustela vison*
Bank Vole (R66 & R67)	*Myodes glareolus*
Brown Rat (R66)	*Rattus norvegicus*
European Rabbit (R66 & R67)	*Oryctolagus cuniculus*
Fallow Deer (R66 & R67)	*Dama dama*
Wild Boar (R67)	*Sus scrofa*
Water Fern (R67)	*Azolla filiculoides*
Canadian Waterweed (R66 & 67)	*Elodea canadensis*
Giant Hogweed (R66)	*Heracleum mantegazzianum*
Indian Balsam (R66)	*Impatiens glandulifera*
Curly Waterweed (R67)	*Lagarosiphon major*
Himalayan Knotweed (R66 & R67)	*Persicaria wallichii*
Japanese Knotweed (R66 & R67)	*Reynoutria japonica*
Nuttall's Waterweed (R66 & R67)	*Elodea nuttallii*
Rhododendron ponticum (R66 & 67)	*Rhododendron ponticum*
Three-cornered Garlic (R66)	*Allium triquetrum*
Zebra Mussel (R66 & R67)	*Dreissena (Dreissena) polymorpha*

5.4.1.12 Hydrology

The closest watercourses to the Proposed Development site are the Broadford River (ID: IE_SH_27B020300), which flows across the northern boundary of the site in a north-western direction ultimately flowing into Doon Lough west of the town of Broadford. To the south-east of the site is the Bridgetown (ID: IE_SH_25B230100) River, which flows through Bridgetown village and ultimately flows into the River Shannon.

The Biotic Index of Water Quality (BIWQ) was developed in Ireland by the EPA. Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

The EPA Envision map viewer was consulted on 24th June 2024 regarding the water quality status of the watercourses which occur within the EIAR Study Area, or flow downstream into. The Broadford River has been assigned a 3-4 'Moderate' Q-Value when measured at Scott's Bridge (RS27B020500) monitoring station in 2023. Q-rating data is also available for the Bridgetown River(Station RS25B230100). Most recent data (2023) have assigned a Q rating of 3-4 (Moderate) to the watercourse at this point.

According to Chapter 7 Hydrology & Hydrogeology as a part of this EIAR application,

> '*On a regional scale, the Proposed Development site is located in the River Shannon catchment with the northern portion mapped in the Shannon Estuary North (Catchment ID 27) within the Owenogarney_SC_010 sub-catchment.*
>
> *The southern portion of the Proposed Development site is located in the Lower Shannon (Catchment ID 25A) within the Shannon[Lower]_SC_080 sub-catchment.*
>
> *The proposed extraction area is located in the Lower Shannon Catchment while the proposed restoration/infill area is located in both.*
>
> *In the Owenogarney_SC_010 sub-catchment., the Proposed Development site drains locally to the Broadford River (Broadford_010 river waterbody). The Broadford River flows through Loch an Dúin, approximately 10km downstream of the site, prior to entering the Owenogarney River. Only infilling/restoration is proposed in the Owenogarney_SC_010 sub-catchment.*
>
> *In the Shannon[Lower]_SC_080 sub-catchment, the Proposed Development site drains locally to the Bridgetown(Clare)_010 river waterbody (referred to as the Black River on OSI mapping). The Bridgetown River flows into the River Shannon approximately 6km downstream of the Proposed Development site. Aggregate extraction and infilling/restoration are proposed in the Shannon[Lower]_SC_080 sub-catchment.*
>
> *The closest designated site to the Proposed Development site is Glenomra Woods SAC and pNHA (Site Code: 001013) and is located ~1.5km to the southwest and hydrologically remote from the Proposed Development.*
>
> *Glenomra Wood is a deciduous woodland located in south-east Co. Clare, about 10 km north of Limerick city. The site is a Special Area of Conservation (SAC) selected for the presence of Old Oak Woodlands. There is no surface water or groundwater interaction between the Proposed Development site and this designated site.*
>
> *The Lower River Shannon SAC is located 3.3km to the southeast of the Proposed Development site.*
>
> *Bridgetown River and Broadford River drain into the Lower River Shannon where the respective downstream distance to the SAC is approximately 6km and 28km.*
>
> *The closest designated site to the Proposed Development site is Glenomra Woods SAC and pNHA (Site Code: 001013) and is located ~1.5km to the southwest and hydrologically remote from the Proposed Development.*
>
> *Headwater streams of the Bridgetown River flow along the southwestern and southeastern boundaries of the Proposed Development site while a headwater stream of the Broadford River flows along the northern boundary of the site.*

However, due to the presence of the underlying high permeability sand and gravel deposits, there is limited runoff from the site towards these rivers due to high groundwater recharge rates. Runoff rates are likely to be highest at the southwestern corner of the site (near site entrance) where a wetland/fen exists. The wetland/fen is drained by the western tributary of the Bridgetown River.

There is some runoff generated from the processing /yard areas (former concrete plant area) to the north of the reception building and this flows westerly under gravity towards an existing settlement pond/lagoon system located close to the western boundary where it percolates to ground. This discharge to ground is permitted by an existing discharge licence (WP 170). The discharge rate is limited to 113m³/hour.

There is no overflow to the headwater stream of the Bridgetown River which flows immediately to the west of the settlement pond/lagoon system.

There is also a network of 3 no. connected settlement ponds/lagoons located on the north of the Proposed Development that were previously used for the settling of fines/sediments in wash water from the aggregate washing plant. Treated water from the settlement ponds/ lagoons is then allowed discharge into a manmade pond located on the west of the Proposed Development site.

Water from the manmade pond can then be recycled back to the washing plant via pumps and a pipe network. The settlement ponds/lagoons and manmade pond is a closed system as there is no overflow to local watercourses. The pond is also receiving localised runoff from nearby access roads and previous processing areas located upslope to the east'.

5.4.1.13 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectad R66 & R67, within which the Proposed Development site is located.

The Proposed Development site is split between the Lower Shannon catchment (ID: 26D) and Shannon Estuary North catchment (ID: 27D). On a more local scale, the Proposed Development site is split between the Shannon[Lower]_SC_080 and Owengarney_SC_010 sub-catchments.

The closest watercourses to the Proposed Development site are the Broadford River (ID: IE_SH_27B020300), which flows across the northern boundary of the site in a north-western direction ultimately flowing into Doon Lough west of the town of Broadford. To the south-east of the site is the Bridgetown River (ID: IE_SH_25B230100), which flows through Bridgetown village and ultimately flows into the River Shannon.

The mammal species recorded within the relevant hectad have widespread ranges and distributions in Ireland (Marnell *et al* 2009)[12], and are likely to be recorded frequently throughout Ireland. A review of bat records for the area did not identify any roosts within or immediately adjacent to the Proposed Development site. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visit.

Lough Eorna is the nearest I-WeBS subsite to the Proposed Development site, Lough Eorna is 29.2km to the northeast of the site. Majority of bird species recorded within the IWEBS subsite, Lough Derg and Middle Shannon Callows SCI species are reliant on semi-natural habitats such as wetlands. For this reason, the desk study informed the site visit which assessed the suitability of the habitats within the site to support wetland bird species.

The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors. The desk

[12] *Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.*

study and accompanying NIS has identified the European Site's Lower River Shannon SAC [002165] and River Fergus and River Shannon SPA [004077] and Nationally Designated Sites Doon Lough NHA [000337], Inner Shannon Estuary, South Shore pNHA[000435], Fergus Estuary and Inner Shannon, North Shore pNHA [002048] occurring within the Zone of Influence of the Proposed Development. No records of protected species were identified within the site boundary during the desk study.

5.4.2 Ecological Walkover Survey Results

5.4.2.1 Description of Habitats and Flora within the Ecological Survey Area

A dedicated habitat survey of the area within the Proposed Development was undertaken on the 30th of March 2023, 25th of April 2023, 18th of May 2023, 17th of July 2023, 28th of August 2023 and 17th of April 2024 by Brónagh Boylan (BSc.), Aran von der Geest Moroney (BSc.), Rachel Minogue (BSc.) and David Culleton (BSc.).

The habitats recorded during the site visit are described below (See habitat map below Figure 5-7 and Figure 5-8).

Map Legend

- Proposed Development boundary
- Buildings and artificial surfaces
- Exposed sand, gravel or till
- Spoil and bare ground
- Recolonising bare ground
- Active quarries and mines
- Other artificial lakes and ponds
- Reed and large sedge swamps
- Depositing/lowland rivers
- Improved agricultural grassland
- Marsh
- Dry meadows and grassy verges
- Wet grassland
- Scrub
- Immature woodland
- Depositing/ Lowland Rivers (FW2)
- Drainage Ditches (FW4)
- Hedgerows (WL1)
- Treelines (WL2)

N

Drawing Title

Habitat Map

Project Title

Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	Drawing No.
211137	Figure 5-7
Scale	Date
1:9,000	15.10.24

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Proposed Site Layout
Proposed Development boundary
Proposed Extraction Boundary
Proposed Restoration Area
Proposed Washplant Location
Proposed Settlement Pond Area
Proposed New Inspection Shed & Soakway
RECEIVED: 29/11/2024
Map Legend
Buildings and artificial surfaces
Exposed sand, gravel or till
Spoil and bare ground
Recolonising bare ground
Active quarries and mines
Other artificial lakes and ponds
Reed and large sedge swamps
Depositing/lowland rivers
Improved agricultural grassland
Marsh
Dry meadows and grassy verges
Wet grassland
Scrub
Immature woodland
Depositing/ Lowland Rivers (FW2)
Drainage Ditches (FW4)
Hedgerows (WL1)
Treelines (WL2)
N
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Drawing Title
Habitat Map with Proposed Site Layout Overlain
Project Title
Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare
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CT
Checked By
RW
Project No.
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Figure 5-8
Scale
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The site entrance, weighbridge within the site boundary, existing buildings and old quarrying equipment, and hardstand areas are classified under **Buildings and artificial surfaces (BL3)**.

*Plate 5-1- Shed found on site classified under **Buildings and artificial surfaces (BL3).***

The Proposed Development site is an existing quarry. As a result of previous extraction procedures, there are stockpiles of sand and gravel on site classified under **Active quarries/mines (ED4)**. Areas of the site have been classified as active quarries, despite inactivity within the quarry for several years, as areas of the site have remained uncolonized during the inactive years, and due to the high levels of unconsolidated stockpiles within the quarry. There are multiple unconsolidated roads running through the site classified as **Spoil and bare ground (ED2).**

*Plate 5-2- Piles of sand and gravel on site were classified under **Active quarries/mines (ED4)** as the stockpiles as the stockpiles have not been recolonised by vegetation or fauna.*

*Plate 5-3 Typical section of unconsolidated access track within the EIAR Study Boundary that has been classified as **Spoil and bare ground (ED2)**.*

A **Depositing/lowland river (FW2)** borders the southeast of the Proposed Development site. This watercourse is the Bridgetown River, and is heavily encroached by vegetation, primarily bramble (*Rubus fruticosus agg.*) with little standing water and no flow present in the section of the watercourse bordering the grasslands to the southeast of the site. The river was bordered by **Scrub (WS1)** habitat. The water was turbid and moderate flowing at the time of the survey with a watercourse width of 1-2m (Plate 5-4).

*Plate 5-4- **Depositing/lowland river (FW2)** present across the southeast of the EIAR Site Boundary, and **Scrub (WS1)** comprising the riverbank and riparian vegetation.*

To the west of the entrance to the Proposed Development site, is an area of **Reed and Large swamps (FS1)**. The habitat is dominated by common reed (*Phragmites australis*) and bulrush (*Typha latifolia*) in an area of standing water.

*Plate 5-5- **Reed and Large Sedge Swamp (FS1)** present to the west of the entrance road within the Proposed Development site.*

In areas of the north-west, southeast and centre of the site, areas of **Recolonising bare ground (ED3)** were documented. Species within these areas included colt's foot (*Tussilago farfara*), nettle (*Urtica dioica*), willow herb (*Epilobium* spp.), shepherd's purse (*Capsella bursa-pastoris*), dandelion (*Taraxacum* spp.), common gorse (*Ulex europaeus*), scatterings of conifer & willow saplings (*Sitka* spp.) (*Salix* spp.), hawksbeard (*Crepis capillaris*), daisy (*Bellis perennis*) and ragwort (*Jacobaea vulgaris)*.

*Plate 5-6- Area of **Recolonising bare ground (ED3)** present within the Proposed Extraction area.*

The majority of the northwest and easternmost extent of the site contained **Immature Woodland (WS2)**, particularly along the west and eastern boundaries of the site. Species of this habitat found on site included Birch (*Betula* spp.), Willow (*Salix* spp.), with some common gorse (*Ulex europaeus*). Ground flora included: nettle (*Urtica dioica*), foxglove (*Digitalis purpurea*), herb Robert (*Geranium robertianum*), hard shield fern (*Polystichum aculeatum*), ivy (*Hedera hibernica*), bramble (*Rubus fruticosus agg.*).

*Plate 5-7- **Immature woodland (WS2)** present along the western boundary of the Proposed Development.*

At times across the site, **Immature Woodland (WS2)** was bordered by **Scrub (WS1)** vegetation, with Scrub (WS1) vegetation dominating the south-western corner of the site. Additionally, **Scrub (WS1)** vegetation had recolonised areas between existing sand and gravel piles with common gorse (*Ulex europaeus*) heavily present on site. **Scrub (WS1)** species found within the Proposed Development site included willow (*Salix* spp.), Birch (*Betula* spp.), gorse (*Ulex* spp.), Blackthorn (*Prunus spinosa*), bracken fern (*Pteridium aquilinum*), bramble (*Rubus fruticosus agg.*), nettle (*Urtica dioica*), thistle (*Cirsium vulgare*) and Himalayan Knotweed (*Persicaria wallichii*).

*Plate 5-8- Gorse **Scrub (WS1)** present in the south-east of the site.*

Across the site, there are multiple areas of **Exposed sand, gravel or till (ED1)** in the form of exposed sand cliff faces and gravel till stockpiles. The exposed sand cliff faces were often colonised by gorse and offer suitable nesting habitat to Sand Martin (*Riparia riparia*).

Plate 5-9 Exposed sand, gravel or till (ED1) cliff face in the northwest of the Proposed Development site.

Other artificial lakes and ponds (FL8) are present in the west and north of the Proposed Development with two small ponds found in the south-east of the Proposed Development within the proposed extraction area. Vegetation documented surrounding these ponds included soft rush (*Juncus effusus*), hard rush (*Juncus inflexus*), bulrush (*Typha latifolia),* marsh thistle (*Cirsium palustre*), fire weed (*Chamaenerion angustifolium*), and marsh horsetail (*Equisetum palustre*). The pond present in the northwest of site was heavily encroached by the stockpiles of sand and gravel located to the east of the pond as there is no barrier present between the pond and stockpiles. Additionally, the pond had a muddy substrate with a low number of small rocks/cobbles present and was 0.5 m in depth.

Plate 5-10- Pond present in the north-west of the site heavily encroached by willow (Salix spp.) classified under ***Other artificial lakes and ponds (FL8).***

The pond in the far north of site within an associated area of **Marsh (GM1)** was approx. 1m in depth with large boulders present in the water. Surrounding the pond was a high number of both soft rush (*Juncus effusus*) and hard rush (*Juncus inflexus*) with approximately 30% coverage of algae at the surface of the pond. The large pond present to the east of the site was surrounded by bull rush (*Typha latifolia)* and previously listed **Scrub (WS1)** vegetation.

Plate 5-11- Pond found in the most northern section of the site, with a boulder substrate classified under ***Artificial lakes and ponds (FL8).***

As previously stated, the area to the far north of the site is dominated by **Marsh (GM1).** Vegetation recorded in this habitat included watercress (*Nasturtium officinale*), hairy bittercress (*Cardamine hirsute*), soft rush (*Juncus effusus*), marsh horsetail (*Equisetum palustre*), common water-starwort (*Callitriche stagnalis*), yarrow (*Achillea millefolium*), marsh pennywort (*Hydrocotyle vulgaris*), marsh cinquefoil (*Potentilla palustris*), *Calliergon* moss, horsetails (*Equisetum* spp.) bog chickweed (*Stellaria alsine*), and water figwort (*Scrophularia auriculata*).

Plate 5-12- Marsh (GM1) area located adjacent to Artificial lakes and ponds (FL8) present in the north of the site.

A **Drainage Ditch (FW4)** is present in the north-west of the Proposed Development site, bordered on both sides by immature woodland (WS2). The **Drainage Ditch (FW4)** had no flow and was heavily encroached by vegetation. The **Drainage Ditch (FW4)** had stagnant water in which pondweed (*Potamogeton natans*), marsh horsetail (*Equisetum palustre*), marsh woundwort (*Stachys palustris*), bull rush (*Typha latifolia*), willow (*Salix* spp.) and beech (*Fagus sylvatica*) were present.

