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Natura Impact Statement

prepared for Tom McNamara & Partners

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CONSTRUCTION COST MANAGERS
PROJECT MANAGERS

on behalf of Art Data Centres

ART DATA CENTRES

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1 Introduction

1 This report has been prepared by Scott Cawley Ltd. for the applicant, Art Data Centres who is seeking permission for the development of a data centre , located to the west of the Ennis townland, after Junction 13 of the M18 Motorway on the R352. The proposed data centre will comprise of the development of six data hall buildings, offices, a vertical farm, an electrical substation, an energy centre, a transformer compound, undergrounding of circuit cables, associated infrastructure and a number of car parking areas (hereinafter referred to as the proposed development).

2 This NIS has been prepared in accordance with the provisions of Part XAB of the Planning and Development Act, 2000 (as amended) and in accordance with the requirements of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive).

3 It considers the implications of the proposed development, on its own and in combination with other plans or projects, for European sites[1] in view of the conservation objectives of those sites. It includes a scientific examination of evidence and data to identify and assess the implications of the proposed development for any European sites in view of the conservation objectives of those sites. It considers whether the proposed development, by itself and in combination with other plans or projects, would adversely affect the integrity of any European sites. In reaching a conclusion in this regard consideration is given to any mitigation measures necessary to avoid or reduce any potential negative impacts.

4 The purpose of this NIS is to provide an examination, analysis and evaluation of the potential impacts of the proposed development on European sites and to present findings and conclusions with respect to the proposed development in light of the best scientific knowledge in the field. This NIS will inform and assist the competent authority, Clare County Council , in carrying out its Appropriate Assessment as to whether or not the proposed development will adversely affect the integrity of any European sites, either alone or in combination with other plans and projects, taking into account their conservation objectives.

5 The proposed development is neither connected with nor necessary to the management of any European sites.

2 Legislative Context

6 The Birds and Habitats Directives - Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the Birds Directive) and Council Directive 92 /43 /EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) – require Ireland to establish protected sites as part of a European wide network of sites (the Natura 2000 network which are known in Ireland as European sites) for habitats and species that are of international importance for conservation. In Ireland, European sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are selected for habitats listed on Annex I of the Habitats Directive (including priority Annex I habitat types which are in danger of disappearance) and species listed on Annex II. SPAs are selected for bird species (listed on Annex I of the Birds Directive), regularly-occurring populations of migratory bird species (such as ducks, geese and waders), and areas of international importance for migratory birds. The specified habitats and species for which each SAC and SPA is selected,

[1] The Natura 2000 network of sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation, composed of sites hosting the natural habitat types listed in Annex I and species listed in Annex II, and special protection areas classified pursuant to the Birds Directive (2009/147/EC). The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland, these sites are designed as *European sites* – as defined under the Planning and Development Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs).

correspond to the qualifying interests (in the case of SACs) or special conservation interest species (in the case of SPAs) for the sites, for which conservation objectives are prepared.

7 Article 6(3) of the Habitats Directive states that:

> 'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'

8 This provision is transposed into Irish law by Part XAB of the Planning and Development Acts 2000 as amended. Section 177U(4) of the said Acts provides for screening for Appropriate Assessment as follows:

> *'The competent authority shall determine that an appropriate assessment of [...] a proposed development [...] is required if it cannot be excluded, on the basis of objective information, that the [...] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.'*

9 Section 177U(5) provides as follows:

> *'The competent authority shall determine that an appropriate assessment of a […] proposed development, […], is not required if it can be excluded, on the basis of objective information, that the […] proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.'*

10 Section 177T(1) and (2) provide that a NIS is '*a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites' and specifies that it 'shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites'*.

11 Consideration has been given in the preparation of this report, to the evolution in interpretation and application of directives and national legislation arising from jurisprudence of the European and Irish courts, in respect of Article 6 of the Habitats Directive.

3 Methodology

3.1 Scientific and Technical Competence Relied Upon

12 This NIS was authored by Síofra Quigley and reviewed by Kate-Marie O'Connor, Andrew Speer, and Colm Clarke of Scott Cawley Ltd. The background and experience of the author and contributors to this report are set out below.

Síofra Quigley is a Senior Consultant Ecologist with Scott Cawley. She obtained an honours degree in Zoology, from National University of Ireland Galway, and a Masters in Wildlife Biology and Conservation from Edinburgh Napier University. She has four years' professional experience working in the UK and Ireland on large to small scale infrastructure projects, with governmental and private clients. Síofra is experienced in carrying out field surveys in several protected species , including bat, otter, badger, red squirrel, reptile, pine marten and mountain hare. She has also been involved in radio tracking mountain hares and bats, bat call analysis, badger bait marking, acting as an Ecological Clerk of Works, has undertaken Phase 1 habitat surveys (JNCC standard) and reports, and desk top studies. Since joining Scott Cawley, Síofra's work also involves the preparation of reports, including Ecological Impact Assessment and Appropriate Assessment reports for residential, commercial, and infrastructural projects across Ireland.

Kate-Marie O'Connor is an experienced ecologist with over eight years' experience in professional ecological consultancy. She holds an honours degree in Natural Sciences from Trinity College Dublin, specialising in Botany, and obtained a distinction in her Masters in Environmental Modelling, Monitoring and Reconstruction from the University of Manchester. She also holds an advanced diploma in Planning and Environmental Law from The Honourable Society of King's Inn. She is a Full Member of the CIEEM. Her experience as a principal ecologist has focused on the preparation of ecological assessments, most frequently for EIA and AA, with all the key elements of those processes including planning for and undertaking ecological baseline surveys, desk studies, analysis and presentation of data and results, undertaking assessment of impacts and identifying appropriate mitigation measures. She has worked on a range of public and private sector schemes in the UK and Ireland. Kate-Marie has a specialist interest in botany but is also competent in a range of fauna surveys (*e.g.* mammals including badgers, bats and otters, and newts).

Andrew Speer is a Technical Director at Scott Cawley Ltd. with over 15 years' professional ecological consultancy experience in ecological impact assessment. Andrew is a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds an honours degree in Zoology from NUI Galway, a Postgraduate Diploma in Geographic Information Systems (GIS) from the University of Ulster and an Advanced Diploma in Planning and Environmental Law from Kings Inns. He has extensive experience in the Appropriate Assessment (AA) process and has been the lead author for the preparation of numerous Screening for Appropriate Assessment Reports, Natura Impact Statements (NISs) and Natura Impact Reports (NIRs). Andrew also provides technical review and due diligence of Appropriate Assessment documentation for public and local authorities to aid their decision-making process as well as peer review of AA documentation prior to lodgement of planning applications.

Colm Clarke is a Principal Ecologist with Scott Cawley and has seven years' experience in ecological consultancy. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is a full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM), a member of the Irish Environmental Law Association (IELA), and chairperson of the Dublin Bat Group (an affiliate group of Bat Conservation Ireland (BCI). Colm also organises field excursions for the Botanical Society of Britain and Ireland (BSBI) Dublin/East Coast Local Group. Colm's principal specialisms are in botany, and bats, although he also has experience in a range of other fauna surveys, wintering birds, freshwater white-clawed crayfish, freshwater pearl mussel, badger and otter. Colm is experienced in the survey and assessment of a variety of EU Annex I habitat types from his time at Scott Cawley, and he is Scott Cawley's lead ecologist on bat mitigation. Colm has been project manager and lead author on a large number of Ecological Assessments (including Ecological Impact Assessment, Biodiversity Chapters of Environmental Impact Assessment Reports, and Appropriate Assessment) for Scott Cawley, spanning industrial facilities, residential development, transport infrastructure, and commercial developments.

3.2 Guidance and Approach

13 This NIS has been prepared having regard to the following documents.

<u>European Commission Guidance</u>

- *Assessment of Plans and Projects in Relation to Natura 2000 sites: Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2021)
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (European Commission, 2019)

- *Communication from the Commission on the Precautionary Principle* (European Commission 2000)[2]
- *Nature and Biodiversity Cases – Ruling of the European Court of Justice* (European Commission 2006)
- *Article 6 of the Habitats Directive – Rulings of the European Court of Justice* (European Commission Final Draft September 2014)

Irish Guidance

- *OPR Practice Note PN01. Appropriate Assessment Screening for Development Management* (Office of the Planning Regulator, 2021);
- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (Department of Environment, Heritage and Local Government 2010 revision)
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. *Circular NPW 1/10 & PSSP 2/10* (NPWS, 2010)

14 In addition, regard has been had to the following guidance in characterising impacts, including determining magnitude and significance of impacts, as relevant in the application to Appropriate Assessment and European sites:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Chartered Institute of Ecology and Environmental Assessment, 2018)
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, May 2022)
- Environmental Guidelines Series for Planning and Construction of National Roads (National Roads Authority, 2005-2010)

3.3 Assessment Methodology

15 The proposed development (including the proposed design, construction methodologies and operational effects) was analysed and assessed to identify the potential impacts associated with the proposed development that could affect the ecological environment.

16 From this, the zone of influence of the proposed development was defined. Based on the identified impacts, and their zone of influence, the European sites potentially at risk of any direct or indirect impacts were identified.

17 In establishing which European sites are potentially at risk (in the absence of mitigation) from the proposed development, a source-pathway-receptor approach was applied. In order for an impact to occur, there must be a risk enabled by having a source (e.g. water abstraction or construction works), a receptor (e.g. a European site or its Qualifying Interest(s) (QIs) or Special Conservation Interest(s) (SCIs) species), and a pathway between the source and the receptor (e.g. pathway by air for air borne pollution, or a pathway by

[2] The precautionary principle is a guiding principle that derives from Article 191 of the Treaty on the Functioning of the European Union and has been developed in the case law of the European Court of Justice (e.g. ECJ case C-127/02 – Waddenzee, Netherlands).

This guidance document notes that the precautionary principle "*covers those specific circumstances where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the chosen level of protection*".

Applying the precautionary principle in the context of screening for appropriate assessment requires that where there is uncertainty or doubt about the risk of significant effects on a European site(s), it should be assumed that significant effects are likely and AA must be carried out.

a watercourse for mobilisation of pollution). For an impact to occur, all three elements must exist; the absence or removal of one of the elements means there is no possibility for the impact to occur.

18 The identification of source-pathway-receptor connection(s) between the proposed development and European sites essentially is the process of identifying which European sites are within the zone of influence of the proposed development, and therefore potentially at risk of significant effects. The zone of influence is defined as the area within which the proposed development could affect the receiving environment such that it could potentially have significant effects on the QI habitats or QI/SCI species of a European site, or on the achievement of their conservation objectives (as defined in CIEEM, 2018).

19 The identification of a source-pathway-receptor risk does not automatically mean that significant effects will arise. The likelihood of significant effects will depend upon the characteristics of the source (e.g. extent and duration of construction works), the characteristics of the pathway (e.g. direction and strength of prevailing winds for air borne pollution) and the characteristics of the receptor (e.g. the sensitivities of the European site and its QIs/SCIs). However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the significance of the effect depending upon the nature and exposure to the risk and the characteristics of the receptor. In this case, where there is uncertainty, the precautionary principle has been applied.

20 This assessment has been undertaken in consideration of all potential impact sources and pathways connecting the proposed development to European sites, in view of the conservation objectives supporting the conservation condition of the sites' QIs/SCIs.

21 The conservation objectives relating to each European site and its QIs/SCIs are expressed generally for SACs as "to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected", and for SPAs "to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA".

22 Following on from this, and as defined in the Habitats Directive, favourable conservation status (or condition, at a site level) of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable

23 The favourable conservation status (or condition, at a site level) of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis

24 Where site-specific conservation objectives have been prepared for a given European site, these include a series of specific attributes and targets against which effects on conservation condition, or integrity, can be measured, i.e. an impact which affects the achievement of favourable conservation condition, as measured by the attributes and targets, is an impact on site integrity.

25 In the case of some QIs/SCIs in certain European sites, the conservation objective is to restore rather than maintain conservation condition and this distinction is taken into account in the assessment; as is any legacy damage to European sites that has occurred since their designation, insofar as possible.

3.4 Desktop Study

26 The desktop data sources used to inform the assessment presented in this report are as follows (accessed in May 2022):

- Online data available on European sites and protected habitats/species as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie[3], including conservation objectives documents
- Online data available on protected species as held by the National Biodiversity Data Centre (NBDC) from www.biodiversityireland.ie
- Information on the surface water network and surface water quality in the area available from www.epa.ie
- Information on groundwater resources and groundwater quality in the area available from www.epa.ie and www.gsi.ie
- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie
- Information on the location, nature and design of the proposed development supplied by the applicant's design team
- University of Bristol Speleological Society – Irish Caves Locations. Available from http://www.ubss.org.uk
- *Clare County Development Plan 2017 – 2023* (As Varied) (Clare County Council, 2019)
- *Clare Biodiversity Action Plan 2017 – 2023* (Clare County Council, 2017)
- *Clare County Development Plan 2017 – 2023 Variation No. 1, Natura Impact Report* (Clare County Council, 2019)
- *Clare County Development Plan 2017 – 2023 Variation No. 1, Flood Risk Assessment* (Clare County Council, 2019)
- *Limerick County Development Plan 2010-2016* (Limerick County Council, 2010)
- *Shannon Town and Environs Local Area Plan 2012-2018* (Clare County Council, 2018)
- *The Galway County Development Plan 2015-2021* (Galway County Council, 2015)
- *Clare County Council Development Plan 2017-2023 (As Varied)* (Clare County Council, 2019), specifically in regard to the proposed development site. Specific policies and objectives relating to AA were as follows:

  Development Plan Objective: Appropriate Assessment, Strategic Environmental Assessment and Strategic Flood Risk Assessment

  - CDP2.1 It is an objective of the development plan:
    - To require the preparation and assessment of all planning applications in the plan area to have regard to the information, data and requirements of the Natura Impact Report, SEA Environmental Report and Strategic Flood Risk Assessment Report contained in Volume 10 of this development plan;
    - To require projects to be fully informed by ecological and environmental constraints at the earliest stage of project planning and any necessary assessment to be undertaken, including assessments of disturbance to species, where required;

[3] The following SAC and SPA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2022_04 and SPA_ITM_2021_10.

- To require compliance with the objectives and requirements of the Habitats Directive, the Bird Directive, Water Framework Directive, all other relevant EU Directives and all relevant transposing legislation.

Development Plan Objective: Environmental Impact Assessment

- CDP14.9 It is an objective of Clare County Council:
  - To implement the EIA Directive, ensuring that all elements/stages or components of the project are included in one overall assessment and all reasonable alternatives are taken into consideration in choosing the option with the least environmental impact.
  - To have regard to 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments (2013)' when considering proposals for which an EIA is required;
  - To ensure full compliance with the requirements of the EU Habitats Directive, SEA Directive and associated legislation/regulations, including the associated European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), European Communities (Environmental Assessment of Certain Plans and Programmes) regulations 2004-2011, and the European Communities (Environmental Impact Assessment) Regulations 1989–2011 (or any updated/superseding legislation).

Development Plan Objective: European Sites

- CDP14.2 It is an objective of the development plan:
  - To afford the highest level of protection to all designated European sites in accordance with the relevant Directives and legislation on such matters;
  - 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);
  - To recognise and afford appropriate protection to any new or modified SPAs or SACs that are identified during the lifetime of this plan, having regard to the fact that proposals for development outside of a European site may also have an indirect effect.

Development Plan Objective: Requirement for Appropriate Assessment under the Habitats Directive

- CDP14.3 It is an objective of the development plan:
  - To implement Article 6(3) and where necessary Article 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). All assessments must be in compliance with the European Communities (Birds and Natural Habitats) Regulations 2011;

- To have regard to 'Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities 2009' or any updated version.

Development Plan Objective: Protection of Water Resources

- CDP8.22 It is an objective of the development plan:
  - To protect the water resources of County Clare having regard to the requirements of the relevant EU Directives;
  - To ensure that developments that would have an unacceptable impact on water resources, including surface water and groundwater quality and quantity, designated sources protection areas, coastal and transitional waters, river corridors and associated wetlands are not permitted;
  - In areas of potable groundwater resources or over vulnerable aquifer areas, development proposals will only be considered if the applicant can clearly demonstrate that the proposed development will not pose a risk to the quality of the underlying groundwater;
  - To protect groundwater resources, in accordance with statutory requirements and specific measures as set out in the Shannon and Western River Basin Management Plans;
  - To ensure that proposals for development which infringe on a river boundary, or an associated habitat, including their connection by groundwater, will only be considered where it can be clearly demonstrated that:

    • The character of the area will be conserved;

    • An acceptable physical riparian zone will be maintained with all natural vegetation preserved;

    • There will be no impact on the ecological, aquatic or fishing potential of the waters or associated waters;

    • All proposals are in compliance with the requirements of the Habitats Directive, where appropriate.

Development Plan Objective: Habitat Protection

- DP14.11 It is an objective of the development plan:
  - To protect and promote the sustainable management of the natural heritage, flora and fauna of the county through the promotion of biodiversity, the conservation of natural habitats and the enhancement of new and existing habitats;
  - 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 ensure that there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within 3km of known roosts.

- Information contained within the Environmental Impact Assessment Report (EIAR) prepared for the proposed development planning application, including Chapter 3 Planning and Development Context, Chapter 5 Land, Soils & Geology and Hydrogeology, Chapter 6 Hydrology, Chapter 7

Biodiversity, Chapter 8 Air Quality & Climate, Chapter 9 Noise and Vibration, Chapter 10 Landscape and Visual.