*Plate 5-13- **Drainage ditch (FW4)** present in the northwest of the Proposed Development site.*

Grasslands recorded as **Dry meadows and grassy verges (GS2)** were present in the south-west of the Proposed Development site separated from one another and the wider site by **Hedgerows (WL1).** Species found in these grasslands were meadow foxtail (*Alopecurus pratensis*), cock's foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), germain speedwell (*Veronica chamaedrys*), nettle (*Urtica dioica*), pignut (*Conopodium majus*), clovers (*Trifolium* spp.), lesser stitchwort (*Stellaria graminea*), red fescue *(Festuca rubra*), soft rush (*Juncus effusus*), yarrow (*Achillea millefolium*), and creeping buttercup (*Ranunculus repens*). **Hedgerow (WL1)** lines were made up of Blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), bramble (*Rubus fruticosus agg.*), elder (*Sambucus nigra*), oak saplings (*Quercus* spp.), willow (*Salix* spp.), birch (*Betula* spp.), common gorse (*Ulex europaeus*), nettles (*Urtica dioica*) and bracken (*Pteridium aquilinum.*).

*Plate 5-14- Grassland designated under **Dry meadows and grassy verges (GS2)** separated from adjacent fields by **Hedgerows (WL1).***

Grasslands present to the far south-east of the site and northwest of the Proposed Development boundary were classified as **Improved agricultural grassland (GA1)** due to the species composition present and the presence of livestock grazing within them. Species recorded within these fields included yorkshire fog (*Holcus lanatus)*, ribwort plantain (*Plantago lanceolata)*, white clover (*Trifolium repens)*, red clover (*Trifolium pratense)*, soft rush (*Juncus effusus*), perennial rye grass *(Lolium perenne)*, creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), smooth hawk's-beard (*Crepis vesicaria*), ragwort (*Jacobaea vulgaris)*, yarrow (*Achillea millefolium),* sheep's sorrel (*Rumex acetosella*), fescue (*Festuca* spp.), *vulgare*), broadleaved dock (*Rumex obtusifolius)*, sweet vernal grass (*Anthoxanthum odoratum*), knapweed (*Centaurea nigra*), common vetch (*Vicia sativa),* and bracken (*Pteridium aquilinum.*).

Within the field in the northwest, the **Treeline (WL2**) habitat surrounding the grassland was bordered by Hawthorn (*Crataegus monogyna*) with ground flora within the treeline consisting of native bluebell (*Hyacinthoides non-scripta)*, lesser celandine (*Ficaria verna*), and wood anemone (*Anemone nemorosa*).

*Plate 5-15- **Improved agricultural grassland (GA1)** present in the southeast of the Site.*

Surrounding the boundary of the Proposed Development site in the northeast of the site and the northern agricultural grassland, **Treelines (WL2)** are present. **Treelines (WL2)** identified bordering the boundary of the Proposed Development site consist primarily of ash (*Fraxinus excelsior*) trees, with the agricultural grassland to the north of the site surrounded by ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and oak (*Quercus petraea*).

*Plate 5-16- **Treeline (WL2)** present at the north of the site.*

None of the habitats within the Proposed Development site proposed for extraction, infill and restoration conform to habitats listed under Annex I of the EU Habitats Directive.

Himalayan Knotweed (*Koenigia polystachya)*, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, was recorded within the EIAR

Study Area. An Invasive Species Management Plan for this species has been prepared and is included in Appendix 5-3.

No botanical species protected under the Flora (Protection) Order (2022) were recorded during the survey.

5.4.3 Faunal Survey Results

5.4.3.1 Badger survey

While some mammal trails, paw prints and snuffle holes were recorded within the site, no indication of significant badger activity was recorded, and no setts were identified within or adjacent to the EIAR Study Area boundary. The EIAR Study Area boundary does, however, provide suitable supporting habitat for this species and it is likely to occur within the site, at least on occasion. Examples of prints found within the EIAR Study Area boundary are seen in Plate 5-17.

Plate 5-17- Badger prints found within the EIAR Study Area boundary.

5.4.3.2 Otter survey

The Bridgetown River Waterbody present at the southeast boundary of the Proposed Development site offers surface water connectivity to the Lower River Shannon SAC, in which otter is a Qualifying Interest. As such, the watercourse was assessed and surveyed for potential foraging and commuting habitat to otter.

No sign of otter was observed. No sign of otter spraints, scat, prints, slides, trails, couches and holts was observed. The river to the southeast was heavily encroached with vegetation primarily bramble, containing a low level of standing water with no flow at the time of survey (Plate 5-18).

Plate 5-18- Depositing/lowland river (FW1) assessed for signs of otter.

5.4.3.3 Bat surveys

A detailed bat survey report is provided in Appendix 5-2 of this EIAR. This document provides a detailed description of all survey methodologies as undertaken at the site during 2023. Full details of the survey times and dates and the methodologies followed are provided in the Bat Survey Report, included as Appendix 5-2, along with details of all the surveyors.

5.4.3.3.1 *Bat Habitat Appraisal*

New Collins guidelines were published in September 2023 (Collins, 2023[13]), after the bat habitat appraisals was undertaken. The new protocol includes the *'None* category', where no uncertainty exists on the lack of PRFs on a tree or structure. Trees where further assessment is required are marked as Further Assessment Required (FAR), and trees with obvious PRF are marked PRF, which can be assessed as either PRF-I, which corresponds to the previous *Negligible* and *Low* categories, or PRF-M, which marks a sizeable feature suitable to host a maternity roost. The assessment and scope of surveys carried out with reference to the previous edition are considered in line with the updated guidelines and appropriate for the site.

A bat walkover and inspection survey were conducted on the 27th of July 2023. During this survey, habitats within the study area were assessed for their suitability for bats to roost, forage and commute. Connectivity with the wider landscape was also considered to determine habitat suitability.

[13] Collins, J. (ed.) (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition).* The Bat Conservation Trust, London.

With regard to foraging and commuting bats, the Proposed Development site is considered of *Moderate* suitability due to the high habitat diversity and presence of conifer woodland, watercourses and treelines throughout. Built and open areas are also considered of *Moderate* suitability, as they are usually surrounded by linear habitats and do not limit connectivity within the site.

Details of the assessment of existing man-made structures for their suitability to host roosting bats are presented below. Trees within the Proposed Development footprint are also assessed in more detail.

5.4.3.3.2 *Preliminary Roost Assessment*

PRF Structures

Four structures were identified and inspected as part of the roost assessment effort, the weighbridge office, a large shed, a water pump building and a hopper. The weighbridge office was also the subject of roost emergence surveys. Details of the emergence survey are presented in Section 5.4.3.3.3.

Weighbridge Office

This structure is an office building with a tiled roof (R 62648 69120). The structure is located north of the site entrance gate, and west of the proposed extraction boundary. The building has a separate attic space (Plate 5-21). Access points were identified underneath gaps in the fascia board, and underneath roof tiles (Plate 5-20). Bat droppings and feeding remains were found inside the building (Plate 5-22). It was assigned a *Moderate* roosting potential. The shed was subject to a dusk emergence survey on 27th of July 2023.

Plate 5-19 South aspect of Weighbridge office

Plate 5-20 Gaps in fascia board

Plate 5-21 Separate attic space

Plate 5-22 Feeding remains found inside the building

Large Shed

The large shed is a corrugated iron structure located southeast of the weighbridge office (ITM X 562622 Y 669067) (Plate 5-23). Panels on the walls and roof illuminate it during the daylight hours (Plate 5-24). However, the northern end of the building has rooms that are dark throughout. Within these rooms, evidence of feeding bats was found, along with droppings (Plate 5-25). A single dead bat was found in an old disused toilet during the 27th of July 2023 inspection (Plate 5-26). No ID was possible on the carcass. A second dead bat impossible to ID was found in the same location on the 28th of August. A single feeding bat was also seen inside the structure during the same night following a barn owl survey. The bat's behaviour was indicative of a brown long-eared bat, however no ID was possible. The shed is in regular use by bats, but was assigned a *Low* roosting potential, as it is likely favoured for limited opportunistic roosting, particularly feeding and night roosting.

Plate 5-23 Eastern aspect of Large Shed

Plate 5-24 Large Shed interior

Plate 5-25 Feeding remains found within office area in Large Shed

Plate 5-26 Dead bat found in toilet of Large Shed

Water Pump Building

The water pump building is a flat roof concrete building located east of the weighbridge office (ITM X 562631 Y 669182). Numerous access points were identified in the structure, such as gaps in the concrete exterior and open windows (Plate 5-27 and 5-29). A large number of droppings and feeding remains were found inside the structure (Plate 5-30). No bats were found. Whilst evidence of bats using the building was evident, there is no capacity for hosting regular or significant roosting, and the building is likely in use as a feeding perch or night roost. It was assigned a *Low* roosting potential.

Plate 5-27 Water pump building southern aspect

Plate 5-28 Interior of water pump building

Plate 5-29 Water pump building eastern aspect

Plate 5-30 Dropping and feeding remains found within water pump building.

Hopper

The hopper is a small concrete building once used for funnelling sand and gravel (Plate 5-31). It is located to the east of the water pump building (IG Ref: R 62700 69175). The interior of the structure is exposed and overgrown. However, a single Leisler's bat was found roosting between the northern wall and concrete support beam. The structure was assigned a *Low* roosting potential.

Plate 5-31 Top of the hopper

PRF Trees

The site comprised a network of treelines and hedgerows in the agricultural fields to the southwest of the site. Conifer plantations bordering existing tracks and roads dominated the other areas of the site. These were assessed as having *Negligible* roosting potential for bats. Deciduous treelines identified throughout the site were assessed for their potential to host roosting bats. The majority of linear features comprised hedgerows with sparse, immature trees with *No* potential roosting features.

A number of trees within the site boundary were assessed, as they may be felled as a result of the proposed works. Four trees assessed presented or were likely to present features suitable for roosting bats. Most of the trees were observed with binoculars and were located in inaccessible areas: the assessment was provided as a precaution. Details of the assessment are presented in Table 5-11, with photos in Plates 5-32 to 5-35. In all four cases, no potential roost features were visible due to heavy ivy cover. Therefore, in the event that felling is required, further assessment will be needed to establish if potential roosting features are present. The location of the trees assessed is presented Figure 5-9.

Table 5-11 Tree Inspection Results

#	Species	Potential	IG Reference	Notes	Plate
1	Unknown	Low	R 63028 69219	Old tree with old ivy covering trunk	2-14
2	Unknown	Moderate	R 63073 69148	Mature tree with old ivy cover.	2-17
3	Unknown	Low	R 63143 68923	Mature tree with old ivy cover.	2-18
4	*Fraxinus spp.*	Moderate	R 62583 69884	Mature trees with heavy ivy cover.	n/a

Plate 5-32 Tree 1; Ivy cover on trunk

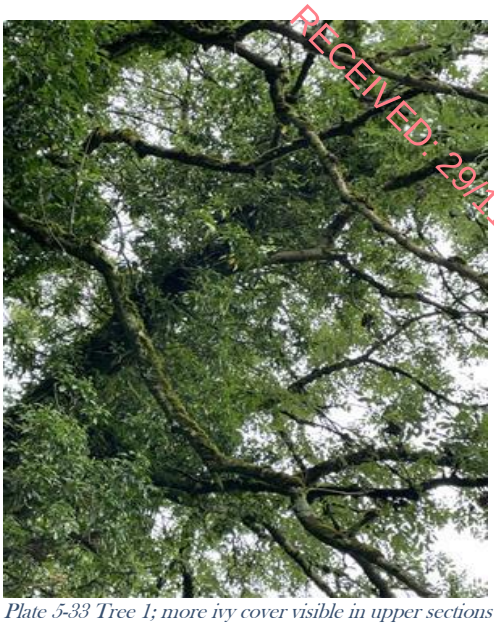

Plate 5-33 Tree 1; more ivy cover visible in upper sections

Plate 5-34 Tree 2; Mature tree with heavy ivy cover

Plate 5-35 Tree 3; Light ivy cover on trunk

Map Legend

- Proposed Development boundary
- Assessed Trees

N

Drawing Title

Location of Assessed Trees

Project Title

Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare

Drawn By	Checked By
CT	RW
Project No.	Drawing No.
211137	Figure 5-9
Scale	Date
1:10,000	16.10.24

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5.4.3.3.3 Bat Activity Surveys

Manual Surveys

Dusk Emergence Survey

Four structures were identified within the site. Bat use was confirmed within three of the structures during the initial inspections carried out on 27th July 2023 and further surveys were not deemed necessary at early design stages. Roosting was also confirmed within the weighbridge office, however as the attic space was not sully accessed, a dusk emergence survey was also carried out. Table 5-12 summarises the survey effort in relation to dusk emergence survey carried out to identify and classify potential roosts. Individual surveys are described below.

Table 5-12 Manual activity surveys at PRFs.

PRF	IG Ref.	Date	Survey Type	Results
Weighbridge Office	R 62647 69121	27th July 2023	Dusk Emergence	Single Leisler's bat emerged at 21:50.

Weighbridge Office

One dusk emergence survey was carried out at the weighbridge office located 500 metres north of the main entrance gate. During the survey, one Leisler's bat was observed emerging from the southwest corner of the office. Leisler's bats, *Myotis* spp. and soprano and common pipistrelles were also recorded foraging during the survey by both surveyors, which were located at the north and south of the office. In particular, social calling by Leisler's bats was recorded, and bats were observed continuously flying in circles above the site's car park early during the survey. Bat activity reduced once barn owls were spotted flying across the site and above the office.

Night Walkover Survey

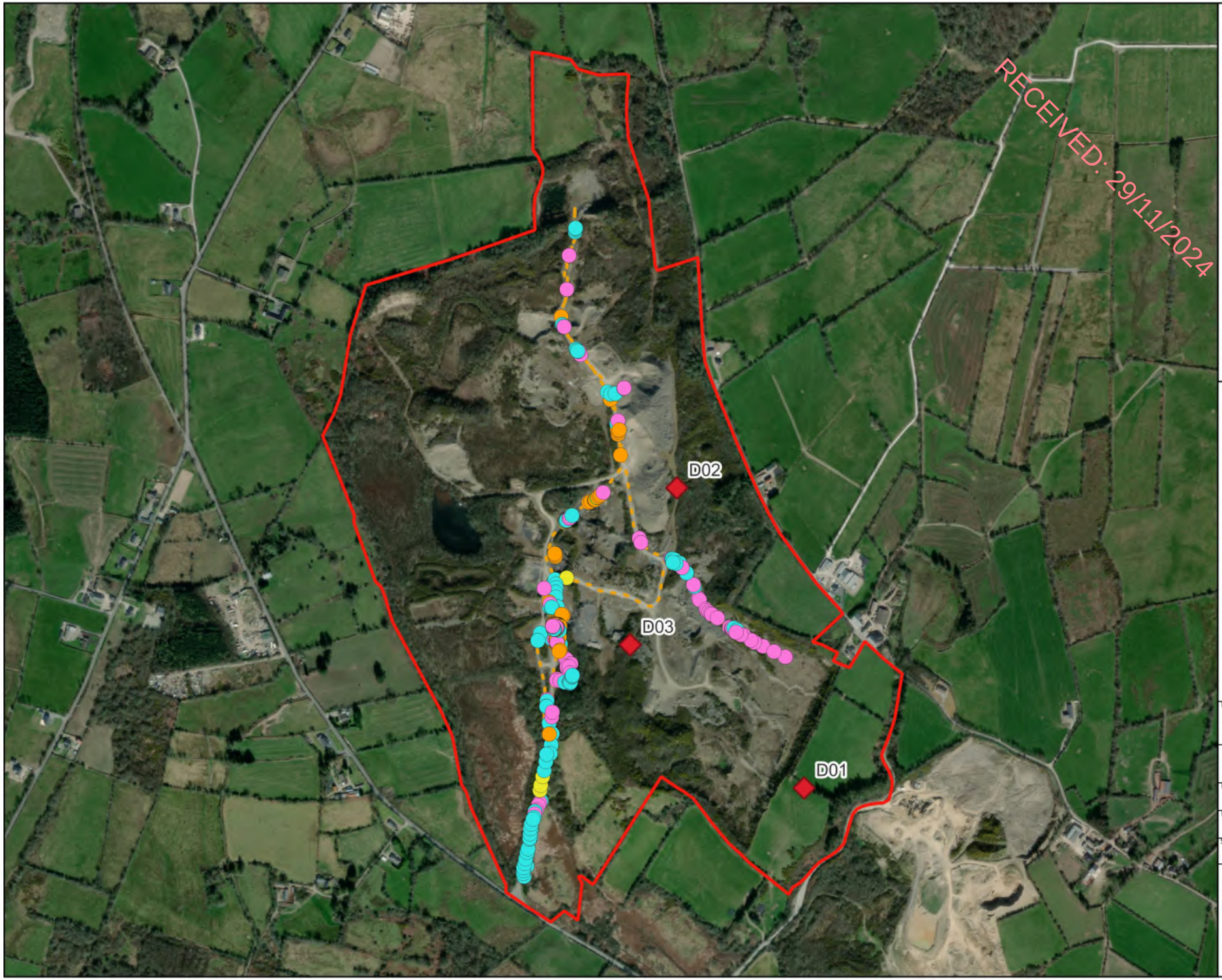
The manual activity survey also comprised of a night walkover transect at dusk. The night walkover survey followed the dusk emergence survey undertaken on the 27th of July 2023. The survey began at 23:00 and was completed at 00:28. Regular bat activity was recorded on the survey, with a total of 231 bat passes (Table 5-13).