- Site Lighting Analysis Report and Light Spill Modelling Study, produced by Hurley Palmer Flatt (January 2022)
- The Construction and Environmental Management Plan, produced by AWN Consulting Ltd. (February 2022)
- The Landscape and Biodiversity Management Plan produced by Nicholas de Jong Associates (June 2021)
- The Landscape Design Strategy produced by Nicholas de Jong Associates (June 2021)
- Surface Water and Pollution Management Plan, Art Data Centre, produced by Clifton Scannell Emerson Associates (CSEA), (June 2021)

3.5 Consultations

27 The following organisations with relevance to ecology were consulted:

- The National Parks & Wildlife Service (NPWS) section of Department of Housing, Local Government and Heritage (formerly Department of Culture, Heritage and the Gaeltacht)
- The Vincent Wildlife Trust

28 A summary of these consultations with relevance to Appropriate Assessment is provided in Table 1 below.

Table 1: *Appropriate Assessment issues raised during consultation*

Consultee	**Date of Consultation**	**Issues Raised**	**Relevant Section of the NIS where this is addressed**
NPWS - *Department of Housing, Local Government and Heritage* (formerly Department of Culture, Heritage and the Gaeltacht)	15/01/2021	• NPWS raised concerns regarding light spill from the proposed development on important ecological features for commuting and/or foraging bats, specifically in relation to lesser horseshoe bat, and that a light spill model would be a key factor in informing mitigation. • NPWS highlighted the critical timing needed for compensatory planting of ecological corridors. • NPWS queried whether hen harrier winter roost surveys would be undertaken. • NPWS queried the culvert with otter ledges in place under the M18 Motorway and whether they discharge onto the site, and if they had been checked for otter usage.	Section 7.2.5 of the NIS addresses mitigation required for light spill and early planting regimes. Section 2.5 of the AA Screening details specific surveys undertaken for the site (including hen harrier). Section 3.2.3 details the otter surveys undertaken within the site.

Consultee	Date of Consultation	Issues Raised	Relevant Section of the NIS where this is addressed
Vincent Wildlife Trust	13/01/2021	Topics discussed included: • Additional areas for planting were recommended within the proposed development site. • Linear habitats for bats along Toureen Laneway was recommended to be maintained and kept completely dark. • The Light Spill Model would be crucial in informing our assessment. • Planting of native species on site was recommended.	Section 7.2.5 of the NIS addressed mitigation required for light spill and planting regimes.
Public consultations, including landowners, neighbours and local councillors.	22/04/2021	No issues were raised during these consultations regarding ecology.	-

3.6 Baseline Surveys

47 This section describes the methodologies followed for the ecological surveys undertaken to inform the assessment presented in this NIS.

48 Ecological field surveys were carried out in accordance with best practice professional guidelines between June – October 2018, June 2020 - April 2021, and March 2022. The surveys and survey dates are presented in Table 2.

Table 2 *Ecological surveys and survey dates*

Survey	Survey Date(s)	Surveyor(s)
Habitat surveys (including invasive plant species)	27th July 2018 16th August 2018 8th – 10th July 2020 14th March 2022	Scott Cawley Ltd.
Badger surveys	7 – 9th July 2020 14th March 2022	Scott Cawley Ltd.
Otter surveys	7th – 9th July 2020 14th March 2022	Scott Cawley Ltd.
Breeding bird surveys	25th June 2020 6th July 2020 20th April 2021	Scott Cawley Ltd.
Wintering bird surveys (including hen harrier surveys)	24th September 2020 20 – 21st October 2020 9th November 2020 4th December 2020 24th January 2021 17th February 2021 8th March 2021	Scott Cawley Ltd. and independent ornithologist, André Robinson
Bat surveys:		Scott Cawley Ltd.
Building surveys (internal and external)	6th – 8th July 2020 15th March 2022	
Static detector activity surveys	July – October 2018 July - October 2020	
Walked transect surveys	7th and 16th August 2018 July – August 2020	
Roost emergence/re-entry activity surveys	July – September 2020	

3.6.1 Habitats and Flora Survey

49 Terrestrial and aquatic habitat surveys were undertaken of the proposed development site on the 27th July and 16th August 2018 by Kate-Marie O'Connor B.A. (Hons) M.Sc. and Colm Clarke B.A. (Hons) M.Sc., on the 8th – 10th July 2020 by Siofra Quigley B.Sc. (Hons) M.Sc. and Alexis Fitzgerald B.A. (Hons) M.Sc., and on the 14th March 2022 by Síofra Quigley, following the methodology described in Best Practice Guidance for Habitat Survey and Mapping[4]. All habitat types were classified using the *Guide to Habitats in Ireland*[5],

[4] Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

[5] Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

recording the indicator species and abundance using the DAFOR scale[6] and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database*[7], having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*[8] and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*[9]. Annex I habitat types were classified after the *Interpretation manual of European Union Habitats EUR28*[10] with reference to the corresponding national habitat survey reports and NPWS wildlife manuals, as applicable. The nomenclature for Annex I habitats follows that of the *Interpretation manual of European Union Habitats EUR28* with abbreviated names after those used in *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*[11].

3.6.2 Fauna surveys

3.6.2.1 Terrestrial mammals (Excl. Bats)

50 A terrestrial fauna survey (excluding bats) was undertaken on the 7th – 9th July 2020 and on the 14th March 2022 by Síofra Quigley B.Sc. (Hons) M.Sc. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Surveys to check for the presence of badger *Meles meles* setts and otter *Lutra lutra* holts within the study area, and to record any evidence of use, were undertaken. Indirect method of surveying for red squirrel *Sciurus vulgaris* and pine marten *Martes martes* were also undertaken, which included checking tree canopies for the presence of potential dreys and dens.

51 Infra-red motion-activated cameras were deployed in areas of suitable habitat to confirm usage of certain mammal species, specifically for badger, pine marten, and red squirrel within the woodland habitat in the north west, and to determine usage of Spancelhill Stream for foraging/commuting otters in the north west (under NPWS Licence No. 007/2020). These cameras were deployed for a period of 27 nights between 23rd September – 20th October 2020. The mammal ledge located in the west of the site in the culvert beneath the M18 Motorway was also checked for signs of otter or other mammal usage during surveys carried out along the Spancelhill Steam in 2020 and 2022.

3.6.2.2 Bats

<u>Building and tree surveys</u>

52 A ground-level assessment of trees, structures and buildings within the subject lands, to examine their suitability to support roosting bats and potential to act as important landscape features for commuting/foraging bats, was based on guidelines (see Table 3) in *Bat Surveys for Professional Ecologists: Good Practice Guidance* (Collins ed., 2016) and included inspections of trees, structures and buildings for potential roost features (PRFs), and for signs of bats (staining at roost entrances, droppings, carcasses,

[6] The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.

[7] Weekes, L.C. & FitzPatrick, Ú. (2010) The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

[8] Stace, C. (2019) *New Flora of the British Isles*. *4th Edition*. C&M Floristics.

[9] Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

[10] CEC. (Commission of the European Communities) (2013) *Interpretation manual of European Union Habitats EUR28.* European Commission, DG Environment.

[11] NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*. Unpublished NPWS report.

insect remains). This included internal access of barns and outbuildings to assess for the actual presence of bats, and for evidence as described above. Residential buildings were unable to be accessed due to Covid 19 restrictions, however all buildings were assessed externally. Building and tree surveys were undertaken during surveys carried out in 2018, 2020, and 2022.

Table 3 *Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, applied according to professional judgement. (Collins (2016)*

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, treelined watercourses and grazed parkland. Site is close to and connected to known roosts.

Transect surveys

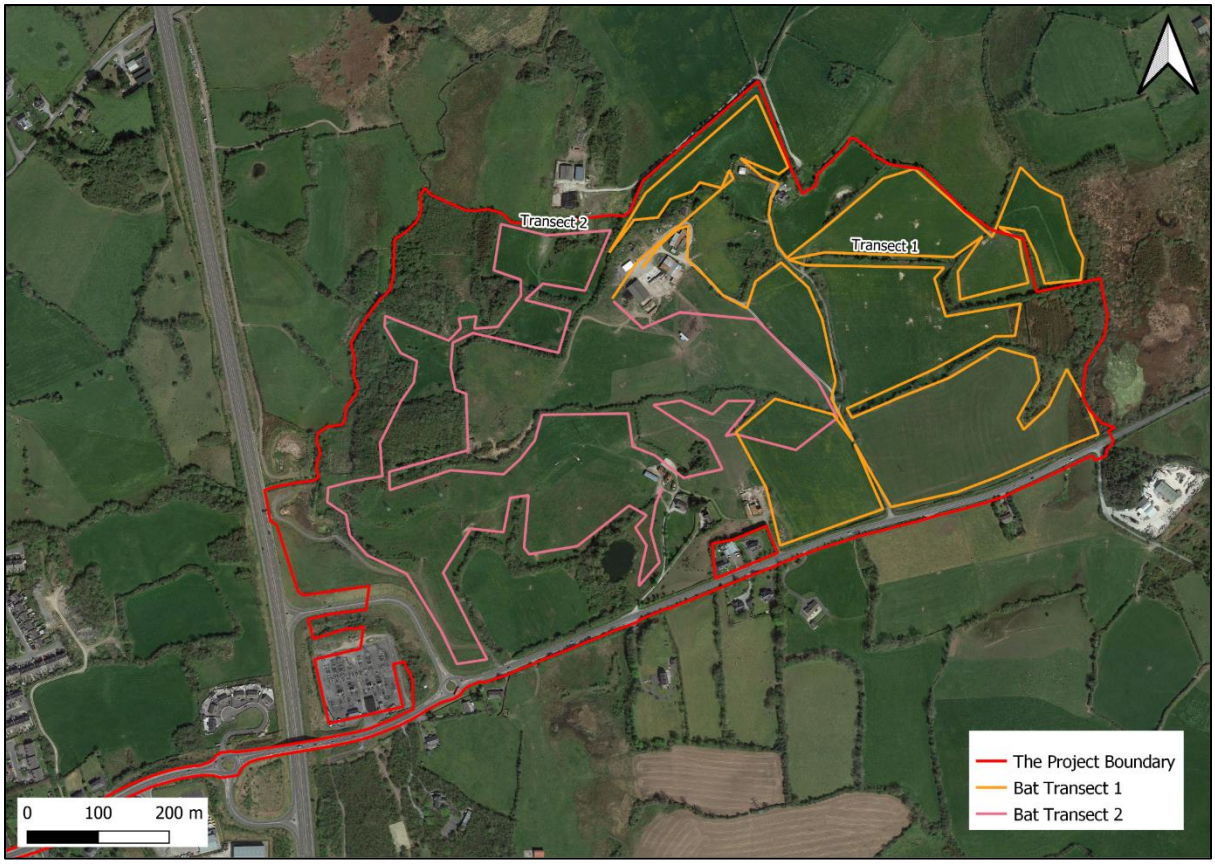
Two extended dusk and one all night bat activity walked transect surveys were undertaken within the subject lands. The extended dusk surveys commenced 15 minutes before sunset and lasted for

approximately two hours. One full night survey was also undertaken from 15 minutes before sunset, until just before sunrise. This full night survey was carried out to determine how bats use the proposed development site throughout the night. Details of dates, timings, weather, and other details are shown in Table 4 below. Two routes were walked by two surveyors during each visit, the routes are illustrated on Figure 1. The focus of the routes was to survey linear vegetation features and field boundaries. However, this was also dependent on access between fields. Direct observations of how bats use the landscape were recorded, and handheld ultrasound detectors (Elekon Batlogger M) were used to identify the bat species by their calls. Data generated from the transect surveys was analysed using Elekon BatExplorer software, whereby calls were identified to species level (where this was possible), through professional judgement and with reference to *British Bat Calls: A Guide to Species Identification* (Russ, 2012). Transect surveys were undertaken in 2018 and 2020, however in 2018, two dusk transects were carried out, and in 2020 two dusk surveys and one full night survey were undertaken.

Table 4 *Details of transect surveys undertaken within the proposed development site.*

Date (Sunset/Sunrise)	Survey Time	Survey Type	Weather Conditions
08/07/2020 (22:00)	21:47- 23:39	Dusk transect survey	Mild, wet weather with temperatures around 16°C and light breeze. Overcast with light to moderate rain throughout the night.
28-29/07/2020 (21:35/05:20)	21:20 – 05:00	All night transect survey	Dry and partially overcast, with temperatures between 13 - 14°C.
18/08/2020 (20:55)	20:42 – 22:31	Dusk transect Survey	Dry, mild partly cloudy weather with temperatures around 16°C and light breeze.

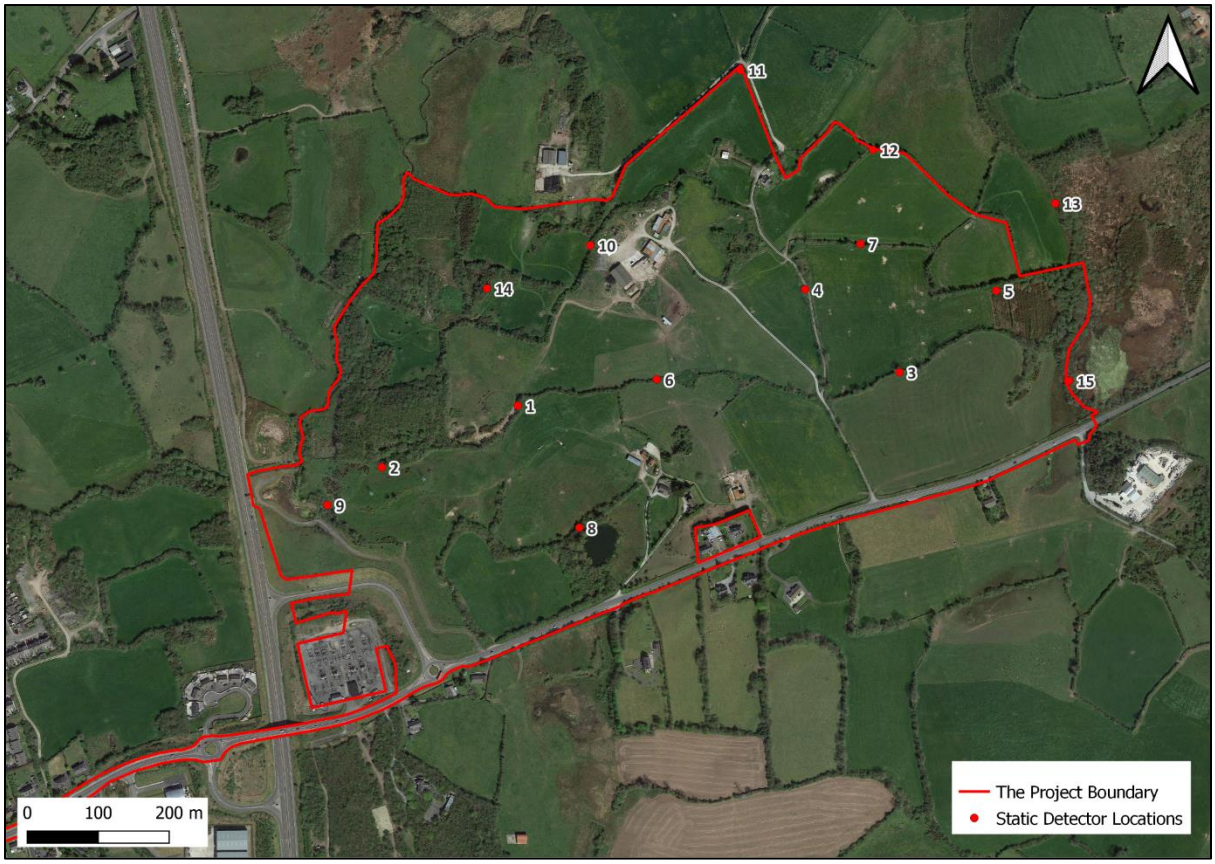
Figure 1 *Indicative transect routes walked within the site (updated)*



Automated static detectors

The walked transect surveys were supplemented by automated static bat detectors (*i.e.* Song Meter SM2). This use of static bat detectors at a fixed location for an extended period of time increases the likelihood of recording lesser horseshoe bats present on site compared to walked transects only. Detectors were deployed for a minimum period of 8 nights at 15 different locations within the subject lands between the 6th July and 20th October 2020. Locations of these deployments were chosen with an emphasis on areas identified as being potentially suitable for commuting and/or foraging bats, whilst also ensuring the site was covered as best as possible. Locations of the deployed static detectors can be found in

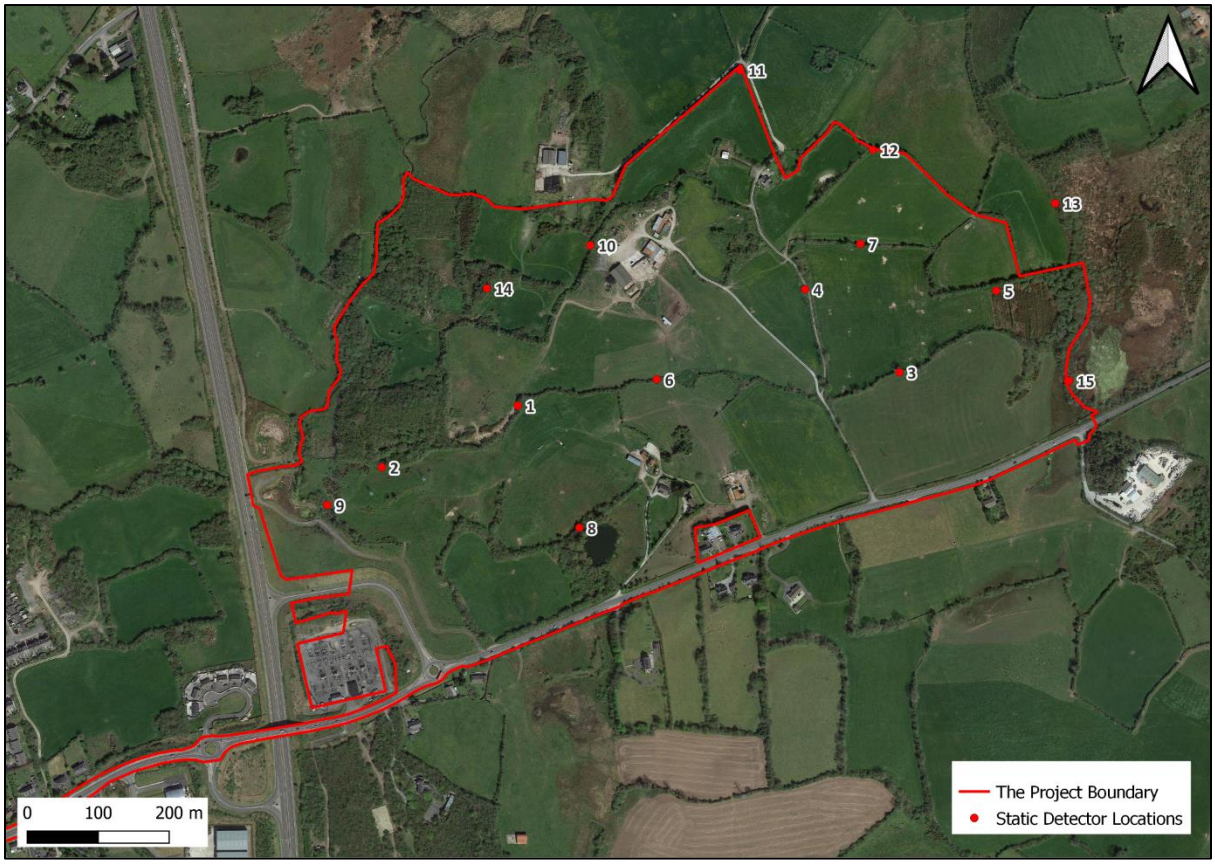
Figure 2 *Locations of deployed static bat detectors (updated)*



. Once the detectors had been deployed for a minimum of 7 nights, they were collected and the data was analysed using Kaleidoscope bat analysis software. This software identifies each individual bat call recorded by the detectors, which can then be used to identify the calls by species.