Table 5-13 Night Walkover survey results

Date	Km	Common pipistrelle	Soprano pipistrelle	Leisler's bat	Brown long-eared bat	*Myotis* spp.	Lesser Horseshoe bat
27/07/2023	4.1	94	91	35	3	2	6

The walkover survey was aimed at assessing the use of linear features and other habitats by bats. The survey followed existing roads throughout the site. Bat activity was dominated by common and soprano pipistrelles. Common pipistrelles were predominantly recorded at the west of the site where immature conifer plantation was abundant. Soprano pipistrelles were principally found at the south of the site. Six Lesser horseshoe bat passes were also recorded during the walkover survey in the southwest of the site.

Figure 5-10 presents the spatial distribution of bat activity across the night walkover surveys.



Map Legend

- Proposed Development boundary
- Static Detector Locations
- Manual Transect 27.07.2023
- Myotis spp.
- Leisler's bat
- Nathusius pipistrelle
- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared bat
- Lesser horseshoe bat

Drawing Title

Manual Transect Results

Project Title	Proposed Quarry Extraction and Restoration, Ballyquin, Co. Clare
Drawn By: CT	Checked By: RW
Project No.: 211137	Drawing No.: Figure 5-10
Scale: 1:9,500	Date: 16.10.24

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Static Detectors Surveys

Six SM4 static detectors were deployed on the site for a minimum 10-day period. Three detectors were deployed on 17th July 2023. They were moved on 27th July 2023 to three new locations and were collected on 15th August 2023. These detectors allowed a specified look into species composition, commuting and foraging activities within the site. Locations were chosen to represent areas of likely bat activity.

In total 25,368 bat passes were recorded. Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Common pipistrelle (*Pipistrellus pipistrellus*) made up the vast majority of the activity recorded within the site (n=15,005), followed by Soprano pipistrelle *(Pipistrellus pygmaeus*) (n=7,842). Leisler's bat (n=1,779) and *Myotis* spp. (n=526) were less frequently recorded, followed by brown long-eared bats (n=151). 65 instances of lesser horseshoe bat were recorded at the site. The Site is located within the current known range for this species. Plate 5-36 shows total bat species composition recorded at the site.

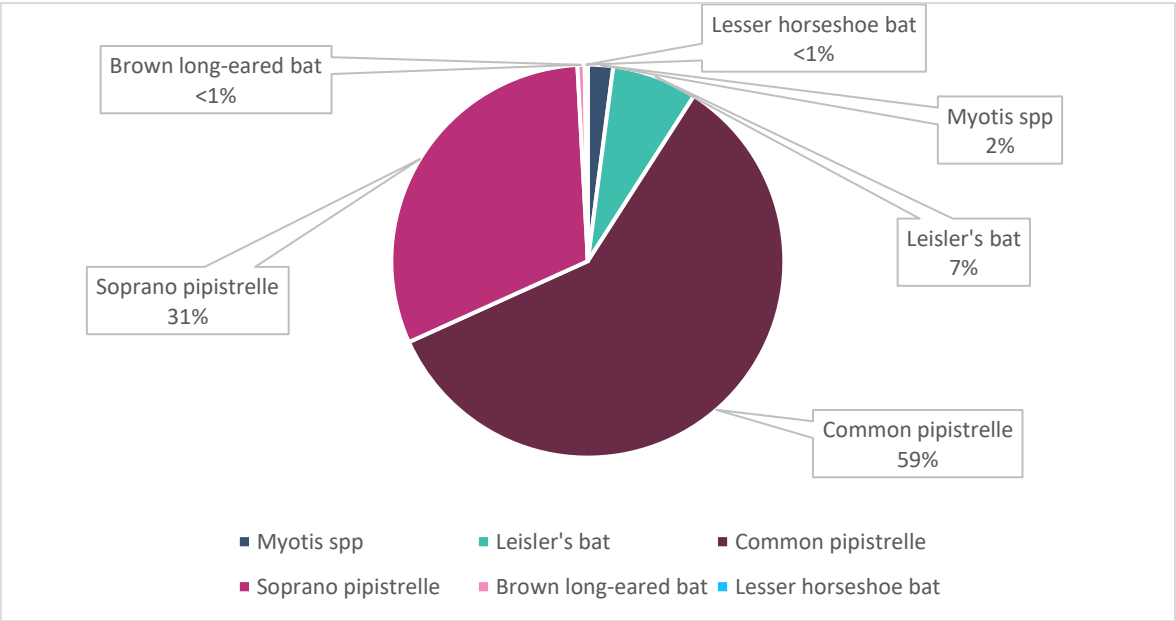

Plate 5-36 Total bat species composition.

The plate below shows total bat passes per detector, which are summarised in Table 5-14.

Table 5-14 Static detector results, total bat passes

Detector	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Brown Long-eared Bat	*Myotis* spp.	Lesser Horseshoe Bat
D01	2066	2435	108	10	214	1
D02	836	312	96	19	68	11
D03	2415	306	190	5	27	11
D04	5882	1973	248	23	72	18
D05	989	2204	941	58	91	24
D06	2817	612	196	36	54	0

Species composition was varied across the detectors. Common pipistrelles were recorded more frequently at locations D02, D03, D04 and D06. Soprano pipistrelle were recorded in higher numbers at D01 and D05, though instances of common pipistrelle were still high. Leisler's bat activity was highest at

D05. Instances of brown long-eared bats (n=151) were rare at across the site. *Myotis* spp. was recorded more often at D01 that at any other location.

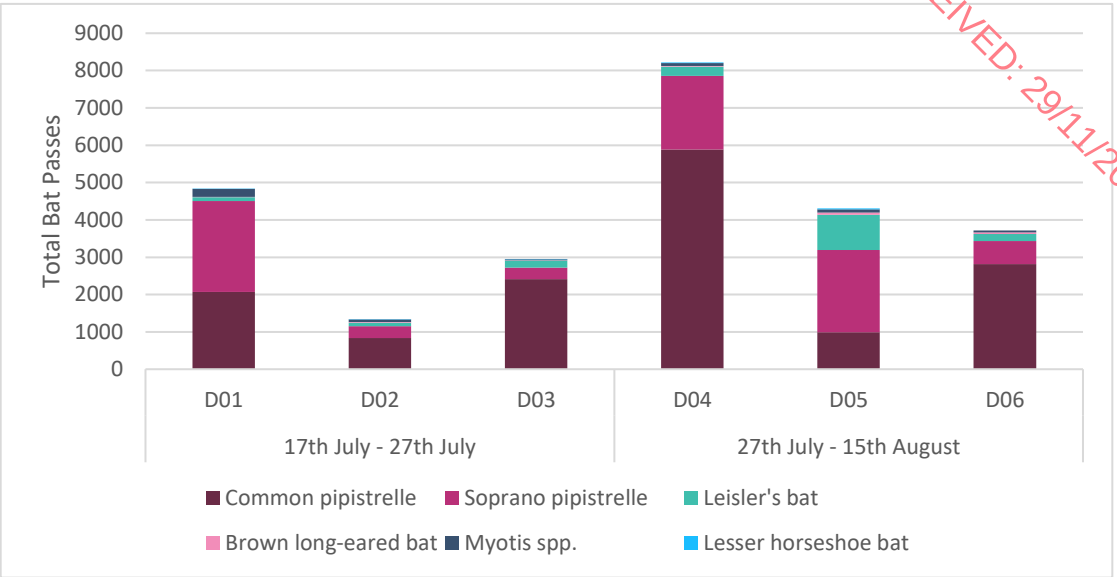

Plate 5-37 Total bat passes per detector.

Analysis of the detector recordings also highlighted the total bat passes per night, per detector. Species composition per night is shown in Plate 5-38. Activity varied between locations and between nights during the two deployments. Species composition was dominated by common pipistrelles at D02, D03, D04 and D06. D01 and D05 activity was predominantly soprano pipistrelles, though Leisler's bat was more prevalent at this location than at any other. Lesser horseshoe bat was recorded at all detectors, with the exception of D06. Occasional increases in activity were recorded for all other species. The highest activity was recorded at D04 on the 7th and 8th of August.

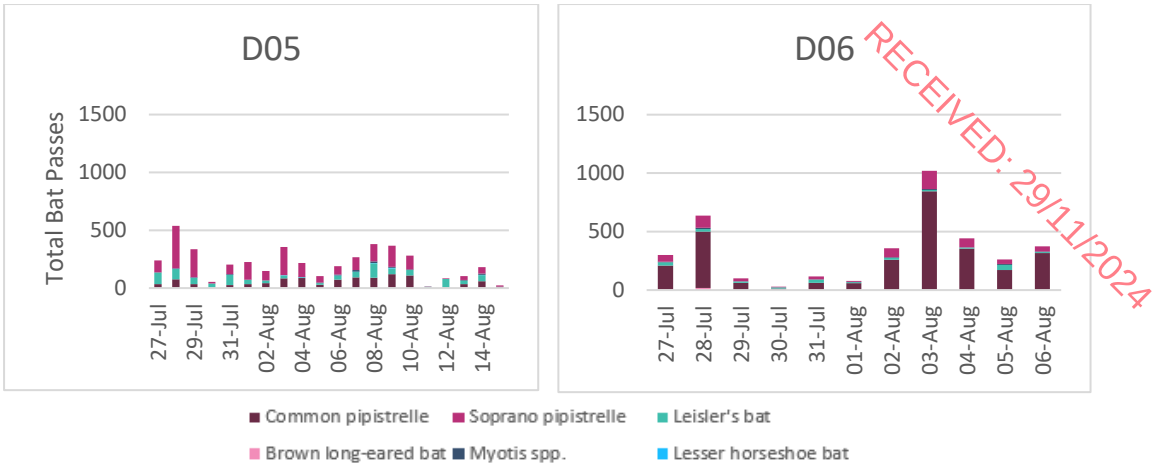

Plate 5-38 Total Bat Passes per Night, per Detector Location

5.4.3.4 Barn Owl Survey

During the manual bat surveys, an incidental sighting of barn owl was recorded. A barn owl was recorded flying south by the existing office building, and subsequently flying back north to the historical quarry plant. In total, a minimum of three barn owls could be heard calling and flying over the quarry plant and current void.

As a result, a barn owl survey was carried out, to determine the use of the site by barn owl and the potential breeding success of the species within the Proposed Development site. A barn owl survey was undertaken on the 28th of August 2023 by Brónagh Boylan (BSc.), Sara Fissolo (BSc.), Aran von der Geest Moroney (BSc.) and David Culleton (BSc.) of MKO. Each surveyor was positioned at a different vantage points within the site to provide the best scope for identifying the use of the site by the species.

The site infrastructure that the barn owls were recorded flying overhead during the bat surveys was inspected, signs of barn owl occupancy was recorded in the form of active whitewash located beneath a large cavity within a concrete wall. Pellets were also recorded adjacent to the infrastructure onsite.

The survey began at 20:07pm and concluded at 21:50pm.

A kestrel was spotted by two surveyors at 20:29pm and 20:31pm flying to the east of the existing quarry plant. At 20:42 the kestrel was seen flying from east to south.

At 21:10pm one barn owl was seen flying out from existing quarry plant and resting on a piece of machinery. It then flew off of the machinery in an eastern direction. At 21:13pm a second barn owl flew in a south-east direction. At 21:11pm, 21:18pm, 21:19pm, and 21:22pm, calls from the barn owl were heard by surveyors coming from an eastern direction.

Potential breeding activity by barn owl at this site was therefore recorded.

5.4.3.5 Other Faunal Species

5.4.3.5.1 *Mammals*

Fox (*Vulpes vulpes*) prints were recorded within the Proposed Development site (Plate 5-39). Fallow deer (*Dama dama*) were sighted within the EIAR Study Area boundary in addition to deer prints often adjacent or within woodland habitat (Plate 5-40). Droppings (See Plate 5-41) likely to be of pine marten (*Martes martes*) or Irish stoat (*Mustela erminea hibernica*) given the small size (relative to badger), black

colour and coiled, discrete shape. These scats contained seeds of ivy and blackberry, which are known to make up to 30% of the pine marten's diet (Lynch et al. 2007[14]).

Plate 5-39- Fox print recorded within the EIAR Study Area boundary.

[14] *Lynch, Á. B., & McCann, Y. (2007). The Diet Of The Pine Marten (Martes Martes) In Killarney National Park. Biology and Environment: Proceedings of the Royal Irish Academy, 107B(2), 67–76.c*

Plate 5-40- Deer prints recorded within the EIAR Study Area boundary.

Plate 5-41- Suspected pine marten droppings found within the EIAR Study Area boundary.

5.4.3.5.2 Birds

A wide array of passerine birds were recorded within the site including robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes),* and bullfinch (*Pyrrhula pyrrhula*). Sand martin (*Riparia riparia*) were recorded nesting in two different areas within the proposed extraction boundary. There were 14 nesting burrows recorded within am earth and pebble stockpile in the quarry void with flight activity by sand martin recorded at the time of surveying, another 13 nesting burrows were recorded in an exposed sand cliff within the proposed extraction boundary (Plate 5-42). Additionally, kestrel (*Falco tinnunculus*) and buzzard (*Buteo buteo*) were recorded hunting within the site.

Plate 5-42- Sand martin nesting within the Proposed Extraction Boundary.

5.4.3.5.3 Invertebrates

A number of invertebrates were recorded within the EIAR Study Area boundary. A small heath (*Coenonympha pamphilus*) caterpillar was recorded (Plate 5-43), in addition to an orange-tip butterfly (*Anthocharis cardamines*) (Plate 5-44). Furthermore, a peacock butterfly (*Aglais io*), small tortoiseshell (*Aglais urticae*), and emperor dragonfly (*Anax imperator*) were recorded.

Plate 5-43- Small heath caterpillar recorded during a multidisciplinary walkover survey.

Plate 5-44- Orange-tip butterfly recorded feeding on a cuckoo flower.

5.4.4 Importance of Ecological Receptors

Table 5-15 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies KERs.

Table 5-15 Key Ecological Receptors identified during the assessment

Habitat or Species Importance	KER Y/N	Rationale
European and National Sites		
European Sites: › Lower River Shannon SAC [002165] › River Shannon and River Fergus Estuaries [004077] *International Importance*	*Yes*	These designated sites have been assigned International Importance as they are sites designated as part of the Natura 2000 Network under the EU Habitats Directive. A potential pathway for indirect effects on these European Site, via the deterioration of water quality resulting from the percolation of pollutants to surface water during the construction and operational phases of the Proposed Development, was identified. **Therefore, these European Site is included as a KER.**
National Sites › Doon Lough Bog NHA [000337] › Inner Shannon Estuary, South Shore pNHA [000435] › Fergus Estuary and Inner Shannon, North Shore pNHA [002048] *National Importance*	*Yes*	This Nationally Designated Sites feature habitats which are dependent on surface water quality in addition to groundwater quality. A potential pathway for indirect effects on these Nationally Designated Sites via the deterioration of water quality resulting from the percolation of pollutants to surface water during the construction and operational phases of the Proposed Development, was identified. **Therefore, these Nationally Designated Sites are included as KER's.**
Habitats		

Habitat or Species Importance	KER Y/N	Rationale
› Buildings and artificial surfaces (BL3) › Spoil and bare ground (ED2) › Active quarries/ Mines (ED4) › Recolonising bare ground (ED3) › Exposed sand, gravel or till (ED1) Local Importance (*lower value*)	*No*	These habitats, although some containing small areas of recolonising habitat that are of some local importance for wildlife, are common and widespread in the local and wider landscape and are highly modified. Although there will be some loss of these habitats or indirect impacts, **these habitats are not included as KERs and *will not* be considered further.**
› Improved agricultural grasslands (GA1) *Local Importance (lower value)*	*No*	Improved agricultural grasslands (GA1) were recorded in the south of the Proposed Development site. This habitat is of low biodiversity value and is heavily managed. To facilitate the proposed extraction of the sand within the quarry there will be a loss of 1.9ha of this habitat. The habitat offers a degree of value to local biodiversity but is highly managed and species poor. **This habitat is *not* included as a KER, and *will not* be considered further.**
› Dry meadows and grassy verges (GS2) Local Importance (*lower value)*	*No*	Dry meadows and grassy verges (GS2) were recorded in the south of the site. This habitat offers value to local biodiversity and is species diverse. However, this habitat will not be impacted on by the Proposed Development as no works are proposed within the footprint of the dry meadows and grassy verges habitat onsite. There will be no loss of this habitat as a result of the Proposed Development. **This habitat is *not* included as a KER, and *will not* be considered further.**
› Marsh (GM1) Local Importance (*higher value*)	*No*	The Marsh (GM1) habitat was recorded at the northeastern most extent of the Proposed Development site. This habitat is confined to this section within the Proposed Development site boundary. This habitat is associated with previous quarry activity and is therefore not commonly found within the wider landscape. However, this habitat will not be impacted on by the Proposed Development as no works are proposed within the footprint of the marsh habitat onsite. There will be no loss of this habitat as a result of the Proposed Development. **This habitat is *not* included as a KER, and *will not* be considered further.**
› Drainage ditch (FW4) Local Importance (*higher value)*	*No*	The Drainage Ditch (FW4) habitat was recorded at the northwest of the Proposed Development site. This drain was recorded as having no flow and was heavily encroached by vegetation. This habitat was only recorded once onsite, however given the context of the wider landscape this habitat is common at a local scale. There will be no loss of this habitat as a result of the Proposed Development as no works are proposed at this

Habitat or Species Importance	KER Y/N	Rationale
		area of the site. **Therefore, this habitat *is not* included as a KER.**
› Other artificial lakes and ponds (FW8) Local Importance (*lower value*)	*No*	This habitat was recorded in multiple spots within the Proposed Development site boundary, mainly in the north, west and southeast within the proposed extraction boundary. This habitat is species poor and is man-made and within the Proposed Development site boundary is associated with old quarry activities and flooded sumps with stockpiles of sand and gravel. This habitat is of some ecological value with emergent and marginal species recolonising the habitat in the intervening period, however these species are common and widespread in a local, national, and international context. The waters from the largest manmade pond in the west of the site will be utilised during the operational phase of the Proposed Development. This manmade pond intercepts the groundwater table and will be supplying water to the proposed wash plant. Although there will be partial loss of this habitat as a result of the Proposed Development, the habitat is manmade and is of little ecological value. **Therefore, this habitat *is not* included as a KER, and *will not* be considered further.**
› Immature woodland (WS2) Local Importance (*higher value*)	*No*	This habitat is widely abundant within the Proposed Development site. This habitat is of reasonable biodiversity value and has the potential in the future to develop into a mature woodland. There will be the loss of 2.4ha associated within the vegetation clearance during the proposed construction phase. However, the species present within this section of the site are not mature and have recently colonised this area since the cease of active quarrying onsite. In total, there will be an 8% loss of this habitat onsite, which is not significant at a local scale given that 36.5ha of immature woodland habitat within the site will not be impacted on by the Proposed Development. The species present are widespread in a local, national, and international context. There will be no significant loss of this habitat onsite given the habitat's distribution in the wider site boundary. **Therefore, this habitat *is not* included as a KER, and *will not* be considered further.**
› Scrub (WS1) Local Importance (*higher value*)	*No*	This habitat is widely abundant within the Proposed Development site and particularly dominates the southwest, southeast and middle of the Proposed Development. This habitat is of some biodiversity value since gorse has recolonised the stockpiles and bare surfaces after the previous quarry activities have ceased. The habitat has the potential to develop and mature in the future. There will be the loss of 3.8ha associated within the vegetation clearance which is not significant at a local scale given that 15.8ha of scrub habitat within the site will not be impacted on by the Proposed Development. However, the species presents are common and widespread in a local, national, and international context. There will be no significant loss of this habitat onsite given the habitat's distribution in the wider

Habitat or Species Importance	KER Y/N	Rationale
		site at the middle and west of the Proposed Development site. **Therefore, this habitat *is not* included as a KER and *will not* be considered further.**
› Reed and large sedge swamps (FS1) Local Importance (*higher value*)	*No*	The reed and large sedge swamp (FS1) habitat was recorded at the southwestern most extent of the Proposed Development site. This habitat is not species rich and is composed of two species: Bullrush and Common Reed. This habitat is not located within the proposed works footprint. There will be no loss of this habitat or indirect effects on this habitat as a result of the Proposed Development. **Therefore, this habitat *is not* included as a KER.**
› Depositing/lowland river (FW2) and aquatic fauna Local Importance (*higher value*)	*Yes*	This habitat comprises the Broadford River at the north, and the Bridgetown River to the south of the Proposed Development. Both rivers are salmonid rivers and comprise semi-natural habitats and provides habitat connectivity to high-value habitats within the wider landscape and potential refuge for species within the area. Both rivers are located outside of the Proposed Extraction Boundary, and the Bridgetown River is located within the Proposed Restoration Boundary. Both watercourses have hydrological connectivity to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA downstream. In the absence of mitigation, the proposed extraction and operational phases have the potential to result in significant indirect effects on the water quality of Bridgetown River that connects downstream to the above-mentioned SAC and SPA. There will be no direct effects as there are no proposed instream works, and no discharges will be entering any watercourse as the hydrology regime onsite is a closed looped system, from man-made ponds to settlement ponds. However, taking a precautionary approach and in the absence of mitigation there are potential for indirect effects as a result of the proposed construction and operational works, in the form of deterioration of water quality due to run-off. The proposed extraction site at its closest is approximately 44m from the Bridgetown River to the south. **Depositing lowland river (FW2) and aquatic fauna are included as a KER due to the potential for deterioration of water quality as a result of the Proposed Development.**
› Hedgerow (WL1) Local Importance (*higher value*)	*Yes*	Hedgerow habitat has been assigned as of Local Importance (*higher value*) as it contains high biodiversity value and helps maintain links and ecological corridors between features of higher ecological value and are likely to be utilised by protected faunal species. To facilitate the Proposed Development, 104 linear metres of this habitat will be lost from within the Proposed Development site.

Habitat or Species Importance	KER Y/N	Rationale
		Therefore, this habitat *is included* as a KER, and *will be* considered further.
› Treeline (WL2) Local Importance (*higher value*)	*Yes*	This habitat has been assigned as of Local Importance (*higher value*) as it contains high biodiversity value and helps maintain links and ecological corridors between features of higher ecological value and are likely to be utilised by protected faunal species. To facilitate the Proposed Development, 186 linear metres of this habitat will be lost from within the Proposed Development site. **Therefore, this habitat is included as a KER, and *will be* considered further.**
› Himalayan Knotweed Local Importance (*lower value)*	*Yes*	The Third Schedule Invasive Species, Himalayan Knotweed, was recorded within the Proposed Development site and is within the footprint for the proposed infill boundary. Due to the species capability to spread vegetatively and its rapid growth, Himalayan Knotweed is highly invasive and can impact native species by shading out native and rare plant species. As this plant is found within the proposed infill works area, **the species is therefore included as a KER, and *will be* considered further.**
Fauna		
› Barn Owl *County Importance*	*Yes*	Barn Owl, a red listed BOCCI species were recorded utilising and nesting onsite during dedicated breeding raptor surveys. Whitewash, pellets, feathers and bones were recorded inside and beneath a cavity of the pre-existing quarry plant onsite, located within the previous quarry extraction area. The national breeding population of barn owl is estimated to be 562-702 pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 22-27 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of six breeding pairs is required for classification as National Importance and of one breeding pair for classification as County Importance. Estimates for the national or county wintering population of barn owl are not available. Therefore, in the absence of national and county population estimates, and following the precautionary principle, regular records of wintering barn owl are treated as County Importance. Therefore, the presence of a breeding pair of Barn Owl within the Proposed Development site constitutes a designation of *County Importance.* There may be direct and indirect impacts upon these species in the absence of mitigation, **Barn owl will therefore be included as a KER and *will be* considered further.**

Habitat or Species Importance	KER Y/N	Rationale
› Sand Martin Local Importance (*higher value)*	*Yes*	Sand Martin, an amber listed BOCCI species were recorded utilising and nesting onsite during multidisciplinary walkover surveys. 27 active burrows were recorded the Proposed Extraction Boundary. There will be direct impacts upon these nesting grounds during the operational phase of the Proposed Development. **Therefore, Sand Martin are included as a KER and *will be* considered further.**
› Birds Local Importance (*higher value*)	*Yes*	Bird species recorded were common species that are typical of the habitats in the wider area of the site. The site does not provide significant supporting habitat for bird species listed on Annex I of the EU Birds Directive. Kestrel, a red listed BOCCI species was recorded foraging onsite. A BOCCI amber list species, sand martin, were recorded roosting at the southern cliff of the Proposed Development site. Hedgerow and scrub habitats within the site provide suitable nesting and foraging habitat for populations of common bird species of Local Importance (*higher value*). As there will be loss of these habitats and there may be direct and indirect impacts upon these species in the absence of mitigation, **Birds are therefore included as a KER and *will be* considered further.**
› Badger Local Importance (*higher value*)	*Yes*	Signs of badger activity were present within the EIAR Study Area boundary in the form of tracks and snuffle holes; however no badger setts were identified within the Proposed Development site. Scrub and hedgerow habitats provide potential suitable habitat and sections of these habitats are to be removed to facilitate the Proposed Development. No setts were identified. However, in the absence of mitigation there is the potential for direct and indirect effects on this species which use the site at least on occasion. **Badger are therefore included as a KER and *will be* considered further.**
› Otter *International Importance*	*Yes*	No signs of otter activity were recorded within the EIAR Study Area boundary, including holts. The Bridgetown River Waterbody flows approximately 5.8km downstream into the Lower River Shannon SAC, and there is the potential for the rivers in the vicinity of the site to be used by Otter on occasion. Given that the Lower River Shannon SAC is 5.8km downstream of the Proposed Development and is designated for Otter as a Qualifying Feature, the population of otter is assessed as being of International Importance. On a precautionary basis, in the absence of mitigation, there may be potential impacts on this species.

Habitat or Species Importance	KER Y/N	Rationale
		Therefore, Otter are included as a KER and *will be* considered further.
› Pine Marten Local Importance (*higher value)*	*Yes*	Evidence of pine marten activity within the Proposed Development site in the form of scat was identified. No evidence of populations being significant at more than a local level was recorded. No dens were recorded within the Proposed Development. Pine marten has been assessed as of Local Importance (Higher value). Given the presence of Pine Marten within the Proposed Development site, they are included as a KER. **Pine marten are therefore included as a KER and *will be* considered further.**
› Other faunal species Local Importance (*higher value*)	*No*	Fox tracks, and fallow deer sightings were recorded within the Proposed Development site boundary. No other species of conservation concern or protected under Annexes of the EU Habitats Directive were recorded. Although other common species may occur within the site, at least on occasion, no potential for significant effect has been identified on any other faunal species associated with the Proposed Development and are thus ***not included*** **as KERs.**
› Bats Local Importance (*higher value*)	*Yes*	All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland, bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts as amended. Bats have been assigned Local Importance (Higher Value) on the basis that bat roosts have been identified within the Proposed Development site boundary and suitable foraging and commuting habitat for bats, such as hedgerows and treelines, are found throughout the study area. As there will be loss of hedgerow as a result of the development, there is potential for loss of commuting/foraging habitat. Given the presence of trees and buildings with roost potential on the site, there is potential for loss of roost habitat and disturbance. **Therefore, bats are included as a KER.**

5.5 Ecological Impact Assessment

This section of the report considers the potential for impact on the KERs that were identified during the desk and field studies. The impacts on each of the KERs is considered during all stages of the Proposed Development, namely; construction and operational/decommissioning.

The below subsections provide an impact assessment on the following KERs as identified in Section 5.4.4 of this report:

Habitats:

- Depositing/lowland river (FW2)
- Hedgerow (WL1)
- Treeline (WL2)
- Fauna:
    - Birds
    - Barn Owl
    - Sand Martin
    - Badgers
    - Otter
    - Pine Marten
    - Bats
- Designated Sites
    - Lower River Shannon SAC [002165]
    - River Shannon and River Fergus Estuaries SPA [004077]
    - Doon Lough Bog NHA [000337]
    - Inner Shannon Estuary, South Shore pNHA [000435]
    - Fergus Estuary and Inner Shannon, North Shore pNHA [002048]

5.5.1 Do Nothing Effect

If the Proposed Development was not to take place, then a slow natural recolonisation of the previously active quarry areas onsite would take place, with the exception of the hard infrastructure standings within the Proposed Development site boundaries. This process of slow colonisation has taken place in the intervening period of the cessation of quarrying activities onsite. If this natural rejuvenation of vegetation occurs onsite and the Proposed Development was not to go ahead, then the quarry voids would not return to topographic levels that existed prior to quarrying within Ballyquin Quarry.

The Do-nothing scenario would see a slow rejuvenation process of scrub and immature woodland encroachment. Sections within this boundary would remain unvegetated due to the presence of stockpiles. As Himalayan Knotweed, a Third Schedule Invasive Species is present within the infill boundary, this would spread further within the site possibly outcompeting native scrub and woodland species.

As previously mentioned, habitats that would recolonise the site would be composed of scrub and immature woodland which would overtime mature and create broadleaf woodlands.

5.5.2 Likely Effects During Construction Phase

It is estimated that the construction phase of the Proposed Development will take approximately 1 month to complete. The following works are required to facilitate the site-enabling and construction Phase of the site.

- Preparation of site for construction;
- Stripping of overburden soils under archaeological supervision for use in construction of environmental berms and ongoing site restoration works;
- Removal of existing internal hedgerows in greenfield extraction area,
- Pouring of concrete for soil inspection area/refuelling area foundation;
- Construction of new drainage network and fuel/oil interceptor at refuelling area;
- Erection of quarantine inspection shed;
- Road paving/improvements;
- Construction of settlement ponds;
- Construction of a fixed processing plant including water management system and ponds for the washing of aggregates; and
- Construction of a new chain-link perimeter fence on the eastern and northern boundaries of the extraction area.

5.5.2.1 Effects on Habitats During Construction

Table 5-16 below provides details of the extent of the recorded habitats on the site, the extent of the habitat that will be lost to facilitate the Proposed Development, and the percentage of the total area of that habitat in the EIAR Study Area that it represents.

Table 5-16 Extent of habitat lost to the Proposed Development and the percentage of the total area of that habitat on site

Habitat	Total Area (Ha) /Length (m²) within the EIAR study boundary	Area (ha)/length (km) to be lost to development footprint	% of total to be lost	KER (Yes/No)
Spoil and bare ground (ED2)	7.7ha	7ha	91%	No
Active quarries and mines (ED4)	6.5ha	5.3ha	81%	No
Recolonising bare ground (ED3)	8.1ha	3.4ha	42%	No
Improved agricultural grasslands (GA1)	8.8ha	1.9ha	22%	No
Other artificial lakes and ponds (FW8)	1.3ha	0.4ha	31%	No
Immature Woodland (WS2)	39.7ha	3.2ha	8%	No
Scrub (WS1)	15.8ha	3.8ha	24%	No
Hedgerow (WL1)	224 linear metres	104 linear metres	46%	Yes
Treeline (WL2)	1,181 linear metres	186 linear metres	15%	Yes

The Proposed Development will result in the loss of areas of habitat that are of Local Importance (Lower Value) and Local Importance (Higher Value) are not identified as KERs. This mainly involves the loss of Spoil and bare ground (ED2), Recolonising bare ground (ED3), Active quarries and mines (ED4), Scrub (WS1), Immature woodland (WS2), Artificial quarries and lakes (FL8), Improved agricultural grasslands (GA1) which has been assessed as of low ecological value, and Scrub (WS1), Immature woodland (WS2) that were assigned Local Importance (Higher Value).

Other habitats assessed as of local importance (lower value) include Buildings and artificial surfaces (BL3), Dry meadows and grassy verges (GS2). Any unanticipated impacts to the buildings and artificial surfaces (BL3) habitat is considered significant as all buildings onsite are to be retained due to recorded bat use during the dedicated bat surveys.

The effects on the following habitats that are identified as KERs are described in the below sections:

- Hedgerow (WL1) and Treeline (WL2)
- Lowland/Depositing River (FW2)

5.5.2.1.1 Assessment of Potential Effects on Hedgerows (WL1) and Treelines (WL2)

Table 5-17 Hedgerow and Treeline impact assessment

Description of Effect	The proposed extraction area will result in a 15% total loss of the Treelines (WL2) habitat onsite and a 46% total loss of Hedgerow habitat. There will be a total loss of 186 linear metres of treeline habitat and 104 linear metres of hedgerow habitat to facilitate the construction phase of the Proposed Development. The areas where this will occur are shown in the Landscape Mitigation Plan for the extraction phase in Figure 1-1 and within the BMEP (Appendix 5-1).
Assessment of Significance prior to mitigation	As there is limited linear connectivity within the proposed EIAR Study Area boundary, in the absence of mitigation, this would constitute a permanent significant loss of hedgerow and treeline habitat at a local scale.
Mitigation	In order to compensate for the loss of linear vegetation, approximately 493 linear metres of new replacement hedgerow planting will be carried out within the site boundary, towards the northeast and southeast of the proposed extraction area. This will result in an increase of linear connectivity within the site prior to the proposed works. Tree/shrub species planted in these locations will be of a similar composition to those occurring on site, will be native and of local provenance. Further details with regard to species, planting location, and management is contained within the BMEP (Appendix 5-1)
Residual Effect following Mitigation	Following implementation of mitigation, no potential for significant effect exists at any geographic scale. The planting of additional hedgerow will serve to enhance the hedgerow/treeline habitat within the Proposed Development site due to increased species diversity compared to that to be lost, will benefit wildlife and due to the increase of 203 linear metres over that to be lost, will result in a net gain in hedgerows and treelines within the site.