The average number of calls recorded per night for each species was calculated for each individual static detector. These averages were then examined against the transect survey results, and based on this analysis the features which are important for commuting and/or forging bats within the proposed development boundary, were identified. 14 static detectors were also deployed in 2018, in similar positions to 2020.

Figure 2 *Locations of deployed static bat detectors (updated)*



Roost emergence/re-entry activity surveys

93 A number of bat roost emergence/re-entry activity surveys were undertaken at six residential buildings and 10 farm buildings/structures within the lands by surveyors who are experienced in bat activity surveys. The surveys were designed with reference to methodologies in *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016), survey details and map showing building locations are provided in Table 5 and Figure 3. Observations of bat activity were recorded, with data generated from the surveys analysed using Elekon BatExplorer software, whereby calls were identified to species level (where this was possible), through professional judgement and with reference to *British Bat Calls: A Guide to Species Identification* (Russ, 2012). Roost emergence/re-entry surveys were only carried out in 2020.

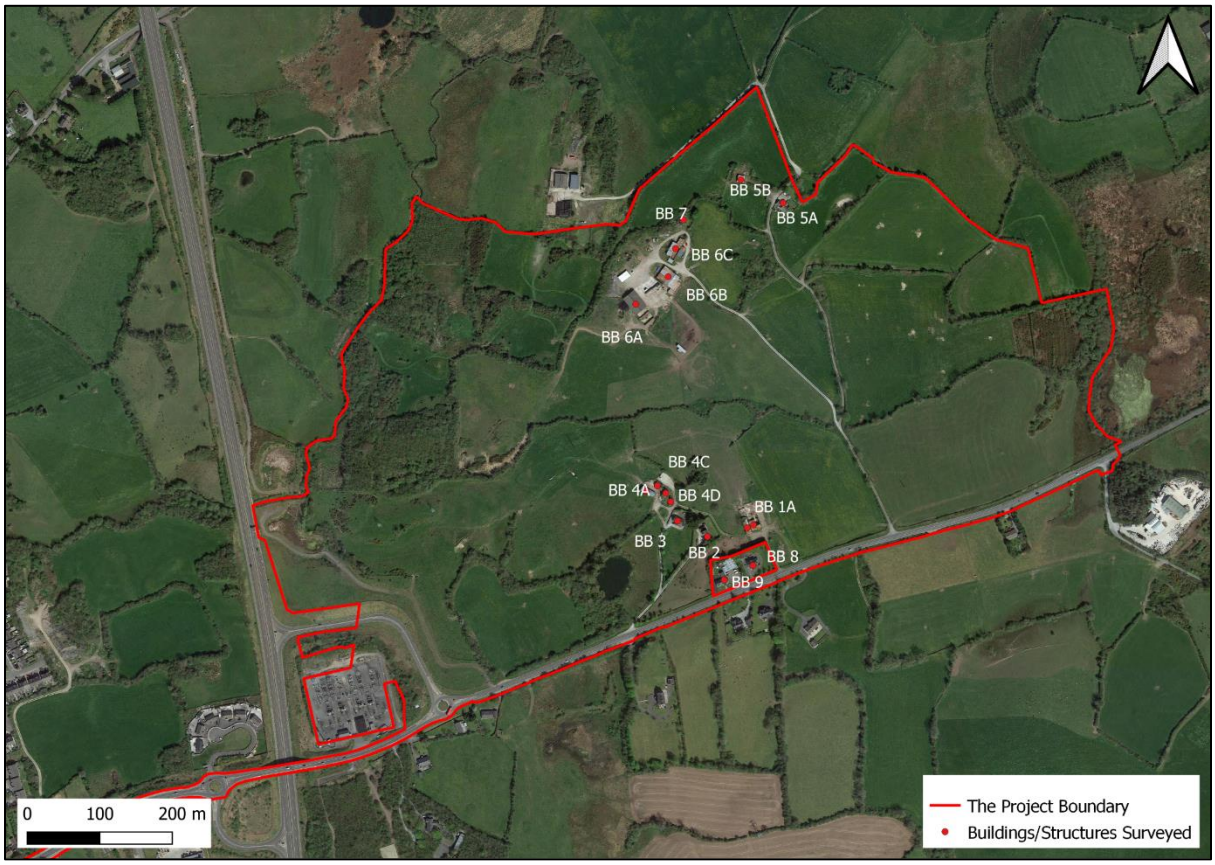
Table 5 *Details of emergence/re-entry bat surveys undertaken within the proposed development site*

Building ID Number	Building suitability, surveyed internally/externally	Number of emergence/re-entry surveys	Date of surveys	Survey time (sunset/sunrise)	Weather Conditions
BB 1A and 1B	Low Internals carried out on BB 1A, unable to carry out internals on BB 1B due to safety concerns. Externals carried out on both.	2 (1 dusk, 1 dawn)	09/07/2020	21:47 – 23:37 (21:59)	Dry, clear skies, temperatures between 12 - 14°C.
			19/08/2020	04:54 – 06:24 (06:24)	Dry, overcast, light breeze with temperatures of 17°C.
BB 2	Moderate Externals only carried out	2 (1 dusk, 1 dawn)	10/07/2020	03:22 – 05:22 (05:24)	Clear, dry night with no wind, temperatures between 12 - 14°
			21/09/2020	19:20 – 21:02 (19:37)	Dry, overcast with no wind, temperatures of 15°C
BB 3	High Externals only carried out	3 (2 dusks, 1 dawn)	07/07/2020	21:47 – 23:37 (22:00)	Overcast, light to heavy rain with no wind, temperatures of 15 - 16°C
			31/07/2020	04:20 – 05:51 (05:53)	Overcast, light rain with no wind, temperatures of 17°C
			19/08/2020	20:39 – 22:22 (20:52)	Overcast, no rain, light breeze, temperatures of 19°C
BB 4A, 4B, 4C, and 4D	Low Internals and externals carried out	1 (dusk)	06/07/2020	21:47 – 23:30 (22:01)	Light rain, overcast with no wind, temperatures of 15 - 17°C
BB 5A and 5B	Moderate (3 surveys undertaken due to poor survey conditions on first survey)	3 (2 dawns, 1 dusk)	27/07/2020	21:18 – 23:10 (21:36)	Overcast, with heavy rain for brief period during survey then dry for rest of survey, no wind, temperatures of 13 - 15°C

Building ID Number	Building suitability, surveyed internally/externally	Number of emergence/re-entry surveys	Date of surveys	Survey time (sunset/sunrise)	Weather Conditions
	Externals carried out on both, internal on BB 5B.		18/08/2020	04:53 – 06:24 (06:23)	Overcast, no rain, light winds, temperatures of 16 - 17°C
			22/09/2020	05:24 – 07:25 (07:22)	Clear skies, no rain or wind, temperatures of 11 - 13°C
BB 6A, 6B, and 6C	Low Externals and internal surveys carried out	1 (dawn)	28/07/2020	03:47 – 05:48 (05:48)	Overcast, light rain, no wind, temperatures of 12 - 13°C
BB 7	Moderate (3 surveys undertaken due to poor survey conditions) External and internal survey carried out	3 (2 dusks, 1 dawn)	29/07/2020	21:16 – 22:56 (21:33)	Overcast with light to moderate rain, gusty winds, temperatures of 15°C
			21/08/2020	04:55 – 06:22 (06:28)	Overcast, no rain, moderate winds, temperatures of 15°C
			22/09/2020	19:24 – 21:00 (19:34)	Overcast, no rain or wind, temperatures of 13°C
BB 8	Moderate External survey only	2 (2 dawns)	30/07/2020	04:20 – 06:05 (05:51)	Overcast, light rain, no wind, temperatures of 16 - 19°C
			23/09/2020	05:54 – 07:20 (07:24)	Clear skies, light rain towards the end of the survey, no wind, temperatures of 11 - 12°C
BB 9	Moderate External survey only	2 (2 dusks)	30/07/2020	21:20 – 23:01 (21:31)	Overcast, dry, with no wind, temperatures of 16 - 17°C
			23/09/2020	19:20 – 21:03 (19:31)	Clear skies, dry, no wind,

Building ID Number	Building suitability, surveyed internally/externally	Number of emergence/re-entry surveys	Date of surveys	Survey time (sunset/sunrise)	Weather Conditions
					temperatures of 8 - 12°C

Figure 3 *Location of buildings surveyed and associated ID number (updated)*



3.6.2.3 Breeding Birds

94 Breeding bird surveys were undertaken on the 25th June and 6th July 2020 by Shea O'Driscoll B.Sc. (Hons) M.Sc., and on the 20th April 2021 by Shane Brien B.Sc. (Hons) M.Sc., using a methodology adapted from the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species* [12]. The study area covered the lands within the proposed development site, which were slowly walked in a manner allowing the surveyor to come within 50m of all habitat features. Birds were identified by sight and song, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes. Buildings and barns within the proposed development site were also checked for nesting barn swallows *Hirundo rustica*, house martins *Delichon urbicum* and barn owls *Tyto alba*.

3.6.2.4 Wintering birds

95 Wintering bird surveys were undertaken once a month during the period of September 2020 and March 2021 by Shane Brien B.Sc. (Hons) M.Sc. and Niall McHugh B.Sc (Hons) both of Scott Cawley Ltd, and André

[12] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. RSPB: Sandy

Robinson, an independent ornithologist, using a methodology based on the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. The study area covered the lands within the proposed development site within the red line boundary and the area under land ownership to the east of the site (not within the red line boundary), as shown on Figure 1. Lands were initially surveyed visually using binoculars/scope from a vantage point(s) at the edge of the study area followed by a walkover of the area to identify birds which may not be visible from a distance (e.g. waders) and evidence of usage by wildfowl such as swans or geese (e.g. droppings). Birds were identified by sight and general location and activity. They were recorded using the British Trust for Ornithology (BTO) species and activity codes.

Hen Harrier

96 Vantage point surveys for the presence of hen harrier were carried out in accordance with best practice guidelines *Raptors – a Field Guide to Surveys and Monitoring (Second Edition 2009)* (Hardey et al., 2009)[13]. The habitats within the site were assessed for suitability for roosting and/or foraging hen harrier. Suitable wintering roosting and foraging habitat was identified within the east of the site, where the wetland/swamp habitats were located. A suitable vantage point was determined that appropriately covered the area identified as potential wintering roosting and foraging habitat. This area was surveyed for two hours at dusk, during monthly visits between September 2020 and March 2021. The site is not suitable as foraging or breeding habitat during the breeding season, as this typically occurs on moorlands and young forestry plantations[14][15][16].

3.6.3 Survey Limitations

97 Occupied residential houses (BB 2, BB 3, BB 5, BB 8 and BB 9) could not be surveyed internally for the presence of roosting bats due to health and safety concerns associated with Covid-19. The absence of an internal inspection does not compromise the assessment of the structure's potential to support roosting bats as buildings that were assessed as having moderate potential (according to BCT guidelines), had at least two emergence/re-entry surveys within the active bat season and during optimal survey conditions.

98 A number of surveys experienced poor weather during surveys, i.e. bat surveys, and wintering bird surveys, which could have implications for results. Any bat activity surveys that experienced poor weather, were repeated when weather had improved. For wintering bird surveys, the visibility was considered acceptable for all surveys undertaken. Therefore, bad weather is not considered a limitation.

99 Five of the 15 statics were deployed in late September which would be considered late in the season. However, weather conditions during September and October 2020 were unseasonably mild and as such, it was considered that all static deployments were undertaken in suitable conditions for recording bat activity. As 2018 surveys included static detector surveys, two seasons of bat activity within the site have been carried out, providing a robust baseline. Bat surveys in April and October, where they meet certain weather conditions and temperature requirements, are also considered acceptable within BCT guidelines.

100 Specific fish and invertebrate surveys were not undertaken within the proposed development. However, this is not considered to be a limitation to the assessment as a precautionary approach is applied and it is

[13] Hardey J, Crick H, Wernham C, Riley H, Etheridge B and Thompson D (2009) Raptors: A Field Guide to Survey and Monitoring, 2nd Edition. TSO, Edinburgh.

[14] Ruddock, M., Mee, A., Lusby, J., Nagle, A., O'Neill, S. & O'Toole, L. (2016). The 2015 National Survey of Breeding Hen Harrier in Ireland. Irish Wildlife Manuals, No. 93. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

[15] Barton, C., Pollock, C., Norriss, D.W., Nagle, T., Oliver, G.A. & Newton, S. (2006). The second national survey of breeding hen harriers Circus cyaneus in Ireland 2005. Irish Birds 8: 1-20.

[16] Norriss, D.W., Marsh, J., McMahon, D. & Oliver, G.A. (2002). A national survey of breeding hen harriers Circus cyaneus in Ireland 1998-2000. Irish Birds 7: 1–10.

assumed any suitable habitat identified could hold populations of species based on local records and habitat suitability.

101 Despite the limitations noted above, sufficient survey data was gathered to fully inform the assessment of impacts, the mitigation measures described in this report and the assessment of residual impacts predicted in relation to the proposed development.

4 Description of the Proposed Development

102 The proposed development is to demolish a number of existing dwelling houses and farm outbuildings and to develop six data storage facilities, an energy centre, an Above Ground Installation (AGI) building, a vertical farm, a substation compound and associated ancillary development on a c. 60ha greenfield site (currently used for agriculture and hosting power transmission infrastructure) in the townlands of Tooreen and Cahernalough, Ennis, Co Clare.

103 Figure 4 presents the site layout for the proposed masterplan. The proposed development footprint occupies c. 17.3ha of the 60ha proposed development site; the site layout reserves c. 10 ha of lands as ecological buffer zones. The indicated buffer zones on Figure 4 were delineated following assessment undertaken as part of the areas assessment within the Clare County Development Plan 2017-2023 (Variation No.1).

104 To facilitate the footprint of the development, there will be a total loss of 2.7km of hedgerows, and 30 trees. There will also be approximately 1,525m^2 of scrub being removed. In order to ensure the site continues to remain suitable for local wildlife species, there will be replacement planting of 4.86km of new native hedgerows, 57 new native trees and 58,567m^2 of native woodland planting. The proposed planting plan will be carried out in phases, with the first phase carried out pre-construction before any removal of vegetation takes place. In order to reduce the amount of soil and material being removed from the lands, berms will be utilised in a number of places within the proposed development. These areas will be planted with woodland species, and will further screen the development. The proposals for the site have been prepared taking account of the of the All-Ireland Pollinator Plan with the majority of the species proposed in the various habitats recommended in the Plan. Further details on the landscaping proposals and phasing of the development can be found in Chapter 10 *Landscape And Visual Impact Assessment* of the EIAR, The Landscape and Biodiversity Management Plan, and the Landscape Design Strategy that will be submitted as part of this application.

Figure 4. *Proposed development. Red hatched areas show the buffer zones included in the proposed development. (updated)*

A full development description can be found in *Chapter 2: Description of the Proposed Development* of the Environmental Impact Assessment Report (EIAR) which will be submitted as part of the planning application.