5.5.2.1.2 Assessment of Potential Effects on Lowland/Depositing River (FW2)

Table 5-18 Lowland/Depositing River (FW2) impact assessment

Description of Effect	The Proposed Development will not result in the loss of any of this habitat within the Proposed Development site boundary. The construction phase may result in indirect effects on this habitat due to deterioration of water quality within this habitat. In the absence of mitigation and taking a precautionary approach there is potential for indirect effects on the Bridgetown River Waterbody, due to the close proximity of the watercourse to the proposed extraction boundary. Indirect effects could occur via deterioration of water quality during the construction phase as a result of the excavation of topsoil and removal of vegetation, associated stockpiling, potential release of hydrocarbons via accidental spillages during refuelling onsite, and potentially through the release of concrete and cement-based products via run-off of contaminated waters or accidental spillages.
Assessment of Significance prior to mitigation	In the absence of mitigation, deterioration of water quality has the potential to result in a significant effect on Lowland/Depositing River and aquatic receptors of local importance, and National and International importance downstream.

Mitigation	**Measures to avoid the release of suspended solids from excavation activities during construction** The following mitigation measures will be implemented to eliminate the risk of negative effects on the lowland depositing river habitat and aquatic ecology from the proposed excavation works of topsoil, the removal of vegetation, and the creation of suspended solids during the construction phase of the development: › Drainage from the development reception area will be directed towards the existing lagoons on the west of the Proposed Development site. › Prior to the commencement of earthworks, silt fencing will be placed down-gradient of the Proposed Extraction Boundary and the Bridgetown River Waterbody at the south of the Proposed Development Site. These will be embedded into the local soils to ensure all site water is captured and filtered; › Daily monitoring and inspections of any constructed site drainage channels during the construction phase will be completed; and › Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses. **Measures to avoid the release of hydrocarbons during construction** The following mitigation measures will be implemented to eliminate the risk of negative effects on lowland depositing river habitat and aquatic ecology from hydrocarbons, fuels, oils, and other compounds used during the construction phase of the development: › No plant maintenance will be completed on site. Any broken-down plant will be removed from the site to be fixed; › Refuelling will be completed in a controlled manner within the proposed refuelling area which will be served by an oil interceptor; › Mobile double skinned bowser will used outside the refuelling area; › A spill kit with absorbent material and pads in the event of any accidental spillages will be kept in the bowser. Drip trays and fuel absorbent mats will be used during all refuelling operations; › Refuelling will be carried out by trained personnel only; › Fuels stored on site during construction will be minimised. Fuel storage areas will be served by an oil interceptor; and, › The plant used during construction will be regularly inspected for leaks and fitness for purpose. **Measures to avoid the release of cement-based material during construction** The following mitigation measures will be implemented to eliminate the risk of negative effects on lowland depositing river habitat and aquatic ecology from concrete and cement based products and other compounds used during the construction phase of the development: › Where concrete is used on site, only the chute will be cleaned, using the smallest volume of water practicable. Washout will be into a skip or dedicated concrete washout area. › No discharge of cement contaminated waters to the site phase drainage system or directly onto bare ground; and, › The pour site (*i.e.* soil inspection shed floor slab) will be kept free of standing water and plastic covers will be ready in case of a sudden rainfall event. **Dust Control** › The hardstanding/roads adjacent the site will continue to be regularly inspected by the Facility Manager for cleanliness and cleaned as necessary. › Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust potential). Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff. › Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.

	› The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness and cleaned as necessary. › Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind. › Water misting or bowsers will operate on-site to mitigate dust in dry weather conditions. › The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary. › All vehicles required to pass through the wheel-wash on exiting the site. › All construction related traffic will have speed restrictions on un-surfaced roads to 15 km/h. › Daily inspection of construction sites to examine dust measures and their effectiveness. › When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper. › All plant and machinery will be maintained in good operational order while onsite. › All plant and materials vehicles shall be stored in the dedicated area. › Monitoring of dust will continue as per the existing and proposed locations (Chapter 8). **Environmental Monitoring** › The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to. Any environmental incidents or non-compliance issues will immediately be reported to the project team.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on Lowland/Depositing River (FW2) and aquatic fauna as a result of the Proposed Development at any geographic scale.

5.5.2.2 Effects on Faunal Species During Construction

The Proposed Development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site but were not included as KERs, see Table 5-15. Given the extensive area of habitat onsite that will remain undisturbed throughout, and the avoidance of the most significant areas of faunal habitat (large areas of immature woodland and scrub, marsh, large sedge and reed swamps), no significant effects on non-KER faunal biodiversity are anticipated as a result of the Proposed Development. Therefore, these species were excluded from further assessment. The effects on fauna that are identified as KERs are described in the below tables.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from deterioration of water quality via water pollution. This has been assessed in Sections 5.5.2.1.2 above and is not repeated below.

5.5.2.2.1 *Assessment of Potential Effects on Badger*

Table 5-19 Assessment of Potential Impacts on Badger

Description of Effect	**Habitat Loss** Evidence of badger were recorded onsite in the form of tracks and snuffle holes. No setts were recorded onsite; however, the species is assumed to use the site at least on occasion. There will be a long-term temporary loss of suitable badger foraging habitat within the proposed extraction boundary, i.e., grassland, scrub, hedgerow, and treeline due to the construction phase vegetation clearance.

Assessment of Significance prior to mitigation	**Habitat Loss** The loss of 104m of hedgerow, 186m of treeline, 1.9ha of agricultural grassland and 3.8ha of scrub habitat will not be significant on the local badger population which only use the site on occasion. These habitats are frequent and common within the surrounding landscape of the Proposed Development site. There will be the proposed replanting of 493 linear metres of hedgerow and bolstering 313 linear metres of hedgerow habitat during the construction phase.
	Disturbance No badger setts were recorded within the Proposed Development site boundary; therefore, no significant direct or indirect effects are anticipated. Taking a precautionary approach, badger which are known to use the area at least on occasion, may create a sett within the Proposed Development site during the intervening period and prior to the construction phase of the Proposed Development. The noise and earth movement during construction works and may have the potential to disturb badgers occupying setts in close proximity to the works for the duration of the month. Badger tunnel systems can extend some distance from sett entrances (over 20m in some cases[15]), and therefore, any excavation by heavy machinery in close proximity to sett entrances risks causing damage to setts and/or direct harm to badgers in the absence of mitigation. This scenario is not currently anticipated as no badger setts were recorded within the Proposed Development. Therefore, no potential for significant effect is predicted. However, mitigation is included on a precautionary basis below.
Mitigation	**Habitat Loss** Following the surveys onsite, it was determined that badger use the Proposed Development site at least on occasion. This loss of habitat has not been considered as significant at any scale and these habitats are widespread and common within the surrounding and wider landscape. Therefore, no mitigation is required for the loss of suitable badger habitats within the Proposed Development site boundary, however, there will be the proposed replanting of 493 linear metres and bolstering of 313 linear metres of hedgerow habitat.
	Disturbance Prior to the commencement of construction works associated with the Proposed Development, the following measures will be undertaken for the avoidance of disturbance and/or direct mortality to badger and to ensure no setts have been established since the original surveys undertaken. The following measures are in line with *Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (NRA 2009). › From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that no additional setts in close proximity to the site works have been built. In the event that a badger sett is identified within or immediately adjacent to the Proposed Development footprint, mitigations as per the above referenced TII document will be implemented for the new sett.
Residual Effect following Mitigation	There will be no significant residual effect on badger as a result of the Proposed Development at any geographic scale.

5.5.2.2.2 Assessment of Potential Effects on Otter

Table 5-20 Assessment of Potential Impacts on Otters

[15] *National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.*

Description of Effect	**Habitat Degradation** Potential for effects on otter has been considered with regard to NPWS '*Threat Response Plan*'[16] (TRP) which identifies four significant threats facing otter in an Irish context: habitat destruction, water pollution, disturbance (recreational sources) and accidental death/persecution. The Bridgetown River Waterbody is located within the Proposed Restoration Boundary and contains suitable otter habitat. The ponds onsite do not have suitable otter habitat present. No otter signs were recorded during the surveys, and no holts were recorded. Therefore, there will be no direct effects on the supporting habitat for otter as no instream or riparian habitat loss is associated with the Proposed Development. However, by taking a precautionary approach, there is potential for the construction phase to result in the run-off of silt during the removal of vegetation and topsoil, creation of berms, run-off of hydrocarbons, cementitious material, and concrete from pouring activities to create hard stand areas, erection of quarry infrastructure, into local watercourses. In the absence of mitigation, this represents a potential indirect effect on otter in the form of habitat degradation through water pollution.
	Disturbance Potential for effects on otter has been considered with regard to NPWS '*Threat Response Plan*'[17] (TRP) which identifies four significant threats facing otter in an Irish context: habitat destruction, water pollution, disturbance (recreational sources) and accidental death/persecution. No otter signs were recorded during the surveys, and no holts were recorded. Therefore, there are no direct or indirect effects on disturbance to otter is anticipated. The proposed extraction boundary is located approximately 44m from the Bridgetown River to the south. Otter may establish a holt or utilise this section of the Bridgetown River in the intervening period prior to the construction phase of the Proposed Development.
Assessment of Significance prior to mitigation	**Habitat Degradation** Due to the close proximity of the Bridgetown River Waterbody (approximately 44m at its closest), there is the potential, in the absence of mitigation, for the construction works to negatively impact upon the watercourse via potential run-off of silt and other pollutants such as hydrocarbons and cementitious material entering the watercourse. This would result in a significant indirect effect on the supporting habitat for otter and has the possibility to be transported further downstream via the aquatic receptor for the 1-month duration of the proposed construction phase works. Given the layout of the Proposed Development, no significant direct effects are anticipated, there will be no loss of breeding or resting places and no direct mortality related impacts on this species are anticipated. In the absence of mitigation, and taking a precautionary approach, there is the possibility of run-off entering the watercourse to the south of the Proposed Extraction Area. This possibility would lead to a significant indirect effect on the species.
	Disturbance No holts were recorded within or adjacent to the Proposed Development site, and therefore, no significant direct effects are anticipated via disturbance to otters as a result of the construction phase of the Proposed Development.

[16] *NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.*
[17] *NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.*

	Taking a highly precautionary approach, and in the absence of mitigation, the noise and earth movement during construction works associated with the Proposed Development, may have the potential to indirectly disturb and stress otter occupying holts in close proximity along the Bridgetown River Waterbody, which may establish during the intervening period before construction works commence. In the absence of mitigation, this could lead to a significant, negative, indirect effect on otter their established holt.
Mitigation	**Habitat Degradation** Mitigation for the prevention of indirect effects on water quality can be found above in Section 5.5.2.1.2. No additional mitigation measures other than those set out in Section 5.5.2.1.2. are considered for the habitat degradation of otter.
	Disturbance Prior to the commencement of construction works associated with the Proposed Extraction and Infill and Restoration Area, the following measures will be undertaken for the avoidance of disturbance to otter and to ensure no holts have been established since the original surveys undertaken. The following measures are in line with '*Guidelines For The Treatment Of Otter Prior To The Construction Of National Road Schemes* (TII 2008[18]). › No signs of otter were found during the dedicated otter surveys. However, from a precautionary basis, pre-commencement survey for otter will be carried out prior to any works commencing. Should otter holts be recorded within 150m of the proposed works, a derogation license will be obtained from NPWS and works carried out in accordance with NRA (2006) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. The otter survey will be carried out no more than 10 months in advance of commencement. › All plant and equipment for use will comply with Statutory Instrument No › 359 of 1996 "European Communities (Construction Plant and Equipment) › (Permissible Noise Levels) Regulations 1996". › Operating machinery will be restricted to the Proposed Development site › boundary. › Work will be completed during daylight hours. However, if lighting is needed › for construction during certain periods over winter months, this lighting will › be limited and will face downwards, with no lighting focussed onto › surrounding habitats or watercourses. › Regular maintenance of plant will be carried out in order to minimise noise › emissions. Particular attention will be paid to the lubrication of bearings and › the integrity of silencers. › All vehicles and mechanical plant will be fitted with effective exhaust › silencers and maintained in good working order for the duration of the › works. › Compressors will be of the "sound reduced" models fitted with properly › lined and sealed acoustic covers which will be kept closed whenever the › machines are in use and all ancillary pneumatic tools shall be fitted with › suitable silencers. › Machines, which are used intermittently, will be shut down during those › periods when they are not in use.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on otter as a result of the Proposed Development at any geographic scale.

5.5.2.2.3 Assessment of Potential Effects on Pine Marten

Table 5-21 Assessment of Potential Impacts on Pine Marten

[18] *National Roads Authority (2008) Guidelines for the treatment of otters prior to the construction of National Road Schemes.*

Description of Effect	**Habitat Loss** Evidence of pine marten were recorded onsite in the form of scat. No dens were recorded onsite; however, the species is assumed to use the site at least on occasion. There will be a loss of suitable pine marten refuge, breeding, and foraging habitat within the Proposed Development site, i.e., scrub, hedgerow, treeline and immature woodland due to the construction phase vegetation clearance associated with the Proposed Development.
	Disturbance No dens were recorded within or adjacent to the Proposed Development site, and direct disturbance to pine marten as a result of the construction phase of the Proposed Development is therefore not currently anticipated. Taking a precautionary approach, pine marten which are known to use the area at least on occasion, may create a den or refuge within the Proposed Development site during the intervening period and prior to the construction phase of the Proposed Development. The noise and earth movement during construction works and may have the potential to disturb pine marten occupying refuges or dens in close proximity to the works for the duration of the month.
Assessment of Significance prior to mitigation	**Habitat Loss** The loss of suitable refuges, breeding and foraging habitat for pine marten will not be significant at any scale, which are known to only use the site on occasion. These habitats are frequent and common within the surrounding landscape of the Proposed Development site.
	Disturbance No pine marten setts or refuges were recorded within the Proposed Development site; therefore, no significant direct or indirect effects are anticipated. Taking a precautionary approach, pine marten which are known to use the area at least on occasion, may create a den or refuge within the Proposed Development site during the intervening period and prior to the construction phase of the Proposed Development. The vegetation removal along with noise and earth movement during construction works and may have the potential to disturb pine marten occupying setts in close proximity to the works for the duration of the month. Pine marten can breed and create refuges in tree cavities, underground tunnels, rock crevices, log piles, old bird nests, squirrel dreys and in buildings. Any direct disturbance to the species in the absence of mitigation could cause direct mortality to the species onsite. Therefore, any excavation by heavy machinery in close proximity to dens or refuges risks causing damage to dens/refuges and/or direct harm to badgers in the absence of mitigation. This scenario is not currently anticipated as no dens were recorded within the Proposed Development. There may be potential for significant direct effects on pine marten and/or the dens/refuges at a local scale if a den is created in the interim. If any pine marten refuges and/or dens are built within the intervening period, there may also be the potential for significant indirect effects on pine marten.
Mitigation	**Habitat Loss** Following the surveys onsite, it was determined that pine marten use the Proposed Development site at least on occasion. This loss of habitat has not been considered as significant on a local scale and these habitats are widespread and common within the surrounding and wider landscape. Therefore, no mitigation is required for the loss of suitable pine marten habitat within the Proposed Development site.
	Disturbance Prior to the commencement of construction works associated with the Proposed Development, the following measures will be undertaken for the avoidance of disturbance and/or direct mortality to pine marten and to ensure no dens/refuges have been established since the original surveys undertaken.

	› From a precautionary basis, a pre-commencement pine marten survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that no refuges/dens in close proximity to Proposed Development site works have been built.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on pine marten as a result of the Proposed Development at any geographic scale.

5.5.2.2.4 Assessment of Potential Effects on Bats

Table 5-22 Assessment of Potential Impacts on Bats

Description of Effect	**Loss of Roosting Habitat** Four buildings with evidence of roosting bats were identified within the site. No significant maternity roosts were identified. All buildings were observed as being used by a small number of bats, and the project was designed with input from experienced ecologists to retain and avoid these structures as part of the proposed development. Trees within the site were assessed for potential to support roosting bats. Across the site there was very little roosting potential. Four large mature trees were identified as providing roosting potential on a precautionary basis as they were not accessible for a full assessment. Of these, three are within the extraction boundary and are proposed for removal. Following the precautionary principle, although all identified structures will be retained, the operational phase impacts have the potential to result in habitat loss to local bat species by modifying potential roosting features and identified roosts. Potential effects on roosting bats may include: › Direct impacts via removal of bat roosting habitat. › Direct mortality of roosting bats. The site was assessed for its potential to provide suitable roosting habitat for lesser horseshoe bat. None of the trees proposed for removal provide roosting potential for lesser horseshoe bats. No lesser horseshoe roosting activity was recorded and there will be no significant loss of potential lesser horseshoe bat roosting habitat as a result of the proposed development. **Loss of Commuting/Foraging Habitat** With regard to foraging and commuting bats, the Proposed Development site is considered to have *Moderate* to *High* suitability for bats overall due to the large amount of semi-natural woodland and scrub within the site, and the number of linear hedgerows and treelines providing high quality connectivity to the wider landscape. Built and open areas, such as building yards are considered *of Moderate* suitability; however, they are surrounded by linear habitats and do not limit connectivity within the site. 186 linear metres of treelines and 104 linear meters of hedgerows are proposed to be removed as part of the extraction works. This loss of linear features is not expected to fragment commuting within the site or significantly limit foraging opportunities.
	Disturbance During the construction phase no works are proposed during nighttime hours and no additional lighting is proposed. The construction phase of the Proposed Development will result in an increase in disturbance to local bat species in the form of noise. In the absence of appropriate design, the development has the potential to disturb potentially roosting bats.
Assessment of Significance	**Loss of Roosting Habitat** As each of the buildings are to be retained during the proposed works, no loss of roosting habitat is anticipated. The loss of trees assessed precautionarily as having roosting potential is not considered a significant loss of roost resource at any geographic level.

prior to mitigation	**Loss of Commuting/Foraging Habitat** No significant loss of bat roosting, commuting or foraging habitat is anticipated beyond the scale of the Proposed Development site boundary. The loss is minimal within the context of the surrounding landscape given that the hedgerow and treeline habitats are widespread and common in the wider area.
	Disturbance In the absence of mitigation, direct disturbance to bats is not anticipated to be significant. However, mitigations have been proposed to limit any potential impacts.
Mitigation and Habitat Enhancement	**Loss of Roosting Habitat** Four buildings within the site will be retained to allow for continued roosting opportunities within the site. All trees outside of the extraction boundary will be retained. A pre-commencement survey will be undertaken on trees proposed to be felled by a qualified ecologist to ensure there are no roosting bats at the time of felling. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess the baseline environment since the time of undertaking the surveys in 2023. If a bat roost is identified within any of the trees to be removed, a bat derogation licence will be obtained from the NPWS, prior to felling and the felling activity will be supervised by a qualified ecologist. › The pre-commencement survey will involve an inspection and/or dusk emergence survey of potential roosting features on the trees to be felled. Due to the potential for use by roosting bats at any time of the bat activity season, and potential use during winter, the following precautionary measures are also recommended: › Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow potential bats to wake and move. › Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006). Four no. 2FN Woodcrete bat boxes will be erected on mature trees throughout the site to provide additional roosting opportunities. Bat boxes should have a southerly orientation and be positioned at least 2m from the ground (ideally 3m), away from artificial lighting. They will be placed adjacent to retained vegetation features such as treelines and hedgerows to ensure they are close to existing flight paths and can avoid wide open spaces (Collins, 2023). The exact location of the bat boxes will be determined by a qualified ecologist, however they will be placed within the south-eastern area of the site where tree loss is expected. A wildlife tower will be constructed at the north of the site to provide further roosting opportunities for bats, including lesser horseshoe bats (See Appendix 5-1 BEMP for further details). **Loss of Commuting/Foraging Habitat** 493 linear metres of hedgerows will be replanted and 313 linear metres of hedgerows will be bolstered within the proposed site boundary. Areas outside of the extraction boundary will be left to recolonise which will provide further suitable commuting and foraging habitat.
	Disturbance Disturbance limitation measures, will be adhered to, including the following measures: › Working at night will be avoided. Where unavoidable, the following mitigations will be applied to carry out work in dark conditions: ○ Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on remaining foraging and commuting habitats i.e. Lighting will be directed away from linear features around the periphery of the site to minimize disturbance to bats.

	○ Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). ○ The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. › All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996". › Plant machinery will be turned off when not in use. › Operating machinery will be restricted to the proposed works site area.
Residual Effect following Mitigation	**Loss of Roosting Habitat** Following the incorporation of mitigation measures above, the retention of existing identified roosts, the provision of bat boxes and construction of a wildlife tower, the Proposed Development will result in a significant increase in suitable roosting habitat within the site. **Loss of Commuting/Foraging Habitat** Implementing the mitigation measures described above is expected to prevent net loss of bat habitat, including areas used for commuting and foraging, at any geographic scale. The Proposed Development will therefore result in a net positive effect on local bat populations.
	Disturbance Following the incorporation of mitigation measures described above, no potential for significant disturbance/displacement impacts of bats has been identified at any geographic scale.

5.5.2.2.5 Assessment of Potential Effects on Birds

Table 5-23 Assessment of Potential Impacts on Birds

Description of Effect	**Habitat Loss** The construction phase of the Proposed Development will result in the removal and loss of supporting bird species habitat. The construction phase involves vegetation (scrub, immature woodland, treeline and hedgerow) and topsoil removal from within the proposed extraction boundary, and the removal of scrub and immature woodland habitat within the Proposed Development site. Such habitats provide suitable nesting habitat for a range of common and widespread bird species locally.
	Disturbance Should the vegetation removal works within the Proposed Development site be undertaken during the bird nesting season (March to August inclusive), it could lead to the destruction or disturbance/displacement of nesting birds.
Assessment of Significance prior to mitigation	**Habitat Loss** The unmitigated impact resulting in the loss of foraging and commuting habitat for bird species is not significant, as the habitats to be lost are common and widespread elsewhere within the Proposed Development site, and wider landscape.
	Disturbance In the absence of mitigation, there is potential for the loss of individual bird nests within the footprint of the Proposed Development site. Whilst this would be a significant effect on the individual nests involved, it would not result in a significant effect on the populations of the species involved in terms of their conservation status.

Mitigation	**Habitat Loss** There will be no significant effects on the local bird assemblage, therefore no mitigations are required. Furthermore, the proposed replanting measure will see an increase of 493 linear metres of hedgerow and 313 linear metres of hedgerow habitat bolstered within the Proposed Development site which will have a positive impact on the local bird assemblage and offer new corridors for connectivity on site and open up habitat for foraging and nesting for birds.
	Disturbance Site clearance will be undertaken under the provisions of the Wildlife Act and outside of the nesting bird season (1st March – 31st August). If vegetation clearance is required during the nesting bird season, this will be preceded by a nesting bird survey and all clearance works supervised by an appropriately qualified ecologist. An ecologist will be on site during site clearance to minimise impact on foraging/roosting bird species. The ecologist will have the ability to cease works on site that could cause disturbance, in the event of significant disturbance impacts being possible.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on birds or supporting bird habitat as a result of the Proposed Development at any geographic scale.

5.5.2.2.6 Assessment of Potential Effects on Barn Owl

Table 5-24 Assessment of Potential Impacts on Barn Owl

Description of Effect	**Habitat Loss** The construction phase of the Proposed Development will result in the removal and loss of supporting foraging habitat for this species. The construction phase involves vegetation (Treeline, hedgerow, agricultural grassland and scrub) removal and topsoil removal from within the proposed extraction boundary, and the removal of scrub and immature woodland habitat within the Proposed Development site. Such habitats provide suitable rodent and small mammal habitat which barn owl predate on. There will be no direct loss of nesting habitat as site infrastructure where the barn owl nest is located within will be retained as part of the Proposed Development.
	Disturbance The construction phase of the Proposed Development will result in some disturbance to barn owl, which were recorded roosting within the existing site boundary. The active roost location was found within the proposed infill boundary and within approximately 75m of the proposed extraction boundary. The roost location is located directly north of the proposed inspection shed and refuelling area. The noise and earth movement during site stripping activities, in addition to the concrete pouring for foundations, construction of new drainage network, erection of site infrastructure and road upgrade works have the potential to cause in-situ disturbance to barn owl due to the close proximity of the roost location to the proposed construction phase works area.
Assessment of Significance prior to mitigation	**Habitat Loss** The unmitigated impact resulting in the loss of foraging habitat is not significant, as the habitats to be lost are common and within the core foraging range for this species and the wider landscape.
	Disturbance There will be no direct effects on the species as the current site infrastructure will be remaining in situ and no works are proposed to this piece of pre-existing infrastructure. Should the

	month-long construction phase take place during the barn owl breeding season (March-August), this could potentially lead to an unsuccessful breeding year for the pair of barn owls utilise the nest location onsite, which in the absence of mitigation, would result in a significant indirect effect. In the absence of mitigation, there is potential for significant disturbance to barn owl onsite, and given the close proximity of the roost location to proposed works area during the construction phase of the Proposed Development, there is the potential for significant effects to any eggs, chicks or fledglings within the nest location. Any effects to barn owl onsite would result in a significant effect.
Mitigation	**Habitat Loss** There will be no significant effects on the foraging habitat for this species, therefore no mitigations are required. Furthermore, the proposed replanting mitigation will see replanting measures of 493 linear metres of hedgerow habitat and 313 linear metres of existing hedgerows bolstered within the proposed site boundary, which will have a positive impact on this species foraging habitat within the Proposed Development site and offer shelter to rodents and small mammals which barn owl predate and will therefore open up habitat for foraging for barn owls.
	Disturbance However, as significant effects via in-situ disturbance are anticipated at the nest location due to the proposed construction and operational phase works, an alternative barn owl roosting and nesting structure will be provided within the Proposed Development site. The alternative nesting will be provided prior to the commence of the construction phase works, in the form of a proposed Wildlife Tower, that is 2m width x 2m length x 4.5m in height, which is proposed to be installed in the north the site. The floor of the barn owl nest box within the proposed Wildlife Tower will be located a minimum of 500mm below the access entrance. The dimensions of the barn owl access hole and floor chamber will be 1000m wide x 400mm deep x 500mm high, with an inspection panel. The proposed Wildlife Tower will provide a barn owl hole that is 150mm width x 250mm in height and will provide a ledge for barn owls to perch directly outside of the barn hole entrance. The barn owl hole will be facing the east, and as a result of the proposed location onsite there will be adequate distance for a fly path into the hole and ledge. Taking a precautionary approach to reduce disturbance to the species onsite, all construction phase works that are located within 200m of the existing nesting site will be undertaken under the provisions of the Wildlife Act and outside of the nesting bird season (1st March – 31st August). The proposed Wildlife Tower will not only provide nesting opportunities for barn owl within the Proposed Development site, but will also provide nesting, rooting and hibernating holes and cavities for Kestrel, Stock Dove, small hole nesting birds (i.e. House Sparrow, House Martin, Swallow, Blue Tit), bats, toads, slow worms, lizards, and invertebrates. The proposed Wildlife Tower design can be found in Figure 1-3 of the BEMP (Appendix 1), and further detail can be found within the BEMP included as a part of this Planning Application.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on barn owls or their supporting foraging habitat as a result of the Proposed Development at any geographic scale.

5.5.3 Likely Effects During Operation

For the purposes of this impact assessment, the operational phase of the proposed works includes the extraction of sand and gravel from within proposed extraction boundary, and includes the process of returning the land to beneficial use after the completion of infilling the current and future quarry voids.

This involves regrading works within the Proposed Development site, the acceptance and infilling of the current void with inert soil, stone waste, and river dredge spoil.

5.5.3.1 Effects on Habitats During Operation and Restoration

The proposed operational phase will result in the loss of areas of habitat that are of Local Importance (Lower Value) and are not identified as KERs. This mainly involves the loss of spoil and bare ground (ED2), recolonising bare ground (ED3), active quarries and mines (ED4), artificial quarries and lakes (FL8), which have all been assessed as of low ecological value and scrub (WS1), immature woodland (WS2) that were assigned Local Importance (Higher Value). Any direct or indirect impacts on the Immature Woodland (WS2) and Scrub (WS1) habitat are not considered significant.

Other habitats assessed as of local importance (lower value) include buildings and artificial surfaces (BL3). Buildings onsite which were identified as having bat roost activity will be retained.

The effects on habitats that are identified as KERs are described in the below:

- Lowland/Depositing River (FW2)

The proposed restoration phase will result in the creation of habitats that are not currently abundantly found within the Proposed Development site, and once established the habitats will be identified as Local Importance (higher value). The proposed new creation of habitats include:

- Hedgerows (WL1)
- Mosaic of Dry calcareous and neutral grassland (GS1)/Dry meadows and grassy verges (GS2)

These newly created hedgerows will increase the linear connectivity within the Proposed Development site and the creation of species rich grasslands and hedgerows will increase the biodiversity value within the proposed site as well as providing beneficial impacts to faunal species seeing the establishment of foraging, refuges and sheltering, hibernating and nesting habitats.

5.5.3.1.1 *Assessment of Potential Effects on Lowland/Depositing River (FW2)*

Table 5-25 Lowland/Depositing River (FW2) impact assessment

Description of Effect	The Proposed Development will not result in the loss of any of this habitat within the Proposed Development site boundary. There will be no run-off or wash waters discharging into any watercourse onsite. The proposed works may result in indirect effects on this habitat due to deterioration of water quality. In the absence of mitigation and taking a precautionary approach there is potential for indirect effects on the Bridgetown River Waterbody, due to the close proximity of the watercourse to the Proposed Extraction Boundary, and location within the Proposed Restoration Boundary. Indirect effects could occur via deterioration of water quality via spills/chemical releases and dust contamination.
Assessment of Significance prior to mitigation	In the absence of mitigation, deterioration of water quality has the potential to result in a significant effect on Lowland/Depositing River and aquatic receptors of local importance, and National and International importance downstream.
Mitigation	**Measures to avoid the release of hydrocarbons during operation and infilling phases:** - On site re-fuelling of machinery will be carried out in a dedicated refuelling area, or using a mobile double skinned fuel bowser outside the refuelling area. A dedicated refuelling area will be constructed as part of the Proposed Development. - No plant maintenance will be completed on site. Any broken-down plant will be removed from the site to be fixed; - Mobile double skinned bowser will be stored in the refuelling area

	› Drainage from the refuelling areas will be routed through a full hydrocarbon interceptor, prior to the final discharge to the swamp wetland within on the southwest of the site. There will be an inspection chamber between the wetland and the lagoon for inspection/sampling. › Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; › Onsite refuelling will be carried out by trained personnel only; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; › An emergency plan for the operational phase to deal with accidental spillages will be implemented as follows: ○ Procedures and contingency plans will be set up to deal with emergency accidents or spills. The following steps provide the procedure to be followed in the event of oil/fuel spill or leak: ○ Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers; ○ If applicable, eliminate any sources of ignition in the immediate vicinity of the incident; ○ Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill; ○ If possible, clean up as much as possible using the spill control materials; ○ Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited; ○ Notify the Site Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action; and, ○ The Site Manager will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring. **Dust Control** › Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions. › The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness and cleaned as necessary. › Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind. › Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions. › The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary. › All construction related traffic will have speed restrictions on un-surfaced roads to 15 km/h. › Daily inspection of construction sites to examine dust measures and their effectiveness. › When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper. **Environmental Monitoring** › The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to. Any environmental incidents or non-compliance issues will immediately be reported to the project team.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on Lowland/Depositing River (FW2) and aquatic fauna as a result of the Proposed Development at any geographic scale.

5.5.3.1.2 Assessment of the Potential for Impacts to Biosecurity

The infill stage of the Proposed Development has the potential to result in disturbance and potential spread of invasive species that were recorded on the site. One Third Schedule Invasive Species, Himalayan Knotweed, was recorded within the Proposed Development site.