Foul water

105 There is an existing 225mm diameter foul drain that forms part of an existing foul drainage network that services the existing Knockanean area southwest of the proposed development along the existing Tulla Road/R352. This existing foul drain discharged to the existing Pumping Station of Gort Na mBlath located approximately 550m further west from the proposed development. It is proposed to convey and discharge all domestic foul flows generated from the proposed development into the existing Gort Na mBlath Pumping Station. A temporary trench excavation along the Tulla road will be undertaken to facilitate pipe laying for connection with existing public wastewater sewer and mains water supply.

106 There is no trade effluent proposed for this development. Foul sewage will be collected from site (*i.e.* from the data storage facility, offices and energy centre washroom facilities and canteen) and discharged through a new pumping station which will be constructed as part of this proposed development, to the foul drainage network which runs along the Tulla Road and ultimately discharges to Ennis North (Clonroadmore) WWTP Reg D0048.

Surface water

107 The proposed surface water drainage service to the development comprises various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage System (SuDS) elements. Stormwater will be attenuated on site for the 1:1000 yr. flood event. An over flow subsurface pipeline will discharge at current discharge rates (greenfield) to the Spancelhill Stream (also known as Ballymacahill River).

108 The roofs, yards and internal access roads proposed throughout and within the footprint of the proposed development will be drained through a sealed drainage system that will ultimately be collected by gullies and conveyed through a series of proposed storm water pipes prior to discharging into a proposed open

attenuation basin. There will be no direct discharge from hardstand area to swallow holes or existing pond features within the site boundary. Further details are provided in Chapter 6 *Hydrology* of the EIAR and within the CSEA engineering reports and drawings[17] prepared for planning.

5 Overview of the Receiving Environment

5.1 European Sites

109 The proposed development does not overlap with any European sites. There are 23 European sites within the vicinity of the proposed development. The nearest European site is the Lower Shannon SAC, located c. 1.4km south-west of the proposed development site. The next closest European site is Ballyallia Lake SAC, located c. 2.2km north west of the proposed development.

110 The Spancelhill Stream flows along the north-western boundary of the proposed development site, flanked by the woodland on the southern bank and improved agricultural grassland and scrub on the northern bank. It flows between two attenuation ponds located within and adjacent to the western section of the proposed development site, before exiting the site through a culvert under the M18 Motorway to Ennis. Spancelhill Stream then flows c. 2.1km downstream until it reaches the River Fergus, which ultimately discharges into the Fergus Estuary c. 4.9km downstream. The River Fergus overlaps with the Lower River Shannon SAC where the Spancelhill Stream joins the River Fergus, and the Fergus Estuary overlaps with the River Shannon and River Fergus Estuaries SPA c. 4.9km downstream. Therefore, the closest European site to the proposed development is the Lower River Shannon, located 2.1km downstream, or 1.4km south west (as the crow flies) to the proposed development.

111 The Dromore Woods and Loughs SAC is located c. 4.5km north west of the proposed development site, and is upstream of the proposed development site. A portion of the River Fergus flows through this European site. The River Fergus then flows c. 9.3km downstream, via Ballyallia Lough SAC, and combines with the outfall of the River Fergus that connects with the Spancelhill Stream, upstream of this.

112 There is therefore a hydrological link between the proposed development site and European sites therein.

113 There are 12 SACs designated for populations of lesser horseshoe bats within 15km of the proposed development. The nearest SAC designated for populations of lesser horseshoe bat is the Old Domestic Building (Keevagh) SAC, located *c*. 4.3km south west of the proposed development.

114 There are four SPAs located within c. 15km of the site. The nearest SPA is Ballyallia Lough SPA, located *c*. 2.5km north west of the site, designated for its wetlands and wildfowl, including; wigeon *Anas penelope*, gadwall *Mareca strepera*, teal *Anas crecca*, mallard *Anas platyrhynchos* , shoveler *Spatula clypeata*, coot *Fulica atra*, and black-tailed godwit *Limosa limosa*. The River Shannon and River Fergus Estuaries SPA also designated for its wetlands and waterbirds, is located c. 7km downstream of the site, via Spancelhill River which flows along the western boundary of the site, and the River Fergus.

115 The European sites present in the vicinity of the proposed development are listed in Table 6, along with their qualifying interests and proximity to the proposed development, and shown on Figure 5.

[17] *Engineering Planning Report, Art Data Centre – Ennis Campus.* Clifton Scannell Emerson Associates (CSEA), February 2022

Table 6 *European sites in the vicinity of the proposed development*

Site name and code	Distance from Proposed Development	Reasons for designation[18]
Special Areas of Conservation (SACs)		
Lower River Shannon SAC [002165]	Located c. 1.4km south west of the proposed development.	1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1150 Coastal lagoons 1160 Large shallow inlets and bays 1170 Reefs 1220 Perennial vegetation of stony banks 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) 1029 *Margaritifera margaritifera* (Freshwater Pearl Mussel) 1095 *Petromyzon marinus* (Sea Lamprey) 1096 *Lampetra planeri* (Brook Lamprey) 1099 *Lampetra fluviatilis* (River Lamprey) 1106 *Salmo salar* (Salmon) 1349 *Tursiops truncatus* (Common Bottlenose Dolphin) 1355 *Lutra lutra* (Otter) NPWS (2012) *Conservation objectives for Lower River Shannon SAC [002165].* Version 1.0. Department of Culture, Heritage and the Gaeltacht.[19]
Ballyallia Lake SAC [000014]	Located *c.* 2.1km west of	3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

[18] "Qualifying Interests" for SACs and "Special Conservation Interests" for SPAs based on relevant Statutory Instruments for each SPA, and NPWS Conservation Objectives for SACs downloaded from www.npws.ie in May 2022. Data on NHA/pNHA sites from the site synopsis documents published by the NPWS (where available).

Priority Annex I habitat types are denoted with an "*" and are habitat types which are in danger of disappearance at a European level – from the definition of "priority natural habitat types" in Article 1(d) of the Habitats Directive

[19] The versions of the conservation objectives documents referenced in this table are the most recent published versions at the time of writing

Site name and code	Distance from Proposed Development	Reasons for designation[18]
	the proposed development.	S.I. No. 71/2018 - European Union Habitats (Ballyallia Lake Special Area of Conservation 000014) Regulations 2018 NPWS (2017) *Conservation Objectives: Ballyallia Lake SAC 000014.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
Old Domestic Building (Keevagh) SAC [002010]	c. 4.3km south east of the proposed development.	1303 Lesser Horseshoe Bat(*Rhinolophus hipposideros*) S.I. No. 91/2016 - European Union Habitats (Old Domestic Building (Keevagh) Special Area of Conservation 002010) Regulations 2016. NPWS (2018) *Conservation Objectives: Old Domestic Building (Keevagh) SAC 002010.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
Dromore Woods and Loughs SAC [000032]	c. 4.4km north of the proposed development.	1355 Otter (*Lutra lutra*) 1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) Habitats 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels 8240 Limestone pavements* S.I. No. 114/2020 - European Union Habitats (Dromore Woods and Loughs Special Area of Conservation 000032) Regulations 2020 NPWS (2018) *Conservation Objectives*: Dromore Woods and Loughs SAC 000032. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Old Domestic Buildings, Rylane SAC [002314]	c. 5.9km north east of the proposed development.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) S.I. No. 175/2016 - European Union Habitats (Old Domestic Buildings, Rylane Special Area of Conservation 002314) Regulations 2016. NPWS (2018*) Conservation Objectives*: Old Domestic Buildings, Rylane SAC 002314. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Newgrove House SAC [002157]	c. 6.3km east of the proposed development.	1303 Lesser Horseshoe Bat(*Rhinolophus hipposideros*) S.I. No. 173/2016 - European Union Habitats (Newgrove House Special Area of Conservation 002157) Regulations 2016. NPWS (2018) Conservation Objectives: Newgrove House SAC 002157. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Newhall and Edenvale Complex SAC [002091]	c. 6.5km south west of the proposed development.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) 8310 Caves not open to the public S.I. No. 284/2017 - European Union Habitats (Newhall and Edenvale Complex Special Area of Conservation 002091) Regulations 2017.

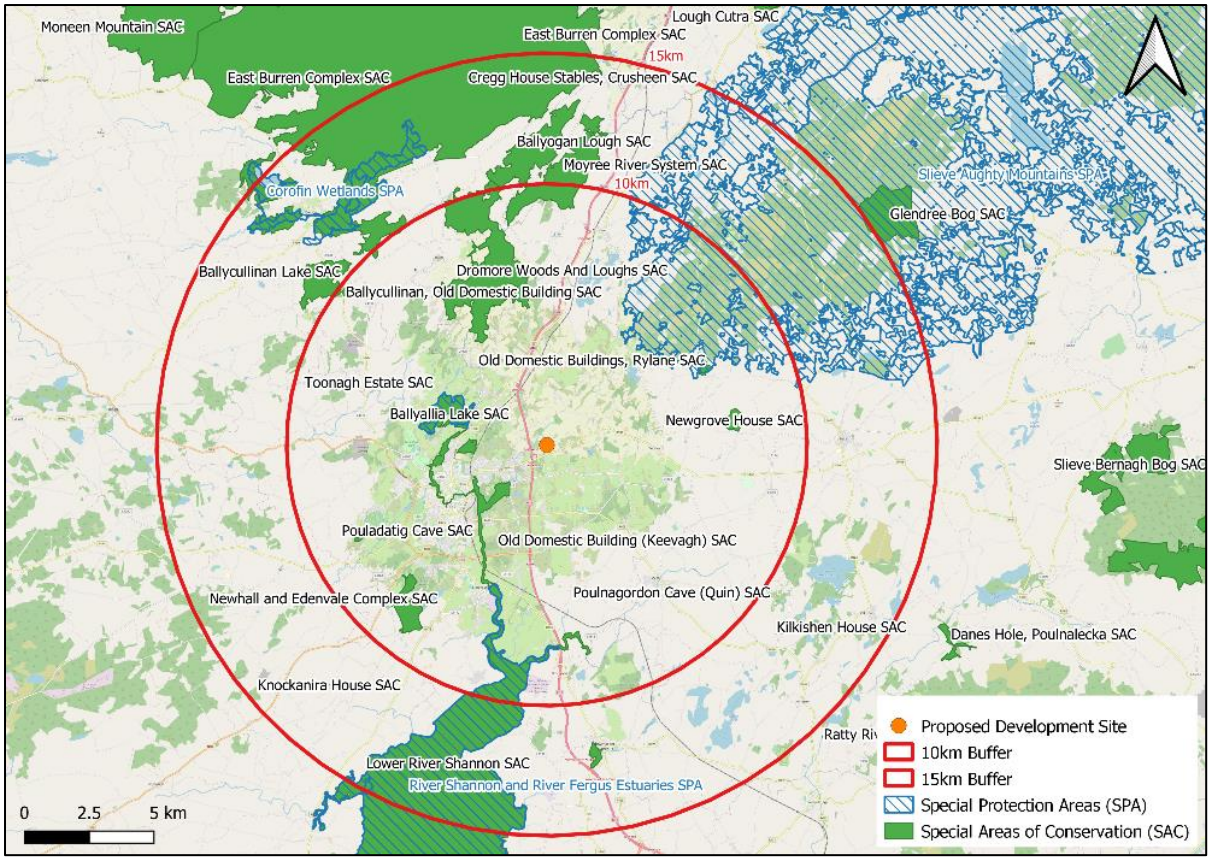
Site name and code	Distance from Proposed Development	Reasons for designation[18]
		NPWS (2018) *Conservation Objectives*: Newhall and Edenvale Complex SAC 002091. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Toonagh Estate SAC [002247]	c. 6.6km north west of the proposed development.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) S.I. No. 520/2016 - European Union Habitats (Toonagh Estate Special Area of Conservation 002247) Regulations 2016 NPWS (2018) *Conservation Objectives:* Toonagh Estate SAC 002247. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Poulnagordon Cave (Quin) SAC [000064]	c. 7km south east of the proposed development	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) S.I. No. 90/2016 - European Union Habitats (Poulnagordon Cave (Quin) Special Area of Conservation 000064) Regulations 2016. NPWS (2018) *Conservation objectives: Poulnagordon Cave (Quin) SAC [000064].* Version 1. Department of Culture, Heritage and the Gaeltacht.
Poulnadatig Cave SAC [000037]	c. 7.2km south west of the proposed development	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) 8310 Caves not open to the public S.I. No. 89/2016 - European Union Habitats (Pouladatig Cave Special Area of Conservation 000037) Regulations 2016 NPWS (2018) *Conservation Objectives: Poulnadatig Cave SAC 000037.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Old Farm Buildings, Ballymacrogan SAC [002245]	c. 8.1km north west of the proposed development.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) S.I. No. 92/2016 - European Union Habitats (Old Farm Buildings, Ballymacrogan Special Area of Conservation 002245) Regulations 2016 NPWS (2018) *Conservation Objectives: Old Farm Buildings, Ballymacrogan SAC 002245.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Moyree River System SAC [000057]	c. 8.2km north of the proposed development.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) 1355 Otter (*Lutra lutra*) 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation 7230 Alkaline fens 8240 Limestone pavements* 8310 Caves not open to the public S.I. No. 651/2019 - European Union Habitats (Moyree River System Special Area of Conservation 000057) Regulations 2019 NPWS (2018) *Conservation objectives for Moyree River System SAC 000057.* Version 1. Department of Culture, Heritage and the Gaeltacht.
Ballycullinan, Old Domestic Building SAC [002246]	c. 9.2km north west of the proposed development.	1303 Lesser Horseshoe Bat (Rhinolophus hipposideros)

Site name and code	Distance from Proposed Development	Reasons for designation[18]
		S.I. No. 174/2016 - European Union Habitats (Ballycullinan, Old Domestic Building Special Area of Conservation 002246) Regulations 2016 NPWS (2018) *Conservation Objectives: Ballycullinan, Old Domestic Building SAC 002246. Version 1*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
East Burren Complex SAC [001926]	c. 9.3km north of the proposed development.	1355 Otter(*Lutra lutra*) 1065 Marsh Fritillary(*Euphydryas aurinia*) 1303 Lesser Horseshoe Bat(*Rhinolophus hipposideros*) 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. 3180 Turloughs* 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation 4060 Alpine and Boreal heaths 5130 *Juniperus communis* formations on heaths or calcareous grasslands 6130 Calaminarian grasslands of the *Violetalia calaminariae* 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** 7220 Petrifying springs with tufa formation (Cratoneurion)* 7230 Alkaline fens 8240 Limestone pavements* 8310 Caves not open to the public 91E0 Alluvial forests with *Alnus glutinosa and Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*)* NPWS (2022) *Conservation Objectives: East Burren Complex SAC 001926.* Generic Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Ballycullinan Lake SAC [000016]	c. 9.4km north west of the proposed development.	7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae* S.I. No. 518/2016 - European Union Habitats (Ballycullinan Lake Special Area of Conservation 000016) Regulations 2016 NPWS (2018) *Conservation Objectives: Ballycullinan Lake SAC 000016*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Ballyogan Lough SAC [000019]	c. 9.7km north of the proposed development.	7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae* 8240 Limestones pavements

Site name and code	Distance from Proposed Development	Reasons for designation[18]
		S.I. No. 547/2021 EUROPEAN UNION HABITATS (BALLYOGAN LOUGH SPECIAL AREA OF CONSERVATION 000019) REGULATIONS 2021 NPWS (2018) *Conservation Objectives: Ballyogan Lough SAC 000019*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Lough Gash Turlough SAC [000051]	c. 11.1km south of the proposed development	3180 Turloughs* 3270 Rivers with muddy banks with *Chenopodion rubri* p.p. and Bidention p.p. vegetation S.I. No. 72/2018 - European Union Habitats (Lough Gash Turlough Special Area of Conservation 000051) Regulations 2018 NPWS (2017) Conservation Objectives: Lough Gash Turlough SAC 000051. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Knockanira House SAC [002318]	c. 11.8km south west of the proposed development.	1303 Lesser Horseshoe Bat *(Rhinolophus hipposideros)* S.I. No. 521/2016 - European Union Habitats (Knockanira House Special Area of Conservation 002318) Regulations 2016 NPWS (2018) *Conservation Objectives: Knockanira House SAC 002318*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Kilkishen House SAC [002319]	c. 12.7km south east of the proposed development site.	1303 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) S.I. No. 177/2016 - European Union Habitats (Kilkishen House Special Area of Conservation 002319) Regulations 2016. NPWS (2018) *Conservation Objectives: Kilkishen House SAC 002319*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
Special Protections Areas (SPAs)		
Ballialia Lough SPA [004041]	c. 2.6km north west of the proposed development site.	A052 Teal*(Anas crecca*) A125 Coot(*Fulica atra*) A053 Mallard(*Anas platyrhynchos*) A050 Wigeon(*Anas penelope*) A156 Black-tailed Godwit(*Limosa limosa*) A056 Shoveler(*Anas clypeata*) A051 Gadwall(*Anas strepera*) A999 Wetland and Waterbirds S.I. No. 58/2010 - European Communities (Conservation of Wild Birds (Ballyallia Lough Special Protection Area 004041)) Regulations 2010 NPWS (2022) *Conservation objectives for Ballyallia Lough SPA [004041].* Generic Version 9.0. Department of Housing, Local Government and Heritage.
Slieve Aughty Mountains SPA [004168]	c. 4.4km north east of the proposed	A098 Merlin(*Falco columbarius*) A082 Hen Harrier(*Circus cyaneus*)

Site name and code	Distance from Proposed Development	Reasons for designation[18]
	development site.	S.I. No. 83/2012 - European Communities (Conservation of Wild Birds (Slieve Aughty Mountains Special Protection Area 004168)) Regulations 2012 NPWS (2022) *Conservation objectives for Slieve Aughty Mountains SPA [004168].* Generic Version 9.0. Department of Housing, Local Government and Heritage
River Shannon and River Fergus Estuaries SPA [004077]	c. 5.1km south west of the proposed development.	A179 Black-headed Gull*(Chroicocephalus ridibundus)* A141 Grey Plover*(Pluvialis squatarola)* A038 Whooper Swan*(Cygnus cygnus)* A140 Golden Plover*(Pluvialis apricaria)* A048 Shelduck*(Tadorna tadorna)* A157 Bar-tailed Godwit*(Limosa lapponica)* A046 Light-bellied Brent Goose*(Branta bernicla hrota)* A137 Ringed Plover*(Charadrius hiaticula)* A156 Black-tailed Godwit*(Limosa limosa)* A160 Curlew*(Numenius arquata)* A164 Greenshank*(Tringa nebularia)* A050 Wigeon*(Anas penelope)* A162 Redshank*(Tringa totanus)* A142 Lapwing*(Vanellus vanellus)* A017 Cormorant*(Phalacrocorax carbo)* A056 Shoveler*(Anas clypeata)* A052 Teal*(Anas crecca)* A143 Knot*(Calidris canutus)* A062 Scaup*(Aythya marila)* A054 Pintail*(Anas acuta)* A149 Dunlin*(Calidris alpina)* A999 Wetland and Waterbirds S.I. No. 329/2019 - European Union Conservation Of Wild Birds (River Shannon And River Fergus Estuaries Special Protection Area 004077) Regulations 2019 NPWS (2012) Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0.
Corofin Wetlands SPA [004220]	c. 10.7km north west of the proposed development.	A156 Black-tailed Godwit*(Limosa limosa)* A052 Teal*(Anas crecca)* A038 Whooper Swan*(Cygnus cygnus)* A050 Wigeon*(Anas penelope)* A004 Little Grebe*(Tachybaptus ruficollis)* A999 Wetland and Waterbirds *S.I. No. 117/2012 - European Communities (Conservation of Wild Birds (Corofin Wetlands Special Protection Area 004220)) Regulations 2012.* *NPWS (2022) Conservation objectives for Corofin Wetlands SPA [004220].* Generic Version 9.0. Department of Housing, Local Government and Heritage.

Figure 5 *European sites within the vicinity of the proposed development site*



5.1.1 Habitats

116 The proposed development site is located in the 10km Grid Square R37 at R 37315 79402, east of Ennis. The land within the site comprises mainly of agricultural fields, used for pasture of cattle and sheep. A number of barns and sheds utilised for agricultural use, and four residential houses are also present within the lands. In the north west of the site, a well-established oak-ash-hazel woodland is bordered by the Spancelhill Stream. Toureen Lough lies in the south of the site, with wetland habitats present in the west and north. The field boundaries within the site largely consist of hedgerows, dry stone walls, and treelines. The R352 bounds the site to the south, with agricultural lands surrounding the proposed development site, and the townland of Ennis to the west.

117 The following habitat types (and mosaics of these), assigned using the Heritage Council Classification System[5] , were identified within the proposed development site:

- Stone Walls and Other Stonework (BL1)
- Buildings and Artificial Surfaces (BL3)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Exposed Calcareous Rock (ER2)
- Mesotrophic Lake (FL4)
- Other Artificial Lakes and Ponds (FL8)
- Reed and Large Sedge Swamps (FS1)
- Depositing/Lowland Rivers (FW2)
- Drainage Ditch (FW4)

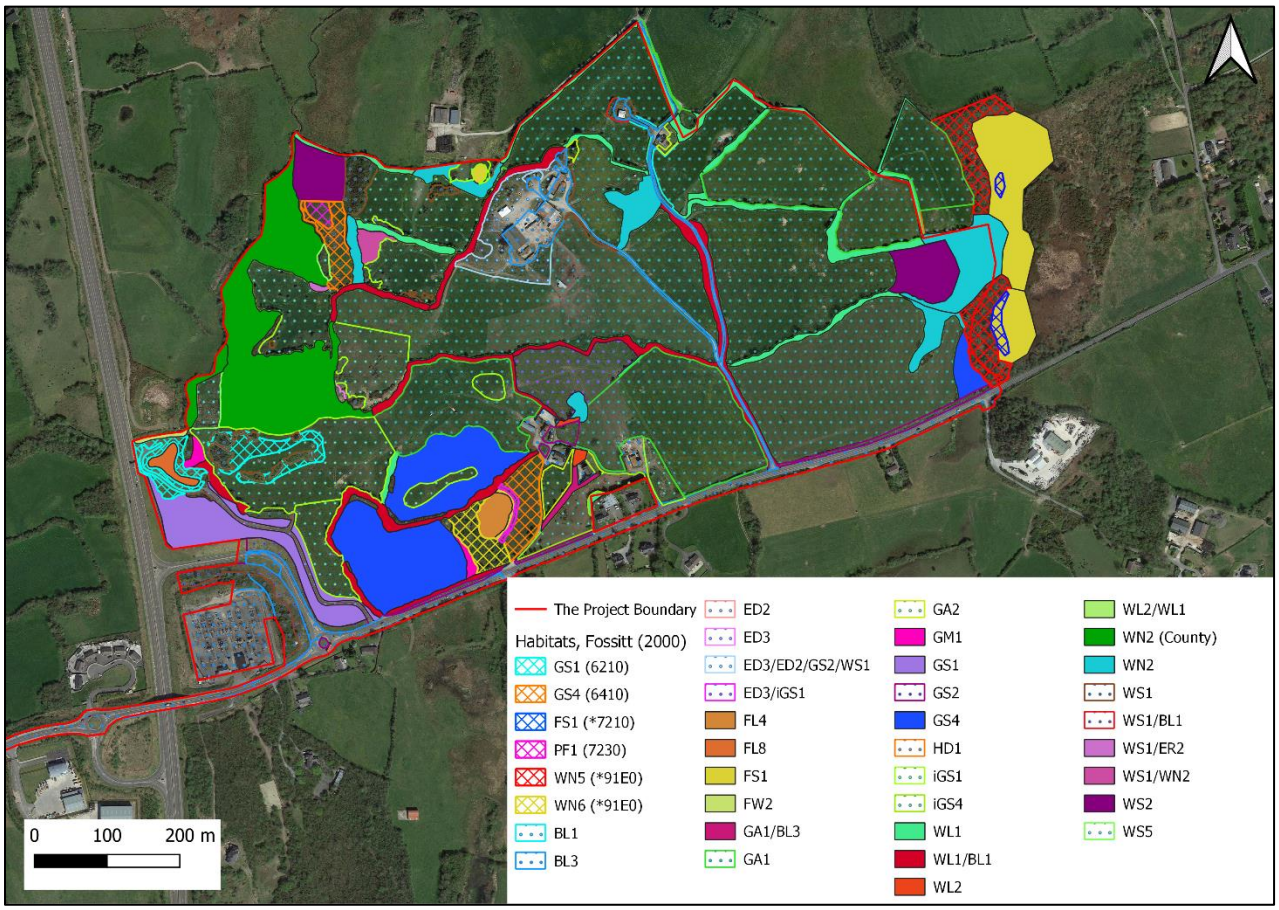
- Improved Agricultural Grassland (GA1)
- Amenity Grassland (GA2)
- Marsh (GM1)
- Dry Calcareous and Neutral Grassland (GS1)
- Wet Grassland (GS4)
- Dense Bracken (HD1)
- Rich Fen and Flush (PF1)
- Hedgerow (WL1)
- Treeline (WL2)
- Oak-Ash-Hazel Woodland (WN2)
- Riparian Woodland (WN5)
- Willow-Alder-Ash Woodland (WN6)
- Scrub (WS1)
- Immature Woodland (WS2)
- Recently-Felled Woodland (WS5)

118 The following habitats listed on Annex I of the EU Habitats Directive were recorded within the proposed development site:

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [*91E0], located in the east of the site, and west of Toureen Lough;
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210], located in the west of the site, south of the woodland;
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410], located east of Toureen Lough, and in the north west of the site;
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [*7210], located in the east of the site; and
- Alkaline fens [7230], two small patches along the eastern bank of Toureen Lough, and in the north west of the site adjacent to the woodland and *Molinia* meadow habitat.

119 Whilst these habitats were recorded on site, they are not located within and do not provide a supporting role to any Annex I habitats connected with any European site. Overall the habitats located within the footprint of the proposed development have limited ecological value.

Figure 6. *Habitat map of the site (updated)*



5.1.2 *Flora*

120 The National Biodiversity Data Centre (NBDC) did not return any records for protected and/or rare plants species as listed on the Flora (Protection) Order 2022, or any Annex II plant species within 2km of the proposed development site, nor were any of these aforementioned species found within the site during field surveys carried out in 2018, 2020 or 2022. *Galium uliginsosum*, a rare plant species (of least concern) contained within *Ireland Red List No. 10: Vascular Plants* (Wyse Jackson *et al.*, 2016), was identified within the proposed development site, in the rich fen and flush habitat in the north of the site.

121 There were two records of a non-native species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2015, i.e. Japanese knotweed *Fallopia japonica*, located c. 1.4km north of the proposed development site. There were no other records of any non-native invasive listed on the Third Schedule, and no such species were recorded within the lands during habitat surveys.

5.1.3 Fauna

5.1.3.1 Otter

122 The NBDC data search returned 16 records for otter within c. 2km of the proposed development, with the most recent from 2018. Locations of these records included along the River Fergus, and Ballyallia Lough, both of which have hydrological connections with the proposed site. Evidence of otter activity (*i.e.* otter spraint) was recorded within Spancelhill Stream in the north west of the site, adjacent to the woodland, *c.* 180m west of the footprint of the proposed development at its closest point. The mammal ledge located underneath the M18 Motorway culvert in the west of the site was also checked for otter usage, with no evidence identified during surveys carried out in 2020. During surveys carried out in 2022, an otter spraint

was identified on the ledge of the M18 culvert. The nearest European site for which this species is designated is the Lower River Shannon SAC, which is located *c.* 1.4km south west of the proposed development site, and hydrologically downstream of the site via the River Fergus. Dromore Woods and Loughs SAC, located *c.* 4.5km north west of the proposed development is also designated for otters, and is hydrologically upstream of the proposed development site via the River Fergus.

5.1.3.2 Lesser horseshoe bat

Desktop records

123 From a review of records held by Bat Conservation Ireland, there were 9 lesser horseshoe bat roosts within *c.* 2km of the proposed development site. The closest three roosts to the site were located c. 405m, *c.* 800m and 830m, all south of the site, with the closest located at Kilfelim. There were 61 records of lesser horseshoe bat from an NBDC desktop search of records within *c.* 2km of the site, the most recent record was from 2015.

Building inspection surveys

124 There were no lesser horseshoe bat roosts identified within the proposed development site. Lesser horseshoe bats are restricted in terms of their choice of roosting site, as they cannot land on walls and crawl in, they must fly through an opening large enough to accommodate it's wingspan (Kelleher, 2006)[20]. As a result, lesser horseshoe bats are typically cave-dwelling species. However in Ireland, this species will use buildings for its summer roosts, and caves for hibernation roosts[21]. Old stone buildings with slate roofs are ideal roosting sites as they usually offer a warm area near the apex of the roof in which to rear young. There are no caves or suitable roost buildings within the proposed development site, with the closest cave in Ballyallia, located c. 2.8km north west of the site, and the nearest known roost located c. 405m south of the proposed development site.

Transect surveys

125 One brief lesser horseshoe bat call was identified during one of the transect surveys of the site in July 2020. This was recorded in the south of the site, adjacent to the cattle sheds.

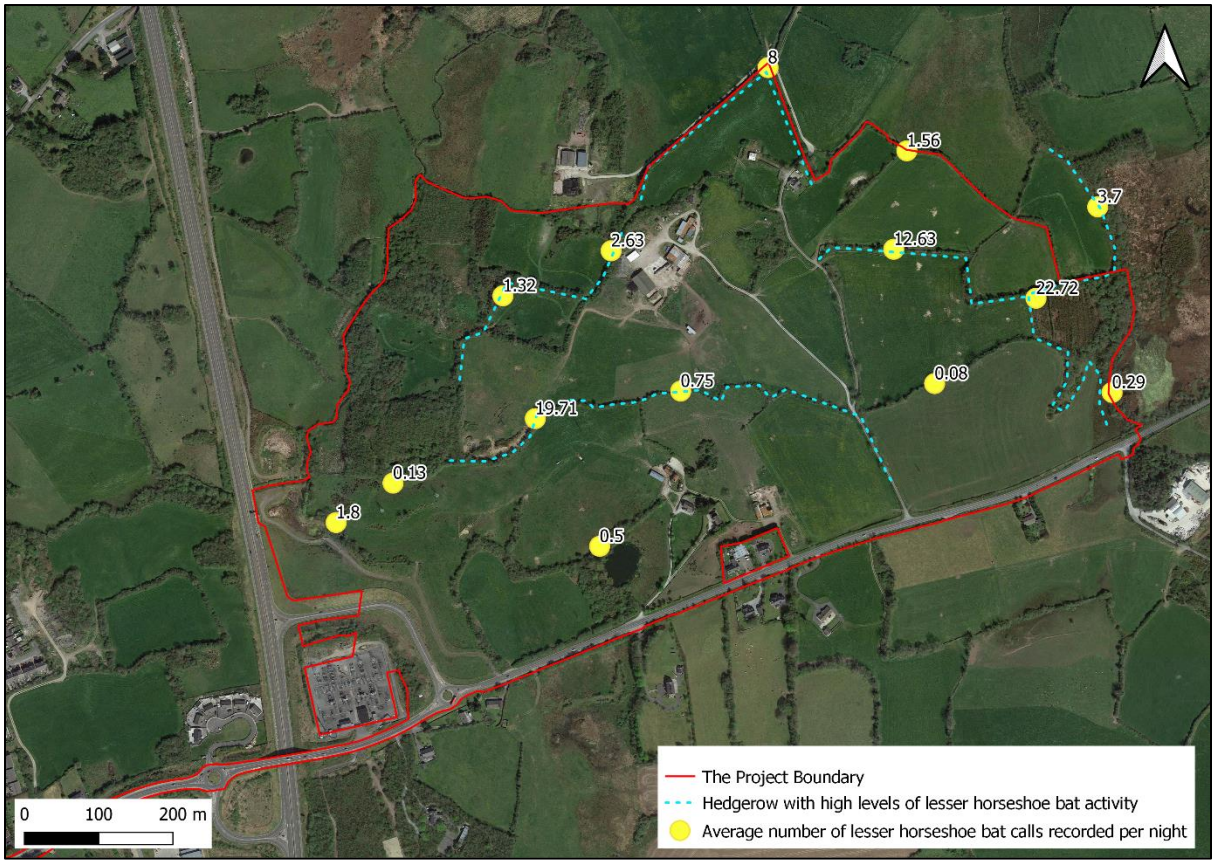
Static detector surveys

126 Lesser horseshoe bats were identified from the use of static detector deployments in 15 different locations across the proposed development site. Lesser horseshoe bat calls were identified on 14 out of 15 of the deployed static detectors, with varying degrees of activity. Highest numbers of calls per night were noted in the east at the boundary of scrub/woodland habitat, in the west along a hedgerow bordering the woodland area, and a hedgerow adjacent to Tooreen Laneway, all of which are bordered by pasture fields (Figure 4). This is ideal habitat for lesser horseshoe, and is clearly important for commuting and foraging for this species within the site.

Figure 7 *Important habitat features for lesser horseshoe bat (blue dotted line), and average numbers of calls per night from static detector deployments (updated)*

[20] Kelleher, C. (2006). *Summer Roost Preferences of Lesser Horseshoe bat Rhinolophus hipposideros in Ireland.* The Irish Naturalists' Journal, Vol. 18, No.6, pp. 229-231.

[21] McAney, K. (2014) *An overview of Rhinolophus hipposideros in Ireland (1994–2014)* Vespertilio 17: 115–125, 2014



European sites

127 The nearest European site designated for lesser horseshoe bat is Old Domestic Building (Keevagh) SAC, a summer breeding site, located *c.* 4.3km south east of the proposed development site. Dromore Woods and Loughs SAC, and Old Domestic Buildings, Rylane SAC are located within 6km of the proposed development site (*i.e. c.* 4.5km north west and *c.* 5.9km north east respectively), and are also designated as European sites for populations of lesser horseshoe bat. Other European sites designated for lesser horseshoe bat located within the vicinity of the proposed development, however further than 6km from the proposed development include; Newhall and Edenvale Complex SAC, Toonagh Estate SAC, Newgrove House SAC, Poulnagordon Cave (Quin) SAC, Poulnadatig Cave SAC, Old Farm Buildings, Ballymacrogan SAC, Moyree River System SAC, Ballycullinan, Old Domestic Building SAC, East Burren Complex SAC, Knockanira House SAC, and Kilkishen House SAC.

5.1.3.3 Wintering birds

128 The desk-based review returned records of 42 wintering bird species, which included 39 SCI species, including 10 species listed under Annex I of the Birds Directive. The majority of wintering birds identified in the desk-based review are typically found in coastal, estuarine and intertidal habitats including the Fergus Estuary and Lower Shannon Estuary.