Table 5-26 Assessment of the Potential for Impacts to Biosecurity

Description of Effect	Himalayan Knotweed is present within the Proposed Development site. The species will be impacted upon during the works, as there are two stands present within the proposed infill boundary. A further stand is found north of the man-made pond onsite and is outside of any proposed works footprint. Any works within 7m of these stands onsite may cause disturbance to the invasive species and may result in the potential further spread of the Third Schedule species onsite. Buddleia is listed as a non-native invasive species (NRA, 2010[19]) and is present within the Proposed Development site boundary, however, is outside of all works footprint. There is no potential for the spread of a medium impact species, Buddleia, within the site boundary as a result of the Proposed Development. There is potential for the imported soils proposed to fill the quarry void to contain spores, rhizomes or fragments of other invasive species, which would be spread within the current and future quarry void creating the further species of other potential Third Schedule Species, invasive, or non-native and noxious weeds within the Proposed Site Boundary.
Assessment of Significance prior to mitigation	The further spread of Himalayan Knotweed or any other Third Schedule Invasive Species through imported materials within the Proposed Development site boundary could result in a significant effect at the local scale. This species is listed on the Third Schedule of Invasive Species, which are highly invasive due in part to spreading vegetatively and rapid growth and can impact native species by shading out native and rare plant species.
Mitigation	A pre-construction survey will be carried out by a suitably experienced ecologist to ascertain the potential further spread of Himalayan Knotweed during the intermittent period within the Proposed Development site boundary. The survey will also assess the need for any specific additional mitigation required in order to ensure that there would be no significant residual impacts on ecological receptors. Removal of Himalayan Knotweed within the Proposed Development site boundary will be carried out using the most appropriate measures according to the species' current extent at the time of the preconstruction survey. The following management is proposed in relation to Himalayan Knotweed: **Spraying Schedule (Chemical Control)** › Prior to the outset of works, the plant will be sprayed with herbicide that is suitable for use in or near water such as Glyphosate or 2,4-D Amine. This will be undertaken to reduce above ground biomass. This will be undertaken between May - September or before leaves discolour and fall. Spring treatment is also an option but less effective. The majority of herbicides require living foliage to take up the active ingredient, therefore the more foliage the greater the uptake. Spraying will be undertaken twice, once in early summer (May) and again in autumn (September) to achieve maximum results. Spraying will be carried out by a competent person adhering to the specific label instructions. › Note: After the above spraying schedule it is still possible for regrowth to occur. Additionally, root materials may still be viable within the soil (can remain viable up to 20 years) and any disturbance to the soil is likely to stimulate more growth. For this reason, it is necessary to carry out both chemical and physical treatment in order to obtain full eradication of the plant. Physical removal of the plant is described below in detail and within the Invasive Species Management Plan (Appendix 5-3). **Site set-up and associated measures**

[19] *Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. NRA, 2010.*

- Prior to the commencement of any works, a pre-commencement survey for Himalayan Knotweed will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the development site and to determine whether there have been any changes in the extent of the infestation since the undertaking of surveys in 2023 & 2024.
- The locations and extent of Himalayan Knotweed within Proposed Infill Boundary and north of the man-made pond will be clearly marked out using temporary fencing to ensure they are not disturbed. An exclusion zone surrounding each stand will also be identified and the will inform the extent of the area to be treated as potentially contaminated. The exclusion zone will be 7m.
- Tool box talks will be held with all members of the contractors team responsible for carrying out measures detailed in this mangement plan. This will detail locations of infested material and how to carry out work on site in a biosecure way.
- Areas infested with Invasive Alien Plant Species (IAPS) will be clearly identified and the specific sites of infestation isolated with fencing or warning tape.
- 'Biosecure zone' signs will be erected at each contaminated site to alert workers that IAPS are present and to avoid entering or interfering with these sites. Likewise, any stockpiles of soil that are or could be contaminated with IAPS must be clearly marked.
- Designated and clearly marked cleaning and/or disinfection stations will be strategically placed within the work site for use by staff, vehicles and machinery.
- Where it is necessary to work in contaminated areas, vehicles with caterpillar tracks will be avoided.
- As a precautionary measure, machinery will be thoroughly cleaned down before entering the site to prevent potential spread of invasive species from elsewhere.
- All vehicles and equipment that have been used in IAPS control operations will be thoroughly pressure-washed in a designated wash-down area each time they leave the works site and once work in that area has been completed. This also includes footwear, personal protective equipment (PPE), tools, and other light equipment. It is important to remove soil that may contain seeds or plant fragments, which otherwise could be transported along the road corridor as works are being undertaken.
- Vehicles leaving contaminated area(s) will either be confined to marked haulage routes protected by root barrier membranes, or be pressure-washed before leaving the area. Only vehicles that are deemed to be biosecure (i.e. sealed so that no soil can escape) shall be used to transport contaminated soil and all will be thoroughly pressure-washed in the designated washdown area before exiting the infested area.
- The clean-down area will be underlain with an impermeable membrane such as a radon barrier to prevent contamination resulting from this operation. In addition, a boot wash with a stiff brush will be installed at the edge of the exclusion zone for pedestrian use.

Excavation and Burial

- Particular care is required in relation to the disposal of Japanese and other knotweed species. Where burial is being used to dispose of these species, a non-persistent herbicide shall be applied to the infestation prior to excavation. The material shall then be excavated and subsequently buried to a minimum depth of 5m. The waste shall be covered with a proprietary root barrier membrane layer and infilled with a minimum 5m depth of uncontaminated soil[20].
- Any geotextile membranes used for burial must be undamaged, sealed securely, have a manufacturer's guarantee that it will remain intact for at least 50 years, and be UV resistant. Where burial to a depth of 5m is not possible, the infestation shall be treated with a non-persistent herbicide prior to excavation, excavated and then completely encapsulated in a proprietary root barrier membrane cell. The upper surface of the cell shall be buried to a depth of at least 2m with uncontaminated soil.
- Clean down will be carried out using brushes and shovels and power washing will be avoided. This is to prevent potentially contaminated run-off spreading outside the Proposed Development site.
- Once the machinery has been cleaned down as much as possible in the dry, the machines will be power-washed, or air blasted to remove any remaining material. The machine will track out of the cell over plywood or other suitable material in order to protect the machine from potential contamination while exiting the contaminated cell area.

[20] *'The Management of Invasive Alien Plant Species on National Roads', TII (2020)*

- Material used for tracking machinery out of the cell will be thoroughly cleaned down under supervision of the invasive species specialist prior to removal off site.

Laying of the Root Barrier Membrane

- Once burial is complete, in order to prevent potential re-growth of rhizomes, infested areas will be overlain with a solid root barrier membrane. The root barrier membrane must stay intact for at least 50 years. A manufacturers' guarantee is required. This will be sized and installed under the supervision of a suitably qualified ecologist and in accordance with the relevant guidelines.
- A layer of no sharps sand or equivalent will be placed on the ground beneath the membrane to ensure that there are no opportunities for it to become ripped. The membrane will be inspected for damage prior to it being laid.
- Ideally, the membranes would consist of a single sheet with no joints. However, if joints are necessary, they will be sufficiently overlapped and sealed with a solid seam (either glue, heat or tape as per manufacturer's recommendations).
- The supervising ecologist will oversee the installation of the membrane and determine whether further measures are required to prevent lateral spread of the plant outward from under the excavated area.
- Following satisfactory laying of the membrane, it will be covered with a 50mm sand layer and then a solid concrete cap for extra protection.
- Once the soil has been removed, the membrane placed and the slab poured, the site will be considered uncontaminated for the purposes of continued works
- A record will be kept of the affected areas and no further excavations or below ground works will be permitted in these areas.

General Biosecurity Measures

The following best practice measures should be adhered to during the treatment and management of the Himalayan Knotweed within the Proposed Development Site.

- No ground works should take place on site prior to the application of the site- specific Invasive Species Management Plan (ISMP). The ISMP will ensure all measures are taken to avoid the spread of species listed on the Third Schedule.
- Ensure all visitors to the site are made aware of the location of the Himalayan Knotweed recorded and are familiar with its characteristics and method of reproduction.
- Machinery operatives and all staff will be given a Toolbox Talk on Himalayan Knotweed and the risks associated with the Third Schedule invasive species prior to any works commencing in either of the Knotweed exclusion zones.
- Only people familiar with identifying Himalayan Knotweed will be allowed to work in close proximity to the plant species.
- A clearly defined bio-secure clean-down area will be established. Additionally, all bio-secure clean-down area associated measures will be carried out.
- No works will take place within the Himalayan Knotweed exclusion zone other than those prescribed in the Invasive Species Management Plan.
- All excavation works within the exclusion zone will be supervised by the contractor's ecologist.
- All measures prescribed in the Himalayan Knotweed management plan will be incorporated into the contractor's respective method statements for works where Third Schedule invasive species occur.
- All soil, river dredge and inert materials imported to infill and regrade the Proposed Infill Boundary will be screened for invasive species by a suitably qualified ecologist before transportation to the site.
- All machinery should be thoroughly cleaned down prior to arriving on the site to avoid the potential spread of invasive species from elsewhere.
- Good construction site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (e.g., Himalayan Balsam, Japanese Knotweed etc.) by thoroughly washing vehicles prior to leaving any site.
- All plant and equipment employed on the construction site (e.g., excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species. Wheel washing facilities will be provided at the site entrance. All washing must be undertaken in areas with no potential to result in the spread of invasive species.
- All infill material required at the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.

	› Despite these measures, should any invasive alien species be introduced to site, these shall be dealt with in accordance with guidelines issued by the National Roads Authority - The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA, 2010). › Should despite these measures any invasive alien species be introduced to site, these shall be dealt with in accordance with guidelines issued by the National Roads Authority - The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA, 2010). The following management is to be employed when dealing with the medium impact invasive species Buddleia: › As per TII guidelines Buddleia is to be physically removed prior to commencement of construction by excavating all instances of Buddleia from within the site boundary. Care is to be taken to remove all traces of Buddleia from the site as broken branches can root and form new plants. Further details on the removal and management of Himalayan Knotweed can be found in the ISMP (Appendix 5-3), and Buddleia in the BEMP (Appendix 5-1).
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, there will be no significant residual effect on biodiversity as a result of invasive species at any geographically scale.

5.5.3.2 Effects on Faunal Species During Operation and Restoration

The Proposed Development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site but were not included as KERs. Given the extensive area of habitat onsite that will remain undisturbed throughout, and the avoidance of the most significant areas of faunal habitat (large areas of immature woodland and scrub, marsh, large sedge and reed swamps), no significant effects on non-KER faunal biodiversity are anticipated as a result of the Proposed Development. Therefore, these species were excluded from further assessment. The effects on fauna that are identified as KERs are described in the below tables.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from deterioration of water quality via water pollution. This has been assessed in Section 5.5.2.1.2 above and is not repeated below.

5.5.3.2.1 *Assessment of the Potential Impacts on Bats*

Table 5-27 Potential impacts on bats

Description of Effect	**Loss of Roosting Habitat** No loss of roosting habitat is anticipated as part of the operational phase of the development. **Loss of Commuting/Foraging Habitat** No loss of commuting or foraging habitat is proposed during the operational phase. The proposed restoration of the quarry will provide improved foraging habitat for bats. 185 linear metres of treelines and 2,756 linear metres of hedgerow are proposed to be planted as part of the restoration works. Areas outside of the extraction boundary will be left to recolonise and mature which will provide further suitable commuting and foraging habitat.
	Disturbance When operational, the quarry will be used primarily during the day, with no works proposed during nighttime hours and no additional lighting is proposed. The operational phase of the

	Proposed Development will result in an increase in disturbance to local bat species in the form of noise and lighting. In the absence of appropriate design, the development has the potential to disturb bats by illumination of roosting, commuting and foraging areas.
Assessment of Significance prior to mitigation	**Disturbance** In the absence of mitigation, direct disturbance to bats is not anticipated to be significant. However, mitigations have been proposed to limit any potential impacts.
Mitigation	**Disturbance** Disturbance limitation measures, will be adhered to, including the following measures: › Working at night will be avoided. › All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996". › Plant machinery will be turned off when not in use. › Operating machinery will be restricted to the proposed works site area.
Residual Effect following Mitigation	**Disturbance** Following the incorporation of mitigation measures described above, no potential for significant disturbance/displacement impacts of bats has been identified at any geographic scale.

5.5.3.2.2 Assessment of Potential Effects on Sand Martin

Table 5-28 Assessment of Potential Impacts on Sand Martin

Description of Effect	**Habitat Loss** The operational phase of the Proposed Development will result in the loss and removal of 27 sand martin burrow entrances within the proposed extraction boundary during the removal of sand and gravel materials during the quarry site extraction operations. During the operational phase, other suitable habitats will become available through temporary stockpiles onsite, which sand martin create burrows opportunistically within quarries.
	Disturbance Should the sand cliff extraction and stockpile removal work within the proposed extraction boundary be undertaken during the bird nesting season (March to August inclusive), it could lead to the direct mortality of sand martin. Any direct disturbance to the species in the absence of mitigation outside of the breeding season could cause direct mortality to the species onsite via excavation by heavy machinery.
Assessment of Significance prior to mitigation	**Habitat Loss** There will be a loss of 27 active burrow entrances, recorded in 2023 on the sand cliff within the proposed extraction boundary. Sand martins are known to return to their previous nesting sites each year if suitable habitat presence continues, and if the previous burrows collapse, the species will create new tunnels. The burrow length can be up to 90cm within suitable habitat and the nest itself at the end of the burrow can be lined with feathers/vegetation[21]. In the absence of mitigation during the operational phase of the Proposed Development, there is the potential to cause direct mortality on this species, that utilise the site to breed during the summer months prior to migration. The unmitigated impact resulting in the loss of 27 active sand martin burrows onsite is considered a permanent significant effect at a local scale. During the operational phase,

[21] *Scottish Wildlife Trust (https://scottishwildlifetrust.org.uk/species/sand-martin/)*

	temporary breeding habitats will become available elsewhere within the void, in the form of temporary stockpiles. However, after the cease of quarry operations onsite, the quarry void will be infilled and suitable breeding habitat for this species will be lost within the Proposed Development site.
	Disturbance The disturbance to the sand martin colony within the Proposed Development site has the potential to result in the direct mortality of birds, chicks and eggs if the removal works were to take place during the bird nesting season. In the absence of mitigation, there is potential for permanent significant direct effects at a local scale.
Mitigation	**Habitat Loss** Alternative breeding and roosting habitat will be provided in the form of a Sand Martin Nesting Wall with a capacity of 50 nesting cavities. This alternative habitat will be permanent with no potential for tunnel collapse which sometimes affects the breeding burrows and nests of this species. The structure will outlast the 22-year operational phase of the Proposed Development and will allow for the continued use of the site by Sand Martin's during the restoration of the Proposed Development. Therefore, long term suitable stable breeding habitat for this amber listed species will be present within the Proposed Development site boundary after activities have ceased onsite and the quarry voids infilled and returned to agricultural use which would see the loss of sandy cliffs and stockpiles onsite. Further information of the Sand Marten Wall can be found within the BEMP (Appendix 5-1). During the operational phase of the Proposed Development, if sand martins create burrows in the temporary stockpiles onsite, works will be undertaken in accordance with the provisions of the Wildlife Act.
	Disturbance A pre-commencement sand martin survey will take place during the breeding season (March-August inclusive), at the locations of the burrowing nests found within the Proposed Extraction Boundary during the 2023 surveys. Dedicated surveys will determine if the previous year's nests are active and if additional nests have formed in the interim. If the tunnelling nests are found to be occupied by sand martin, the excavation works within the proposed excavation boundary will be undertaken in accordance with the provisions of the Wildlife Act.
Residual Effect following Mitigation	Following the implementation of the mitigation proposed above, there will be no significant residual effect on sand martin or supporting breeding habitat as a result of the Proposed Development at any geographic scale.

5.5.4 Biodiversity Enhancement and Management Plan

The restoration phase of the Proposed Development will result in the replanting of 2,756 linear metres of hedgerows and 160 linear metres of treeline habitat within the Proposed development site. The restoration proposal measures will see the site returning to agricultural use similar to the land use prior to quarrying, with agricultural grasslands bordered by hedgerows. Whips/bare root stock are recommended for the restoration phase planting due to the establishment success rates[22]. As linear connectivity within the Proposed Development site is not common, the restoration replanting once matured will significantly improve the connectivity onsite and will provide connecting corridors between the immature woodlands (which will have matured over the 22 years during the operational phase). This gain of habitat onsite will open up new shelter, refuges and nesting areas for fauna that utilise the site. All plant species proposed

[22] *Hedging plating: answers to 18 common questions. Natural England 2008.*

for replanting will be indigenous to the local area and recommended under the All-Ireland Pollinator Plan[23].

The proposed creation of 15.8 ha of grasslands within the Proposed Development site will be a mosaic of dry calcareous and neutral grasslands (GS1) and dry meadows and grassy verges (GS2), with the establishment of species rich swards with a diversity of grass species. Such species rich grasslands are not currently observed within the Proposed Development boundary and will increase the heterogeneity of habitats within the site boundary and will increase the diversity of species found therein. Once established, the nature of the species comprising the swards will allow for tussocky grass species to form and create refuges and foraging areas for species that currently breed onsite or forage within the site boundary.

Further details with regard to the planting and seeding proposals are contained within the BEMP (Appendix 5-1).

5.5.5 Impacts on Designated Sites

5.5.5.1 Impacts on EU Designated Sites

None of the elements of the Proposed Development are located within the boundaries or directly adjacent to any European Designated Sites. There will be no direct effects on any designated site as a result of the construction, operation and restoration phases of the Proposed Development.

In relation to European Sites, a Natura Impact Statement (NIS) has been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment of the Proposed Development in compliance with Article 6(3) of the Habitats Directive. The following European Sits was considered in the NIS:

- Lower River Shannon SAC
- River Shannon and River Fergus Estuaries SPA

Nationally Designated Sites that are also designated as European Sites have been assessed under their latter designations within the NIS that accompanies this application, with the relevant conclusions recorded and referenced in this chapter. These Sites are also assessed under their National Designations below in Section 5.5.6.2.