129 During wintering bird surveys carried out between September 2020 and March 2021, five SCI species from nearby European sites were identified within the lands; coot, mallard, gadwall, and teal being SCI species of Ballyallia Lough SPA c. 2.7km north west of the site, and black-headed gull and teal, SCI species for the River Shannon and River Fergus Estuaries SPA, located c. 5.1km south west of the site, and teal also being an SCI species for the River Shannon and River Fergus Estuaries SPA and Corofin Wetlands SPA, c. 10.7km north west of the site. Suitable habitat for these species was identified within the proposed development, and included; Toureen Lough, the M18 Motorway Attenuation Pond, the wetland habitats in the east of the lands (small section of this habitat within the red line boundary), and the wetland features in the north west. The lands provide some areas of suitable foraging habitat (e.g. open amenity, arable and improved agricultural grassland), for specific wintering birds such as geese and swans. However, these suitable

habitats, while they are present on site, are grazed, mostly located in hilly areas giving limited sight lines, and therefore would have limited suitability for these species. There is ample habitat however for waterfowl and some wader species within the wetland habitats found in the proposed development site. The habitats offer suitable foraging habitat and shelter for smaller overwintering species such as passerine species fieldfare *Turdus pilaris* and redwing *Turdus iliacus*, which were both recorded during the wintering bird surveys carried out in October and November 2020. Peak numbers of 40 for redwing and 30 for fieldfare were observed, with both species identified in the north west of the site moving along the hedgerows.

Table 6 *Details of wintering bird species found within the proposed development site*

Common name/Latin name/BoCCI Code	**Nearest European site**	**Distribution in the study area**	**Peak count/Site/ Date**	**Conservation Importance**	
				BoCCI (Breeding/ Wintering)	**Annex I**
Black-headed gull *Chroicocephalus ridibundus* (BH)	River Shannon and River Fergus Estuaries SPA, c. 5.1km south west as the crow flies	Observed flying over site, did not land within site during three visits.	22 birds, flying high above the central area of the site and headed west, seventh visit	Red (B)	-
Teal *Anas crecca* (T.)	Ballyallia Lough SPA, c. 2.7km north west of the site as the crow flies. River Shannon and River Fergus Estuaries SPA, c. 5.1km south west as the crow flies. Corofin Wetlands SPA, c. 10.7km north west as the crow flies.	Observed on the wetland feature in the north of the site during three visits.	10 birds, on the wetland feature in the north, on third visit	Amber (B/W)	-
Coot *Fulica atra* (CO)	Ballyallia Lough SPA, c. 2.7km north west of the site as the crow flies.	Observed on the wetland feature in the north of the site during one visit.	2 birds, on wetland feature in the north, on first visit	Amber (B/W)	-
Mallard *Anas platyrhynchos* (MA)	Ballyallia Lough SPA, c. 2.7km north west of the site as the crow flies.	Observed on Toureen Lough during three visits, on the wetland feature in the east during one visit and on the wetland feature in the	2 birds, on Toureen Lough, and on feature in the north.	Amber (B/W)	-

Common name/Latin name/BoCCI Code	Nearest European site	Distribution in the study area	Peak count/Site/ Date	Conservation Importance	
				BoCCI (Breeding/ Wintering)	Annex I
		north during one visit			
Gadwall *Mareca strepera (*GA)	Ballyallia Lough SPA, c. 2.7km north west of the site as the crow flies.	Observed wading in wetland meadow adjacent to Toureen Lough during one visit (2), and on the wetland feature in the north during one visit.	2 birds, on Toureen Lough.	Amber (B/W)	-

5.1.3.4 Hen harrier

138 The desktop search returned records for hen harrier and merlin *Falco columbarius*, both Annex I species on the Bird Directive, within *c.* 2km of the proposed development. Whilst there is no suitable summer breeding and foraging habitat within the proposed development (*i.e.* heather moorland, open non-afforested habitats, and young forestry plantations[22]), suitable habitat for wintering hen harrier was identified within the marsh/reed habitat in the east of the site, beyond the red line boundary of the proposed development site. The site was deemed unsuitable for merlin, as they are typically associated with forestry plantations and moor and heathlands (Lusby et al., 2017)[23].

139 Dedicated surveys for hen harrier were carried out monthly between September 2020 and March 2021 (optimum time for winter roost survey[24]), in this area of suitable roosting habitat. No hen harriers were recorded within or near the proposed development site during these surveys. The nearest European site for which both these species are designated is the Slieve Aughty Mountains SPA, located c. 4.5km north west of the proposed development site.

[22] Ruddock, M., Mee, A., Lusby, J., Nagle, A., O'Neill, S. & O'Toole, L. (2016). The 2015 National Survey of Breeding Hen Harrier in Ireland. Irish Wildlife Manuals, No. 93. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

[23] Lusby, J., Corkery, I., McGuiness, S., Fernández-Bellon, D., Toal, L., & Norriss, D. et al. (2017*). Breeding ecology and habitat selection of Merlin Falco columbarius in forested landscapes. Bird Study*, *64*(4), 445-454.

[24] *Irish Hen Harrier Winter Survey, Survey Guide*. Found here http://www.ihhws.ie/

5.1.3.5 Freshwater Pearl Mussel *Margaritifera margaritifera*

140 The freshwater pearl mussel population of the Lower River Shannon SAC is present in the Cloon River, which is located in a different river catchment to that of the proposed development, *c.* 20.5km south west of the proposed development (NPWS, 2012a).

5.1.3.6 Fish Species

141 There are five Annex II fish species found within the Lower River Shannon SAC, i.e. sea lamprey *Petromyzon marinus* , brook lamprey *Lampetra planeri* , river lamprey *Lampetra fluviatilis*, Atlantic salmon *Salmo salar* and twaite shad *Alosa falla* , the four former species of which are Qualifying Interests of the SAC. The three lamprey species and Atlantic salmon have all been observed to be spawning in the Lower Shannon and its tributaries (NPWS, 2013c).

5.1.4 *Hydrology*

142 The proposed development site is located within the Fergus sub-catchment of the Shannon Estuary North catchment. The Spancelhill Stream flows along the north western boundary of the proposed development site between two existing attenuation ponds, before exiting the site through a culvert under the M18 Motorway. It then flows c. 2.1km downstream into the River Fergus, ultimately discharging into the Fergus Estuary c. 4.9km. A drainage ditch along the southern boundary of the woodland drains to the Spancelhill Stream. Other surface water features in the site include: Toureen Lough in the south adjacent to the R352, and wetland habitats in the east and north of the site.

143 According to the EPA online Map Viewer, the Spancelhill Stream has a Q-Value of "Q3" which is of "poor" water quality status. The EPA gather this information from the monitoring station at Gaurus Bridge (a bridge located downstream at Aughavaddy Bridge, located c. 2km downstream from the site) and at Bridge North West, near Spancelhill (a bridge located upstream at Knockaluskraun, located c. 1.9km from the site). The Spancelhill Stream is considered "at risk" of not achieving good status under the Water Framework Directive (WFD). Upstream of where the Spancelhill Stream joins the River Fergus has a Q-Value of "Q3-4", which is of "moderate" water quality status. This is gathered at the Corravarrin Bridge River Station. The River Fergus is also considered "at risk" of not achieving good status under the WFD. The Fergus Estuary, where surface water from the site ultimately discharges to, is considered "Unpolluted", and "at risk" in terms of achieving good status under the WFD.

144 The proposed development site is located in the Spancelhill WFD River Sub Basin, with surface waters also flowing through the Fergus Sub Basin, and draining into the Fergus Estuary, which supports habitats and qualifying interest species of the Lower River Shannon SAC and special conservation interest bird species (and their supporting wetland habitats) of the River Shannon and River Fergus Estuaries SPA.

5.1.5 *Hydrogeology*

145 Geological Survey of Ireland (GSI) data indicates that the proposed development is underlain by "Tubber Formation" which is described as "Crinoidal and cherty limestone and dolomite". GSI data indicates that the site is underlain by a "Regionally Important Aquifer" that is "Karstified (conduit)". The GSI (2018) Interim Vulnerability Map presently classifies the aquifer in the proposed development site as predominantly "Rock at or near surface or karst", with some areas "Extreme", indicating an overburden depth of 0-3m of moderately permeable soil present.

146 The Groundwater Body (GWB) underlying the proposed development site is the "Ennis" GWB, which is currently classified by the EPA as having "Good" groundwater status and the groundwater risk is classed as currently under "Review". There are a number of European sites within this GWB with groundwater dependent habitats, including; Lower River Shannon SAC, Ballyallia Lake SAC, Dromore Woodland and Loughs SAC, Ballycullinan Lake SAC, Moyree River System SAC, Ballyogan Lough SAC, and a small section of the East Burren Complex SAC.

5.1.6 Soils & Geology

147 A full description of the baseline soil and geology of the proposed development site is presented in Chapter 5 Land, Soils, Geology and Hydrogeology of the EIAR accompanying this application. The soils have been interpreted as predominantly loose to medium dense to dense clayey sand/gravel and soft to firm to stiff sandy gravelly clay[25]. The combined data of ground investigations indicated that soil thickness is thinnest through the centre and in the southwest of the site, increasing in thickness to the east and north. Peat and/or silt/clay has been identified surrounding Toureen Lough and in the south east of the site. No contaminated soil has been identified within the site.

148 Bedrock has been interpreted as comprising of low resistivity Dolomite located across the west and south west of the site and higher resistivity Limestone in the centre and east, underlying the majority of the site. Localised vertical and sub-vertical zones of low resistivities have been observed within the dolomite and limestone and have been interpreted as karst zones within the rock.

5.1.7 Air Quality

149 A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. The nearest European site Lower River Shannon SAC is located c. 1.4km south west (at its nearest point) of the proposed development and therefore not located within the ZoI of this potential impact, which is a considered to be a maximum of 200m from the proposed works [26].

150 The back-up diesel generators in the data storage facility will release air pollutant emissions (primarily NO_X emissions). Whilst these will only be used in the event of a power failure and for testing purposes, the potential impacts on nearby designated sites has been examined.

6 Potential Impacts, Zone of Influence and Identifying European Sites at Risk of Effects

151 Based on the baseline and receiving ecological environment and the nature and characteristics of the proposed development the following potential impacts have been identified:

- Habitat loss and fragmentation;
- Habitat degradation/effects on QI/Sci species as a result of hydrological impacts;
- Habitat degradation as a result of hydrogeological impacts;
- Habitat degradation as a result of air quality impacts;
- Habitat degradation as a result of introducing/spreading non-native invasive species;
- Disturbance and displacement impacts; and
- Direct injury/mortality

6.1 Habitat loss and fragmentation

152 The proposed development does not overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts.

153 As the proposed development does not traverse any European sites there is no potential for habitat fragmentation to occur.

[25] *Preliminary Report on the Geophysical Investigation for the Project Art Data Centre, Ennis Co. Clare For GII.* Apex Geophysics April 2021.

[26] NRA (2011) *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*.

154 As the proposed development will not result in habitat loss or habitat fragmentation within any European site, there is no potential for any in combination effects to occur in that regard.

155 Lands located within the proposed development site are currently being utilised by a number of SCI and QI species (as described in Section 5.1.3) which are likely to be connected with populations from nearby European sites for which these species are designated.

156 The Lower River Shannon SAC is designated for otter, and is hydrologically connected to the proposed development site via the River Fergus and Spancelhill Stream. Dromore Woods and Lough SAC is also designated as a European site for otter. While this site is c. 4.5km north west of the proposed development site, a hydrological connection between this European site and the proposed development exists via the River Fergus that flows through Dromore Woods and Loughs, in a southerly direction, ultimately discharging into the Lower River Shannon SAC. Evidence of otter (i.e. spraint) was recorded along the Spancelhill Stream. Whilst no otter holts were recorded, this species is likely to use the Spancelhill Stream as commuting and foraging habitat. Construction works within the Spancelhill Stream will include the installation of a grated culvert with associated headwall and mattress, with a total loss of $2m^3$ of bankside habitat. Habitat loss may also occur indirectly as a consequence of severe habitat degradation arising from a reduction in water quality and/or a change to the hydrological regime, as described in the hydrological impacts below. Therefore, indirect habitat loss as a result of habitat degradation in water quality and/or change to the hydrological regime, could affect the conservation status of this QI species from Dromore Woods and Loughs SAC, and the Lower River Shannon SAC.

157 Fish species i.e. Atlantic salmon, sea lamprey, brook lamprey, and river lamprey, are QI species of the Lower River Shannon SAC. Alteration of the habitats within the tributaries that these species use, could result in habitat loss, and could affect the conservation status of these QI species. As part of the proposed works during construction, there will be the instalment of a grated culvert with associated headwall and mattress with a total loss of $2m^2$. This could result in habitat loss for fish species, however the Spancelhill Stream is deemed unsuitable for salmonid species due to the heavy poaching of this stream from cattle in the surrounding lands. This poaching has resulted in soft, silty substrate with no instream vegetation. Instream vegetation is vital for young salmonid species to be able to hide from predators[27], and therefore the stream is unsuitable for this QI species. Lamprey species tend to live in soft substrate, where they can hide from predators[28]. As this habitat is present along the Spancelhill Stream that borders the proposed development site, there is potential for lamprey species to be directly impacted from the installation of the drainage pipes, headwall and mattress. There may also be indirect habitat loss as a result of habitat degradation in water quality and/or change to the hydrological regime, which could affect the conservation status of these QI species downstream in the Lower River Shannon SAC.

158 Lesser horseshoe bat is a QI species for a number of European sites in the vicinity of the proposed development site. This species has been recorded using the proposed development site for foraging and/or commuting during surveys carried out in 2018 and 2020. No roosts were identified within the site. However, records from BCI (as discussed in Section 5.1.3.2), identified nine lesser horseshoe roosts within 2km of the proposed development site, with the closest being *c*. 430m south. Research carried out on this species has suggested that the majority of feeding activity takes place within c. 2-3km of roosts during the year with occasional movements in excess of c. 4km (Bontadina, 2002 and Biggane, 2003[2930]). This distance

[27] Marsh, JE, Lauridsen, RB, Gregory, SD, et al. Above parr: Lowland river habitat characteristics associated with higher juvenile Atlantic salmon (Salmo salar) and brown trout (S. trutta) densities. Ecol Freshw Fish. 2019; 00: 1– 15.

[28] Lamprey habitats, Lamprey Surveys and consultancy advice UK & Ireland. Found here: https://lampreysurveys.com/lamprey-habitats/

[29] Biggane, S. (2003) The lesser horseshoe bat Rhinolophus hipposideros (Bechstein 1800) at Dromore, Co. Clare: diet, foraging activity, habitat selection and nocturnal behaviour. Ph.D. Thesis, National University of Ireland, Galway, Ireland.

[30] Bontadina, F., Schofield, H. and Naef-Daenzer, B. (2002) Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland. Journal of Zoology 258: 281–290.

can reduce down to a few hundred metres in the birthing season whilst larger scale movements of up to c. 15km are not unreasonable when bats move between winter and summer roosts. The Core Sustenance Zone (CSZ) for this species is described as the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. A review carried out by BCT of radio-tracked individuals, has defined the CSZ as within 2.5km of their roosts[31]. From research carried out in Galway on radio-tracked lesser horseshoe bats, this species has been shown to travel as far as c. 5.15km from roosts for foraging (Rush and Billington, 2014). In consideration of this, a precautionary approach has been adopted and it has been assumed for the purposes of this assessment that the lesser horseshoe bats recorded within the proposed development site may be connected with the lesser horseshoe bat populations of; Old Domestic Building (Keevagh) SAC located c. 4.3km south east, Dromore Woods and Loughs SAC located c. 4.5km north west, and Old Domestic Buildings, Rylane SAC located c. 5.9km north east. European sites designated for lesser horseshoe bat beyond this, are well out with the CSZ and therefore are not included in this assessment. The proposed development will result in the loss of lesser horseshoe bat foraging and commuting habitat, however the site has been designed through an iterative process, to avoid as much lesser horseshoe bat habitat as possible. There is potential however, to impact on the conservation status of this species in the absence of mitigation. There will be a removal of 2.7km of hedgerows and 30 trees within the footprint of the development. In the absence of mitigation, removal of suitable foraging and commuting habitat within the proposed development site may potentially indirectly impact on lesser horseshoe bat species that utilise the site for roosting, foraging and/or commuting by making it unsuitable.

159 A number of SCI species from nearby SPA sites were identified using the lands during wintering bird surveys carried out monthly between September 2020 and March 2021 (inclusive), this included; coot, mallard, teal, black-headed gull, and gadwall. Mallard, coot, teal and gadwall are SCI species of Ballyallia Lough SPA located c. 2.7km north west of the proposed development. Black-headed gull and teal are SCI species for the River Shannon and River Fergus Estuaries SPA located c. 5.1km south west of the site. Teal is an SCI species for Corofin Wetlands SPA, located 10.7km north west of the site.

160 All of the SCI birds identified within the site were either located on the waterbodies within the site (teal, gadwall, mallard, coot) or flying over the site (black-headed gull). The peak count of any individual was teal, with 10 individuals recorded in the north of the site on the temporary pond feature. The development will not involve the removal or alteration of any of the permanent waterbodies within the proposed development site as they are within the ecological protection areas as set out by Clare County Council in the Variation No. 1. The footprint of the development will encroach on temporary 'pond' features in the north west of the site, where teal have been identified during a number of wintering bird surveys (See Section 5.1.3.3).

161 Therefore, the development will have a direct impact on the conservation objectives for Ballyallia Lough SPA, the river Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. The development could also potentially result in the degradation of downstream habitats as a result of the degradation of water quality caused by run off from the development. This could affect the suitability of these habitats for the aforementioned bird species, and in the absence of mitigation could result in loss of supporting habitat for these SCI species from Ballyallia Lough SPA, the River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA.

162 Records of hen harrier, an Annex I bird species were returned from the vicinity of the proposed development. Hen harriers have been found to travel up to 9km from nests (Arroyo et al., 2014), and the nearest European site designated for this species is Slieve Aughty Mountains SPA, c. 4.5km from the proposed development. This species is known to breed and forage in the summer on heather moorland and young forestry plantations where they nest on the ground. They will then spend winter in more coastal

[31] NPWS (2018) *Conservation objectives supporting document – lesser horseshoe bat (Rhinolophus hipposideros) Version 1*. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland.

and lowland areas throughout Ireland[32]. Therefore, there is potential that hen harriers associated with the Slieve Aughty Mountains SPA may hunt and roost during winter in the vicinity of the proposed development. However, dedicated hen harrier vantage point surveys were carried out within the proposed development and no individuals were identified within or in the adjoining lands. Given that the proposed development will sit into the landscape and the nearest building to suitable habitat to be constructed will be over 250m away, there is no potential for the proposed development to result in loss of habitat or territory on SCI populations of hen harrier associated with the Slieve Aughty Mountains SPA.

6.2 Habitat degradation/effects on QI/SCI species as a result of hydrological impacts

163 The release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. In the absence of mitigation, the associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the discharge point or location of the accidental pollution event. Such an occurrence, of a sufficient magnitude, either alone or in combination with other pressures on water quality, and in the absence of mitigation could undermine the conservation objectives of the European sites downstream in the Fergus Estuary transitional waterbody (i.e. the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA).

164 The proposed development is hydrologically connected to the River Fergus, via Spancelhill Stream which flows along the north western boundary of the site. Otter territories are within the range of *c.* 7.5km for females and *c.* 13km for males (Reid *et al*., 2012)[33]. Therefore, there is potential for otter associated with the Lower River Shannon SAC to move upstream and for Dromore Woods and Loughs SAC to be present within the zone of influence of the proposed development. A reduction in water quality as a result of an accidental pollution event (either alone or in combination with other pressures on water quality) however could result in the degradation of the local aquatic environment, which could in turn negatively affect the otter population through direct contact with pollutants or a decline in fish prey. Sea lamprey *Petromyzon marinus*, brook lamprey *Lampetra planeri,* river lamprey *Lampetra fluviatilis*, Atlantic salmon *Salmo salar* and freshwater pearl mussel *Margaritifera margaritifera,* all QI species of Lower River Shannon SAC, could also be negatively impacted from a reduction in water quality.

165 Process and sanitary wastewater from the site (including the proposed development) will be discharged to Irish Water's downstream municipal wastewater infrastructure for appropriate treatment and discharge to receiving water. In the event of a pollution event, there is the potential to affect water quality in the Spancelhill Stream, the River Fergus, and the Fergus Estuary, and therefore European sites and the conservation objectives of these sites therein. In a worst case scenario, the release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during construction, or operation, also has the potential to affect SCI bird species and QI mammal species that commute, forage and loaf in the Fergus Estuary and Shannon Estuary i.e. birds associated with River Shannon and River Fergus Estuaries SPA and marine mammals associated with Lower River Shannon SAC. This reduction in water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present downstream, which in turn could negatively affect the SCI/QI species that rely upon these habitats as foraging/commuting and/or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI and QI populations. In a worst-case scenario these potential impacts could occur to such a degree that the conservation objectives of the River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC are compromised.

[32] Birdwatch Ireland. Hen harrier webpage. Available from: https://birdwatchireland.ie/birds/hen-harrier/

[33] Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

166 As the Proposed development has the potential to result in habitat degradation and effects on of the qualifying/special conservation interest species of European sites as the result of hydrological impacts, there is the potential for in combination effects to occur.

6.3 Habitat degradation as a result of hydrogeological impacts

167 Groundwater effects could arise as a consequence of an accidental pollution event potentially causing a reduction in groundwater quality and/or dewatering activity potentially causing a reduction in groundwater levels in the locality. Long-term discharge of surface water runoff to groundwater during operation of the Proposed development may result in a reduction in groundwater quality and/or quantity in the receiving environment, also resulting in the degradation of groundwater dependent terrestrial ecosystem and any species that they may support.

168 The proposed development lies within the Ennis GWB. There are a number of European sites within this GWB that are designated for groundwater dependent habitats and/or species including; Lower River Shannon SAC, Ballyallia Lake SAC, Dromore Woodland and Loughs SAC, Ballycullinan Lake SAC, Moyree River System SAC, Ballyogan Lough SAC, and a small section of the East Burren Complex SAC. However, excluding the Lower River Shannon SAC, the proposed development is down-gradient of all of these European sites, and therefore is no potential for groundwater impacts to affect conditions in those European sites.

169 Only one of the QIs of the Lower River Shannon SAC may be influenced by groundwater conditions i.e. *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). The nearest known location of this Annex I habitat within the SAC is north of the River Shannon north of Moyross in Co. Limerick, c. 27km south east of the proposed development site (NPWS, 2012a). This site is located within a different groundwater body to that of the proposed development site (Limerick City North GWB). There will be no dewatering or interactions with the water table, and therefore there will be no hydrogeological impacts on European site or their QI species and habitats as a result of the development.

6.4 Habitat degradation as a result of introducing/spreading non-native invasive species

170 No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were present within, or in close proximity to, the proposed development. However, during construction and/or routine maintenance/management work, non-native species could potentially be introduced to terrestrial habitats located within downstream European sites via surface water features. Giant hogweed is typically found in damp places such as riverbanks and spreads via seed dispersal (NBDC, 2013a), while Himalayan balsam and Japanese knotweed are both found in a wider variety of habitats including river banks, roadsides, and urban areas such as waste ground and railways; the former species spreading by seed dispersal, the latter vegetatively (NBDC, 2013b; NBDC, 2013c). Giant hogweed, Himalayan Balsam and Japanese knotweed are all classified as high impact invasive species.

171 The introduction and/or spread of these invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat. This in turn could undermine the conservation objectives of these European sites.

172 As the proposed development has the potential to result in habitat degradation of the qualifying/special conservation interest species of European sites as the result of the spread of invasive species, there is the potential for in combination effects to occur in association with other activities/plans/projects.

6.5 Habitat degradation as a result of air quality impacts

173 A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. The ZoI for ecological receptors (as described in Chapter 8 *Air Quality and Climate* of the EIAR) is 50m from

any construction activities, as the nearest European site to the proposed development is 1.4km south east of the proposed development and therefore any air quality impacts on European sites from the proposed development are imperceptible.

174 The impact of emissions of NO_X within 20 km of the Proposed Development and existing emission points on ambient ground level concentrations within the following designated habitat sites was assessed using AERMOD. The 20km distance was selected based on maximum extent of the impact zone from the air emissions onsite. After 20km, the ambient air concentration of NO_X due to emissions from the facility are imperceptible. The assessment included the following European sites:

- Special Areas of Conservation (SAC) – Ballyallia Lake SAC, Ballycullinan Lake SAC, Ballycullinan Old Domestic Building SAC, Dromore Woods And Loughs SAC, East Burren Complex SAC, Knockanira House SAC, Lower River Shannon SAC, Moyree River System SAC, Newgrove House SAC, Newhall And Edenvale Complex SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, Old Farm Buildings, Ballymacrogan SAC, Pouladatig Cave SAC, Poulnagordon Cave (Quin) SAC, Toonagh Estate SAC; and
- Special Protection Area (SPA) – Ballyallia Lough SPA, Corofin Wetlands SPA, River Shannon and River Fergus Estuaries SPA, and Slieve Aughty Mountains SPA.

175 An annual limit value of 30 µg/m^3 for NO_X is specified within EU Directive 2008/50/EC for the protection of ecosystems. The NO_X limit value is applicable only in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. There are sections of designated sites which are near the proposed development that are within an urban setting, so the limit value for NO_X for the protection of ecosystems is not technically applicable at these sites. Regardless, the annual average concentrations for NO_X from all emission points at the proposed development were predicted at receptors within the designated sites for all five years of meteorological data modelled (2016 – 2020). The receptor spacing ranged from 25 m to 100 m with 2,486 discrete receptors modelled in total within the sensitive ecosystems.

176 The NO_X modelling results are detailed in Table 8.12 of Chapter 8 Air Quality & Climate of the EIAR. Emissions from the facility lead to an ambient NO_X concentration (excluding background) which ranges from 6 – 7% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the proposed development combined with background concentrations will have an slight impact on NO_X concentrations within the sensitive ecosystems contributing at most 70% of the limit value at the worst-case location in the worst-case year modelled.

177 In order to consider the effects of nitrogen deposition owing to emissions from the Proposed Development on the designated habitat sites, the NO_X concentrations determined must be converted firstly into a dry deposition flux. The N deposition flux for the worst-case year is 3.02 kg/ha/yr and is below the range in worst-case critical loads for the various vegetation types of 5-10 kg/ha/yr (UNECE, 2010). Therefore effects of nitrogen deposition on designated sites due to the proposed development are not significant. Overall, the operational phase impact of the proposed development on designated habitat sites is considered long-term, localised, negative and imperceptible[41].

178 The proposed development does not have the potential to result in habitat degradation of the qualifying/special conservation interest species of any European site as the result of air quality impacts, either during the construction phase or the operational phase.

6.6 Disturbance and displacement impacts

179 A temporary and/or permanent increase in noise, vibration and/or human activity levels during the construction and/or operation of the Proposed development could result in the disturbance to and/or displacement of fauna species present within the vicinity of the proposed development. For mammal

species such as otter, disturbance effects would not be expected to extend beyond c. 250m[34]. For birds, disturbance effects would not be expected to extend beyond a distance of c.300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance [35]. Other activities such as piling, may extend beyond this distance.

180 Otter are a QI species for the Lower River Shannon SAC and Dromore Woods and Loughs SAC, both of which are hydrologically connected to the proposed development. Research carried out by Ó Néill et al. (2008)[36] on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged *c.* 7.5km while male otter home ranges varied between *c.* 7-19km. Evidence of otter (i.e. spraint) was recorded along the Spancelhill Stream. Whilst no otter holts were recorded, this species is likely to use the Spancelhill Stream as commuting and foraging habitat. It is therefore likely that this QI species of the Lower River Shannon SAC and Dromore Woods and Loughs SAC would use this watercourse for foraging and/or commuting along. Increased human presence and/or noise and vibration associated with construction works may temporarily displace commuting or foraging otter, particularly during noisy activities such as piling. Otter are known to tolerate human disturbance under certain circumstances[37,38.] Construction works will typically be undertaken during normal daylight working hours and the majority of the construction activities will be over 200m away from Spancelhill Stream. Whilst otters are generally nocturnal in habit, and can (in many circumstances) tolerate high levels of human presence and disturbance, temporary displacement in the vicinity of the proposed development noise and vibration associated with construction works could temporarily displace commuting or foraging otter during the construction phase of the development. Furthermore, temporary works that will be occurring adjacent to Spancelhill Stream for the construction of services pipes for drainage and fibre optics, and the installation of a headwall and mattress with culvert could also result in disturbance. Therefore, there is potential for the construction phase of the proposed development site to result in a temporary disturbance/displacement impacts on QI otter populations associated with the Lower River Shannon SAC and Dromore Woods and Loughs SAC .

181 There are no lesser horseshoe bat roosts within the proposed development site. The closest roost identified to the site is approximately c. 430m south, in Kilfelim. Lesser horseshoe bat have been identified using the site as foraging and/or commuting grounds, predominately located along hedgerows and treelines within the site, and along the woodland area in the north west of the proposed development. There are 13 SACs designated for lesser horseshoe bat located within *c.* 15km of the proposed development site, the nearest of which is Old Domestic Building (Keevagh) SAC, located *c*. 4.3km south east. It is considered likely that this distance of *c*. 4.3km is within the normal core foraging range and the normal commuting range of this species. Research carried out on this species has suggested that the majority of feeding activity takes place within *c*. 2-3km of roosts during the year with occasional movements in excess of *c*. 4km (Bontadina, 2002

[34] This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

[35] The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance*, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. *Wildfowl* (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

[36] Ó Néill L. (2008) Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning. PhD thesis. Trinity College, Dublin.

[37] Bailey, M. and Rochford J. (2006) *Otter Survey of Ireland 2004/2005*. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

[38] The Environment Agency (2010). *Fifth otter survey of England 2009-2010*. Environment Agency, Almondsbury, Bristol, England

and Biggane, 2003). This distance can reduce down to a few hundred metres in the birthing season, with research carried out in Galway on radio-tracked lesser horseshoe bats, this species has been shown to travel as far as *c*. 5.15km from roosts for foraging (Rush and Billington, 2014)[39]. Larger scale movements of up to *c*. 15km are not unreasonable when bats move between winter and summer roosts. In consideration of this, a precautionary approach has been adopted and it has been assumed for the purposes of this assessment that the lesser horseshoe bats recorded within the proposed development site may be connected with the lesser horseshoe bat populations of; Old Domestic Building (Keevagh) SAC, Dromore Woods and Loughs SAC, and Old Domestic Buildings, Rylane SAC.

182 Lighting will also be installed for the proposed development during construction and operation. In absence of mitigation, an increase in the existing light levels within and adjacent to the proposed development site may potentially indirectly impact on lesser horseshoe bat species that utilise the site for foraging and/or commuting by making it unsuitable. Lesser horseshoe bats are the most light sensitive species of bat in Ireland, and therefore any light spill on suitable foraging and commuting habitat within the proposed development has the potential to disturb this species, and negatively impact the conservation objectives of Dromore Woods and Loughs SAC, Old Domestic Buildings (Keevagh) SAC, and Old Domestic Buildings, Rylane SAC.

183 There are three SPAs located in relatively close proximity to the proposed development site which are designated for SCI species that have been identified using the site for foraging, i.e. Ballyallia Lough SPA, the River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. These species include coot, mallard, gadwall, teal and black-headed gull. All of these birds with the exception of black-headed gull, are wader/waterfowl species, and were recording loafing and foraging on the waterbodies within the site (Toureen Lough, wetland in the north and in the east, attenuation pond in the west, and temporary pond feature in the north west). Black-headed gull was not identified landing in the site, but was recorded flying over. All the permanent wetland features suitable for waterfowl/wading bird species are within the ecological protection areas as set out by Clare County Council in the Variation No. 1 (2019). However the temporary pond features in the north of the site, where teal were identified during multiple surveys, will be impacted directly from the proposed development.

184 Initial ground works and site preparation are predicted to produce sound levels of a Slight to Moderate impact[40] and Short-term (see Table 3.3 in Chapter 1 of the EIAR)[4142] with max. noise levels of 56 dB (A) at modelled receptors on site. Following this, construction noise impacts will reduce to Not Significant with max. noise levels predicted at 63 dB (A). Operation noise impacts are predicted to be Negative, Not Significant-Moderate, and Long-Term, with day to day noise levels predicted at max. 35 dB (A), and emergency noise at max. 50 dB (A). However, this is dependent on location, with the noisiest impact predicted in the north east, from the sub-station. The noise impact will be Not Significant in locations near the wetland features (Toureen Lough, attenuation pond, and wetland in the east). Birds are known to habituate regular noise below 70 dB, however sudden irregular noise levels, in excess of 50 dB should be avoided. Therefore, there is potential for the proposed development to result in short-term disturbance/displacement impacts on the SCI populations associated with European sites.

[39] Rush, T., Billington, G. (2014). Galway bat radio-tracking project. Radio tracking studies of lesser horseshoe and vesper bat species, August and September 2014. Greena Ecological Consultancy. Witham Friary, 2014.

[40] Significance of Effects is in accordance with EPA Draft EIA Report Guidelines 2017 and EPA Draft Advice Notes for EIS 2015, with further reference made to the draft '*Guidelines for Noise Impact Assessment*' produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party.

[41] *Chapter 1 – Introduction, ART Data Centre - Ennis Campus EIAR.* AWN Consulting Ltd., February 2022

[42] *Chapter 9 – Noise and Vibration, ART Data Centre - Ennis Campus EIAR*. AWN Consulting Ltd., February 2022

185 Records of hen harrier, an Annex I bird species were returned from the vicinity of the proposed development. Hen harriers have been found to travel up to 9km from nests (Arroyo et al., 2014)[43], and the nearest European site which has been designated is Slieve Aughty Mountains SPA, c. 4.5km from the proposed development. This species is known to breed and forage during the summer months on heather moorland and young forestry plantations where they nest on the ground. They will then spend winter in more coastal and lowland areas throughout Ireland[13]. Therefore, there is potential that hen harriers associated with the Slieve Aughty Mountains SPA may hunt in the vicinity of the proposed development. Dedicated hen harrier vantage point surveys were carried out within the proposed development and no individuals were identified within or in the adjoining lands. Whilst individuals were not identified using the lands during field surveys, suitable wintering roosting and foraging habitat is present in the east of the site. The proposed development is within the winter normal foraging range of hen harriers (Arroyo et al., 2014). However, given the distance between the footprint and the suitable area of wintering roosting and foraging habitat (over 250m away), and as individuals were not identified during surveys carried out within the appropriate survey period, there is no potential for the proposed development to result in disturbance/displacement on SCI populations of hen harrier associated with the Slieve Aughty Mountains SPA.

186 As the proposed development has the potential to result in the disturbance/displacement of qualifying interest species; otter, from the Lower River Shannon SAC and Dromore Woods and Loughs SAC, lesser horseshoe bat from Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Ryland SAC, special conservation interest species; teal, coot, mallard, and gadwall of Ballyallia Lough SPA, teal and black-headed gull of the River Shannon and River Fergus Estuaries SPA, and teal also of Corofin Wetlands SPA. Therefore, there is the potential for in combination effects to also occur.