As per the aforementioned EPA Guidance (2022), "*A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European Sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive".* This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Potential pathways for adverse impacts on the integrity of European Designated Sites (SACs and SPAs) are assessed within the accompanying NIS. The NIS report concludes that:

> '*This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites.*
>
> *Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report. The measures ensure that the construction, operation and restoration of the Proposed Development does not adversely affect the integrity of European sites.*

[23] *All-Ireland Pollinator Plan 2021-2025. National Biodiversity Data Centre Series No. 25, Waterford. March 2021.*

Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

5.5.5.2 Impacts on Nationally Designated Sites

Impacts on Nationally Designated Sites are considered in this section of the report. Where such sites are also designated as SACs or SPAs (European Sites), they have been assessed and considered under that designation in the NIS which accompanies this application. The Inner Shannon Estuary, South Shore pNHA [00435] and Fergus Estuary and Inner Shannon, North Shore pNHA [002048] are considered under their national designations here.

Potential impacts on Lough Doon NHA, Inner Shannon Estuary, South Shore pNHA and Fergus Estuary and Inner Shannon, North Shore pNHA via a pollution event during the construction and operational phase of the Proposed Development was identified. However, a range of mitigation measures, outlined in Section 5.5, will be in place to ensure that any potential pathway for effect on the construction and operational phase water quality or via disturbance during the construction phase is blocked.

No potential for significant impact on any other Nationally Designated Site was identified.

5.6 Cumulative Impact Assessment

The Proposed Development was considered in combination with other plans and projects in the area that could result in cumulative impacts on European Sites, Nationally Designated Sites and protected species. This included a review of online Planning Registers and served to identify past and future plans and projects, their activities and their predicted environmental effects.

5.6.1 Plans

The following development plans been reviewed and taken into consideration as part of this assessment:

- Clare County Development Plan 2023-2029
- 4th National Biodiversity Action Plan 2023-2030
- Regional Spatial and Economic Strategy (RSES) for the Southern Region

The review focused on policies and objectives that relate to biodiversity and natural heritage. Policies and objectives relating to sustainable land use were also reviewed.

Table 5-29: Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
Clare County Development Plan 2023-2029	**CDP3.3** It is an objective of the Clare County Council: a) To require compliance with the objectives and requirements of the Habitats Directive, specifically Article 6(3) and where necessary 6(4), Birds, Water Framework, and all other relevant EU Directives and all relevant transposing national legislation; b) To require project planning to be fully informed by ecological and environmental constraints at the earliest stage of project development and any necessary assessment to be undertaken, including assessments of disturbance to species, where required together with the preparation of both statutory and non-Statutory Ecological Impact Assessments (EcIA); c) To protect, manage and enhance ecological connectivity and improve the coherence of the Natura 2000 Network; d) To require all proposals to ensure there is 'no net loss' of biodiversity within developments **CDP8.14** - It is an objective of Clare County Council: To promote the extraction of minerals and aggregates and their associated processes where such activities do not have a significant negative impact on the environment, landscape, public health, archaeology or residential amenities of the receiving environment and where such operations are in compliance with all national regulations and guidelines applicable to quarrying and mining activities **CDP15.12** It is an objective of Clare County Council: a) To protect and promote the sustainable management of the natural heritage, flora and fauna of the County both within protected areas and in the general landscape through the promotion of biodiversity, the conservation of natural habitats, the enhancement of new and existing habitats, and through the integration of Green Infrastructure (GI), Blue Infrastructure and ecosystem services including landscape, heritage, biodiversity and management of invasive and alien species into the Development Plan; b) To promote the conservation of biodiversity through the protection of sites of biodiversity importance and wildlife corridors, both within and between the designated sites and the wider Plan area; c) To support the	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity. There is no potential for cumulative impacts when considered in conjunction with the current proposal were identified. The Proposed Development will avoid impacts on sensitive habitats and species where possible, and where some effects have been identified, appropriate mitigation and enhancement measures have been incorporated into the project design. The footprint of the proposed works is located outside of any EU and Nationally designated sites. No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified. No developments or projects identified within the draft plan were found to occur in the wider area surrounding the Proposed Development.

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
	implementation of the All-Ireland Pollinator Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan; d) To ensure there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within 2.5km of known roosts; e) To implement and monitor the actions as set out in the Clare County Biodiversity Plan; and f) To promote biodiversity net gain in any new plans/projects/policies to promote development that leaves biodiversity in a better state than before. **CDP15.3** - It is an objective of Clare County Council: a) To afford the highest level of protection to all designated European sites in accordance with the relevant Directives and legislation on such matters; b) To require all planning applications for development that may have (or cannot rule out) likely significant effects on European Sites in view of the site's Conservation Objectives, either in isolation or in combination with other plans or projects, to submit a Natura Impact Statement in accordance with the requirements of the EU Habitats Directive and the Planning and Development Act, 2000 (as amended); and c) To recognise and afford appropriate protection to any new or modified SPAs or SACs that are identified during the lifetime of this Development Plan through the planning application process bearing in mind proposals for development outside of a European site may also have an indirect effect. **CDP15.4** - It is an objective of Clare County Council: a) To implement Article 6(3) and where necessary 6(4) of the Habitats Directive and to ensure that Appropriate Assessment is carried out in relation to works, plans and projects likely to impact on European sites (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s); and b) To have regard to Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities 2009 or any updated version.	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
4th National Biodiversity Action Plan 2023-2030	Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "NBAP"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives. The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows: • **Objective 1:** Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity. Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan. • **Objective 2:** Meet Urgent Conservation and Restoration Needs. Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government. • **Objective 3:** Secure Nature's Contribution to People. Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy. • **Objective 4:** Enhance the Evidence Base for Action on Biodiversity. This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts. • **Objective 5:** Strengthen Ireland's Contribution to International Biodiversity Initiatives. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity	The design and mitigations included as part of the Proposed Development are such that there will be no adverse effect on any European Site and the Protected Areas Network. The proposed restoration will not impact on connectivity within the wider area and will maintain watercourses within and adjacent to the development site in good condition.

Plans	Key Policies/Issues/Objectives Directly Related To European Sites In The Zone of Influence	Assessment of Potential Impact on European Sites
	initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	
Regional Spatial and Economic Strategy 2020-2032	**RPO 126 (a).** Support local authorities acting together with relevant stakeholders in implementing measures designed to identify, conserve and enhance the biodiversity of the Region; seek and support the implementation of the All-Ireland Pollinator Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan; **RPO 126 (b).** Local Authorities are required to carry out required screening of proposed projects and any draft land-use plan or amendment/ variation to any such plan for any potential ecological impact on areas designated or proposed for inclusion as Natura 2000/ European Sites and shall decide if an Appropriate Assessment is necessary, of the potential impacts of the project or plan on the conservation objectives of any Natura 2000/European Site; **RPO 126 (d).** Support local authorities to carry out, monitor and review biodiversity plans throughout the Region. Planning authorities should set objectives in their land use plans to implement and monitor the actions as set out in the National and County Biodiversity Plans, as the conservation of biodiversity is an essential component of sustainable development. Local authorities should address the issue of fisheries protection and invasive introduced species and encourage the use of native species for landscape planting in rural areas, in the review of their biodiversity plans; **RPO 126 (e).** Support local authorities to work with all stakeholders to conserve, manage and where possible enhance the Regions natural heritage including all habitats, species, landscapes and geological heritage of conservation interest and to promote increased understanding and awareness of the natural heritage of the Region.	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be no impact on designated sites or biodiversity as a result of the Proposed Development. Mitigation measures will be implemented as well as bespoke landscaping measures to ensure no net loss to biodiversity.

5.6.2 Projects

5.6.2.1 Planning Applications within the Application Boundary

A review of the Clare County Council Planning Register illustrates that there have been 2 no. planning applications made within or overlapping the Proposed Development boundary, as illustrated in Table 5-30 below.

Table 5-30 Planning Applications within the Application Boundary

Application Reference		Description	Decision
17552		Development of an infill of a previous quarry void from past excavations	Granted, 11/05/2018
Clare County Council (CCC) reference:	23/148	Development of a wind farm together with the development of an underground grid connection cable to the national grid. The development will consist of 8 wind turbines, a permanent meteorological mast, an onsite 38kV electrical substation, and all associated site works. An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) have been submitted with the application	Granted, 21/03/2024
An Bord Pleanála (ABP) reference:	317227		

- The site boundary for this proposed development is located within the planning application boundary of the permitted Fahy Beg Wind Farm. The wind farm shares the Proposed Red-Line Boundary except for the Proposed Extraction Boundary and the southeastern area of the Proposed Site Boundary. The following Fahy Beg Wind Farm infrastructure will be located within the boundary for the Proposed Development: site entrance, 38kV substation and associated grid connection route, two passing bays, two temporary construction compounds, and existing and new access tracks.
- The wind farm's entrance for the construction and operational phases will utilise the existing site entrance to Ballyquin Quarry located within Buildings and artificial surfaces (BL3) habitat. The onsite 38kV Substation is located within a sward of Dry Meadows and Grassy Verges (GS2), and the grid connection route will be cabled underground from the site entrance connecting to the substation. The two temporary construction compounds will be located within pre-existing hardstanding areas, composed of Recolonising bare ground (ED3), Active quarries and mines (ED4) and Scrub (WS1). The permitted new access tracks for the wind farm is located within Scrub (WS1), Immature Woodland (WS2), Active quarries and mines (ED4) and within the Proposed Infill Boundary it traverses Spoil and bare ground (ED2), and immature woodland once again. Both passing bays are located within Immature woodland (WS2). The Fahy Beg Wind Farm permission will entail the instatement of localised ground works for drainage within the Proposed Development site to facilitate the onsite infrastructure. This will not have cumulative impacts on the hydrological regime onsite nor will there be potential for cumulative impacts to nearby wetlands or watercourses within the Proposed Development site boundary.
- The Biodiversity Enhancement and Management Plan (BEMP) for the Fahy Beg Wind Farm outlines the retention of 4.6ha woodland within Ballyquin quarry, at the northwest of the Proposed Development site boundary to mature naturally. This

woodland is outlined within the BEMP to be fenced and signposts erected to prevent any accidental ingress of machinery or interference within the enhancement area, animal access will not be restricted to the woodland area. The BEMP also recommends the installation of a barn owl box and a kestrel box within the biodiversity area within the quarry boundary. The nesting boxes are to be installed on suitable trees if present and on poles as an alternative. The boxes will be maintained for the duration of the wind farm and replaced if required. A log and refugia pile will also be established within the biodiversity area within the quarry boundaries to avoid disturbance. The refugia/hibernacula will provide shelter for wildlife such as small mammals, reptiles, amphibians and invertebrates and the log piles will be utilised by insects. They Proposed Development will not result in any cumulative impacts on those outlined within the BEMP for the Fahy Beg Wind Farm, and, vice-versa the Fahy Beg Wind Farm will not lead to any cumulative impacts on the Biodiversity Management Plan submitted with this Planning Application.

- The Fahy Beg Wind Farm in combination with the Proposed Development will not result in any negative cumulative impacts on the habitats, fauna or flora. Much of the wind farm infrastructure utilises pre-existing access roads or are located within existing hardstand areas from past quarrying activities, that offer minimal to low ecological value. The new wind farm infrastructure and access tracks onsite will be small scale in the context of the quarry site, and in combination with the Proposed Development will not arise to any significant or adverse effects within or externally to the Proposed Development site. The BEMP recommendations for the Proposed Development (Please see Appendix 5-1), will enhance the quarry site and open up new opportunities to species that currently only utilise Ballyquin quarry on occasion, such as Kestrel, which was recorded foraging over the Proposed Development site during the 2023 surveys, and will now have opportunities to nest onsite. There would therefore be no possibility of cumulative negative effects; rather the Fahy Beg Wind Farm and the Proposed Development will result in positive effects on the biodiversity of the site.

5.6.2.2 Planning Applications within the Vicinity of the Application Site

There are a number of valid planning applications on record which lie within the vicinity (taken as a 1km radius) of the application site, one of which is related to the quarry itself. These are summarised in the table below:

Table 5-31 Planning Applications within the Vicinity of the Application Boundary

Application Reference	Description	Decision
ABP Ref: RP2159	Point of detail regarding condition no. 1(a) and condition no. 4 of SU03.0127	Board Decision- see Board Order, 21/08/2018
ABP Ref: SU0127	Quarry	Granted by ABP, 20/12/2016
ABP Ref: QD0011	Extension to existing sand and gravel quarry	Granted by ABP, 23/12/2015
ABP Ref: 318505	Proposed construction of a 110kV underground grid connection cable connecting the permitted Carrownagowan windfarm to the existing 110kV substation at Ardnacrusha	Live case, decision to be decided by 23/05/2024
18/995	Restoration of 3.76ha of a sand and gravel quarry to agricultural grassland	Granted by CCC, 05/12/2018
23/148	Construction of a wind farm and grid connection route	Refused by CCC, 09/03/2023
21/182	Construct a new dwelling house	Granted by CCC, 14/09/2021

Application Reference	Description	Decision
20/373	Construct a new dwelling house	Granted by CCC, 02/11/2020
17/835	Construct a new dwelling house	Granted by CCC, 26/01/2018
17/863	Construct a new dwelling house	Granted by CCC, 13/11/2017
23/60083	Construct a new dwelling house	Granted by CCC, 20/06/2023
16/66	Construct a new dwelling house	Granted by CCC, 25/04/2016
21/21	Retention of roof alterations to an existing house	Granted by CCC, 23/04/2021
24/60230	Construction of a new sand and gravel quarry	Decision Due Date 16/07/2024
18/182	Construction of a slated shed and cattle crush	Granted by CCC, 26/05/2018
17/994	Construction of a new dwelling house	Granted by CCC, 19/03/2018
18/995	Infill restoration of a sand and gravel quarry	Granted by CCC, 09/03/2019
20/288	Construction of a slatted shed	Granted by CCC, 08/08/2020
17/298	Construction of a shed	Granted by CCC, 18/11/2017

5.6.3 Assessment of Cumulative Effects

No potentially significant **cumulative and/or in-combination** pollution, disturbance or habitat loss effects on any of the KER's have been identified with regard to the Proposed Development.

Taking into consideration the reported residual effects from other plan and projects in the area and the predicted effects with the current proposal, no residual cumulative and/or in-combination effects have been identified with regard to any KERs.

5.7 Conclusion

Exposed sand gravel and till (ED1), Spoil and bare ground (ED2), Recolonising bare ground (ED3), Active quarries and mines (ED4), Scrub (WS1), Immature Woodland (WS2), Other artificial lakes and ponds (FL8), Improved agricultural grasslands (GA1), Hedgerow (WL1) and Treeline (WL2) will be lost as a result of the construction phase of the Proposed Development. Exposed sand gravel and till (ED1), Spoil and bare ground (ED2), Recolonising bare ground (ED3), Active quarries and mines (ED4), Scrub (WS1), Scrub (WS1), Other artificial lakes and ponds (FL8) will be lost from the Proposed Development site. The restoration phase of the Proposed Development will result in the current and future quarry void being infilled and reprofiled to previous topographic levels within the site and newly created habitats will include hedgerows and the grassland creation.

The restoration of the Proposed Development has been assessed according to the anticipated future condition of the quarry site following the completion of all extraction works. The proposed infilling and restoration works are confined mainly to habitats of Local Importance (lower value), predominantly existing areas of Exposed sand gravel and till (ED1), Spoil and bare ground (ED2), Recolonising bare ground (ED3), Active quarries and mines (ED4), Scrub (WS1), Other artificial lakes and ponds (FL8), with the exception of Scrub (WS1) which was classified as Local Importance (Higher value), however there will be no significant effect as a result of this loss of habitat within the Proposed Development Boundary. The Proposed Development includes for the restoration of the existing and future quarry pits back to a more natural condition. This will bring substantial biodiversity benefits in terms of restoration of natural habitats, species richness, as well as habitat for pollinating insects, bats and birds.

Potential negative effects on surrounding habitats, protected species and designated sites have been mitigated through a suite of best practice measures in relation to earthworks, the avoidance of pollution and the design of the water management infrastructure, as fully described in Chapter 3 and Chapter 7 of this EIAR. Significant effects at a local scale were identified to Hedgerow (WL1), Treeline (WL2), Lowland depositing river (FW2), Barn Owl, Large reed and sedge swamp (FS1), Himalayan Knotweed and sand martin, mitigations are outlined within this Chapter and once established and followed no residual effects are anticipated. Ecological impacts of the Proposed Development have been assessed in combination with the permitted Fahy Beg Wind Farm site (CCC reference number: 23/148, ABP Reference number: 317227) located within the Proposed Development site boundary and in combination with other local developments.

Taking the above information into consideration and having regard to the precautionary principle, it is considered that the Proposed Development will not result in the loss of habitats or species of county, national or international significance and will not have any significant impacts on the ecology of the wider area. Rather, the restoration will bring substantial net gain in terms of biodiversity and restore exposed soil habitats of the extracted quarry to that of habitats present within the wider landscape.

Provided that the proposed works are carried out in accordance with the design and best practice that is described within this application, no potential for significant effects to biodiversity at any geographic scale are anticipated as a result of the Proposed Development.