6.7 Direct injury/mortality

187 The development has been designed so that the buildings will be set into the existing landscape and will be 40m maximum in height, will be screened by various landscaping features including tree and hedgerow planting carried out during the first phases of the development which will have matured by the time the buildings will be established. The development is also not on a known flight path for SCI and wintering bird species, with gull species typical flying height range up to 250m above sea level while foraging and travelling[44]. Given the small numbers of SCI species identified using the proposed development, most of which were located in the west or north west of the site, it is predicted that there is no potential for the proposed development to increase the collision risk to mobile SCI species which are present in the area, during the construction and operational phases. Therefore, there is no potential for the proposed development to result in mortality of SCI bird species associated with European sites.

188 Records of hen harrier, an Annex I bird species were returned from the vicinity of the proposed development. Hen harriers have been found to travel up to 9km from nests (Arroyo et al., 2014), and the nearest European site which has been designated is Slieve Aughty Mountains SPA, c. 4.5km from the proposed development. This species is known to breed on heather moorland and young forestry plantations where they nest on the ground. They will then spend winter in more coastal and lowland areas throughout Ireland[45]. Therefore, there is potential that hen harriers associated with the Slieve Aughty Mountains SPA may hunt and roost in the vicinity of the proposed development. However, dedicated winter hen harrier vantage point surveys were carried out within the proposed development and no individuals were identified within or in the adjoining lands. The proposed development does not require

[43] Arroyo, B., Leckie, F., Amar, A., McCluskie, A., & Redpath, S. (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland, Bird Study, 61:1, 48-55.

[44] Thaxter, C., Ross-Smith, V., & Cook, A. (2015). How high do birds fly? A review of current datasets and an appraisal of current methodologies for collecting flight height data: Literature review. British Trust for Ornithology Research Report No. 666.

[45] Birdwatch Ireland. Hen harrier webpage. Available from: https://birdwatchireland.ie/birds/hen-harrier/

any tall structures to be constructed (maximum height at 40m), and whilst hen harrier do tend to fly at lower altitudes[46], they were not identified within the site, and the only suitable foraging and roosting habitat is located outwith the redline boundary and the footprint of the site. As such there is no potential, for the proposed development to present a collision risk to hunting and/or breeding hen harrier, during the construction and operational phases. Therefore, there is no potential for the proposed development to result in direct injury/mortality impacts on SCI populations of hen harrier associated with the Slieve Aughty Mountains SPA.

189 Lesser horseshoe bat have been identified using the lands within the proposed development site as foraging and/or commuting grounds. No roosts were identified within the site, however records from BCI (as discussed in Section 3.2.4), identified nine lesser horseshoe roosts within 2km of the proposed development site, with the closest being *c*. 430m south. There are 13 SACs designated for lesser horseshoe bat located within c. 15km of the proposed development site, the nearest of which is Old Domestic Building (Keevagh) SAC, located c. 4.3km south east. It is considered likely that this distance of c. 4.3km is within the normal core foraging range and the normal commuting range of this species. Research carried out on this species has suggested that the majority of feeding activity takes place within c. 2-3km of roosts during the year with occasional movements in excess of c. 4km (Bontadina, 2002 and Biggane, 2003). This distance can reduce down to a few hundred metres in the birthing season, with research carried out in Galway on radio-tracked lesser horseshoe bats, this species has been shown to travel as far as c.5.15km from roosts for foraging (Rush and Billington, 2014). Larger scale movements of up to c. 15km are not unreasonable when bats move between winter and summer roosts. As construction works will largely be undertaken during the day, it is unlikely an increase in construction related vehicles and machinery during construction would present a significant injury/mortality risk that would result in any population level effects. During operation, traffic will be very limited and largely during daytime hours. Therefore, there is no potential for the proposed development to result in significant effects which could have implications for the conservation objectives of Old Domestic Buildings (Keevagh) SAC, Old Domestic Building, Rylane SAC and Dromore Woods and Loughs SAC as a result of direct injury/mortality impacts to lesser horseshoe bats.

190 Otter, which may be associated with the QI population of the Lower River Shannon SAC and Dromore Woods and Loughs SAC have been recorded in the vicinity of the proposed development. The proposed works will involve the installation of a headwall and mattress, with a grated culvert for the services and fibre duct layouts, along the bank of the Spancelhill Stream in the west of the site. This installation will be very temporary in nature (2-3 weeks), and there are no other works proposed within the stream. Otters are primarily nocturnal animals, and as works will be undertaken during daytime hours, it is unlikely that an increase in construction related vehicles and machinery during construction would present a significant injury/mortality risk to otters. Therefore, there is no potential for the proposed development to result in significant effects which could have implications for the conservation objectives of Lower River Shannon SAC and Dromore Woods and Loughs SAC as a result of direct injury/mortality impacts.

6.8 Summary

191 The potential impacts associated with the proposed development have the potential to affect the receiving environment and, as a result, the conservation objectives supporting the qualifying interest/special conservation interests of eight European sites: Dromore Woods and Loughs SAC, Lower River Shannon SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA. Other European sites within the vicinity of the proposed development have been ruled out due to the following reasons;

[46] Madders, M. and Whitfield, D. P. (2006). Upland raptors and the assessment of wind farm impacts. *Ibis*, *148*, 43-56.

- The proposed development is down-gradient of European sites (Dromore Woods and Loughs SAC, Ballyallia Lake SAC, Ballycullinan Lake SAC, Moyree River System SAC, Ballyogan Lough SAC, and the East Burren Complex SAC) and therefore there is no potential for hydrological impacts or the risk of spread of invasive species from the proposed development site to affect the conservation objectives of these habitats within these European sites.
- European sites designated for lesser horseshoe bats further than 6km from the proposed development site have been ruled out due to the reasons described in Section 3.3.1.
- The next nearest SPA to the proposed development is c. 22km north (Coole-Garryland SPA), and is considered too great a distance to be impacted by the proposed development. All other SPAs are located a greater distance away, and therefore are also located at a distance too great to be impacted from the proposed development.

192 As the proposed development itself is likely to affect the QIs/SCIs or conservation objectives of European sites, there is also the potential for other plans or projects to act in combination with it to result in significant effects on European sites.

193 The potential impacts of the proposed development on the receiving environment, their zone of influence, and the European sites at risk of likely significant effects are summarised in Table below.

Table 7 *Summary of the potential impacts of the proposed development on the receiving environment, their potential zone of influence, and the European sites within the zone of influence*

Potential Direct or Indirect Impacts and zone of influence of the Potential Effects	**Are there any European sites within the zone of influence?**
Habitat loss and fragmentation No European sites are at risk of direct habitat loss impacts. There is potential for loss of *ex situ* inland feeding sites used by SCI wintering bird species within the proposed development site development (*i.e.* Toureen Lough, M18 Attenuation Lake, and temporary ponds in the north west), and QI species lesser horseshoe bat.	Yes There are no European sites at risk of direct habitat loss impacts associated with the Proposed development. There are European sites at risk of *ex situ* habitat loss impacts associated with the Proposed development, namely: Lower River Shannon SAC, Dromore Woods and Loughs SAC, Old Domestic Buildings (Keevagh) SAC, Old Domestic Building, Rylane SAC, River Fergus and River Shannon Estuaries SPA.
Habitat degradation/effects on QI/SCI species as a result of hydrological impacts Habitats and species downstream of the proposed development site and the associated surface water drainage discharge points, and downstream of offsite wastewater treatment plants.	Yes There are European sites at risk of hydrological effects associated with the Proposed development, namely: Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA. There is also potential for impact on QI otter species associated with Dromore Woods and Loughs SAC.
Habitat degradation as a result of hydrogeological impacts Groundwater dependant habitats, and the species those habitats support, in the local area that lie downgradient of the proposed development site.	No There are no European sites at risk of hydrogeological effects associated with the Proposed development.

Habitat degradation as a result of introducing/spreading non-native invasive species Habitat areas within, adjacent to, and potentially downstream of the proposed development site.	Yes There are no non-native invasive species present on the proposed development site however, accidental introduction of non-native species could occur during construction therefore, there is a risk associated with the proposed development to any European sites downstream from the spread/introduction of non-native invasive species including; Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA
Habitat degradation as a result of air quality impacts Potentially up to 200m from the Proposed development boundary.	No There are no European sites at risk of air quality effects associated with the Proposed development.
Disturbance and displacement impacts Potentially up to several hundred metres from the proposed development boundary, dependent upon the predicted levels of noise, vibration and visual disturbance associated with the proposed development, in conjunction with the sensitivity of the qualifying interest species to disturbance effects	Yes. There are no European sites within the potential zone of influence of disturbance effects associated with the construction or operation of the Proposed development. However, there are *ex situ* inland feeding sites which are utilised by SCI wintering bird species within the proposed development (*i.e.* Toureen Lough, M18 Attenuation Lake, and temporary ponds in the north west) and within the potential disturbance ZoI of the proposed development. These are associated with the sites: Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Corofin Wetlands SPA and the Slieve Aughty Mountains SPA. Lesser horseshoe bat is a QI species of Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, and Old Domestic Building, Rylane, for which there is potential for construction impacts from the proposed development.
Direct injury/mortality impacts	No There are no QI or SCI species associated with European sites at

Potential for injury/mortality of mobile QI/SCI species as a result of collision with structures or machinery during construction and operation	risk of mortality associated with the Proposed development.

7 Assessment of Effects on European Sites

194 This section of the NIS assesses the direct and indirect impacts of the proposed development on the European sites which fall within its zone of influence. For each of these European sites, the assessment below sets out the relevant ecological baseline information, the analysis of the potential impacts, the qualifying interests/special conservation interests at risk of these potential impacts, in view of the sites' conservation objectives, and the mitigation measures (if required) to avoid/reduce the effects of any potential impacts.

195 The assessment of the proposed development in combination with any other plans or projects on European sites is presented in Section 8.

7.1 Lower River Shannon SAC [002165]

7.1.1 Ecological Baseline Description for Lower River Shannon SAC

196 The Natura 2000 Standard Data Form (NPWS, 2018) lists the SAC has having many Annex I habitats, including the most extensive area of estuarine habitat in Ireland. A range of Annex II species are also present including the only known resident population of bottlenose dolphin *Tursiops truncates* in Ireland, all three species of lamprey, and populations of Atlantic salmon *Salmo salar*. A number of birds listed on the EU Birds Directive either winter or breed in the site. The site is internationally important for waterfowl with more than 50,000 individuals occurring in winter. Several species listed in the Irish Red Data Book are present, perhaps most notably the only known Irish populations of *Scirpus triqueter*. Threats to the site include reclamation of land, flood relief works, gravel extraction, the spread of cord-grass *Spartina* sp., and industrial development resulting in water polluting operations.

7.1.2 Qualifying Interests and Conservation Objectives of Lower River Shannon SAC

197 The qualifying interests of Lower River Shannon SAC, and the overall conservation objective, are listed below in Table 8.

Table 8 *Qualifying Interests and Conservation Objectives of Lower River Shannon SAC*

Qualifying Interest(s)	Conservation Objective(s)
1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1150 Coastal lagoons 1160 Large shallow inlets and bays 1170 Reefs 1220 Perennial vegetation of stony banks 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 1310 *Salicornia* and other annuals colonising mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected

Qualifying Interest(s)	Conservation Objective(s)
91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) 1029 *Margaritifera margaritifera* (Freshwater Pearl Mussel) 1095 *Petromyzon marinus* (Sea Lamprey) 1096 *Lampetra planeri* (Brook Lamprey) 1099 *Lampetra fluviatilis* (River Lamprey) 1106 *Salmo salar* (Salmon) 1349 *Tursiops truncatus* (Common Bottlenose Dolphin) 1355 *Lutra lutra* (Otter) NPWS (2012) Conservation objectives for Lower River Shannon SAC [002165]. Version 1.0. Department of Culture, Heritage and the Gaeltacht.	

198 In conjunction with considering the generic conservation objective for this SAC "To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected", the site specific conservation objectives document for Lower River Shannon SAC also informed this assessment.

199 The site specific conservation objectives document sets out the attributes, measures and targets that define the favourable conservation condition of the qualifying interests within the European site. Affecting the conservation condition of the qualifying interests/special conservation interests is deemed to constitute an adverse effect on the integrity of a European site. The specific attributes and targets used to define the conservation objectives of the qualifying interests of Lower River Shannon SAC are presented in Section 7.1.3, Table 9.

7.1.3 Examination and Analysis of Potential Direct and Indirect Impacts

200 The direct and/or indirect impacts by which the proposed development could (in the absence of mitigation measures) potentially affect the conservation objective attributes and targets supporting the conservation condition of the qualifying interests of Lower River Shannon SAC, are:

- Habitat loss and fragmentation
- Habitat degradation/effects on QI species as a result of hydrological impacts
- Disturbance and displacement impacts
- Habitat degradation as a result of introducing/spreading non-native invasive species

7.1.3.1 Habitat loss and fragmentation

201 Otter are a QI species for Lower River Shannon SAC, which is downstream of the proposed development. Research carried out by Ó Néill et al. (2008) on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged *c.* 7.5km while male otter home ranges varied between *c.* 7-19km. Evidence of otter was identified within the proposed development site along Spancelhill Stream. As there is a hydrological connection between the proposed development and the European site (located *c.* 2.1km downstream), it is considered that the proposed development site is within the potential home range of otter associated with the Lower River Shannon SAC and, therefore, otter present within Spancellhill Stream at this location may be connected with this SAC population. Construction works within the Spancelhill Stream will include the installation of a grated culvert with associated headwall and mattress, with a total loss of 2m^3 of bankside habitat. This habitat loss is considered to be temporary (2-3 weeks), and will be reinstated following completion of this. The total area of this installation will be 2m^3. Therefore, the predicted habitat loss impact will not have any long-term effects on the QI otter population in terms of distribution/range, extent of available habitat, couch/holt sites, and barriers to connectivity. Therefore the

impact on otter populations connected to the Lower River Shannon SAC as a result of direct habitat loss/fragmentation, is not considered to be significant.

202 The installation of this culvert, headwall and mattress, may require instream works. As the section of the Spancelhill Stream where works will be required has suitable habitat for lamprey species, there is potential for the proposed development to directly impact these QI species, i.e. brook lamprey, river lamprey, and sea lamprey.

203 Indirect habitat loss as a consequence of severe habitat degradation arising from a reduction in water quality and/or change to the hydrological regime, could also affect the conservation status of the Lower River Shannon QI species, including: otter, sea lamprey, river lamprey, brook lamprey, Atlantic salmon and common bottlenose dolphin from the Lower River Shannon SAC.

7.1.3.2 Habitat degradation/effects on QI/SCI species as a result of hydrological impacts

204 The release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and the accidental spillage and/or leaks of containments (*e.g.* fuel, oils, lubricants, paints, bituminous coatings, preservatives, weed killer, lime and concrete) into receiving waters. The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge. The proposed development is hydrologically connected to the Spancelhill Stream and the River Fergus both of which discharge into the Fergus Estuary. Therefore, (albeit unlikely due to the distance between the main construction activities and watercourses) there is potential for the proposed development to result in effects which could have implications for the conservation objectives of Lower River Shannon SAC as a result of hydrological impacts.

7.1.3.3 Disturbance and displacement impacts

205 A temporary and/or permanent increase in noise, vibration and/or human activity levels during the construction and/or operation of the proposed development could result in the disturbance to and/or displacement of QI otter populations present in the vicinity of the proposed development. Such disturbance effects would not be expected to extend beyond a distance of *c.* 150m[47] for the majority of the proposed development, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond. Noisy works associated with the proposed development could include piling works between c. 150-200m away from watercourses known to support otter. These potential impacts could occur to such a degree that the conservation objectives of the Lower River Shannon SAC are undermined. As the works are planned during the day, levels of noise would not be expected to be dissimilar to background traffic noise, to which the mostly nocturnal otter would be habituated to from the M18 Motorway directly west of the site. If works were required at night time, however, an increase in noise levels in close proximity to watercourses used by otter could result in disturbance impacting otter movements. Furthermore, temporary works that will be occurring adjacent to Spancelhill Stream for the construction of services pipes for drainage and fibre optics, and the installation of a headwall and mattress with culvert, could also result in disturbance. It is predicted that the disturbance could affect the local population over the short term, but that the local otter population could utilise other

[47] This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

unaffected suitable habitat along the watercourse during this temporary period. This is not uncommon among otter who can maintain a number of resting sites within their territory[48].

206 The temporary works required in the bank of Spancelhill Stream, may also result in a disturbance and/or displacement of lamprey species in the watercourse, that are from the Lower River Shannon SAC. Lamprey species may utilise the soft, silty substrate within this section of the Stream for burrowing into, and therefore any instream works required may temporarily impact the conservation objectives of this QI species.

207 Therefore, there is potential for the proposed development to result in significant effects (albeit temporary) which could have implications for the conservation objectives of Lower River Shannon SAC as a result of disturbance/displacement impacts.

7.1.3.4 Habitat degradation as a result of introducing/spreading non-native invasive species

208 No non-native invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were present within, or in close proximity to, the proposed development. During construction and/or routine maintenance/management work, non-native species could potentially be introduced to terrestrial habitats located within downstream European sites via surface water features. The introduction and/or spread of these invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat. This in turn could undermine the conservation objectives of these European sites. The proposed development is hydrologically connected to the Spancelhill Stream, River Fergus, both of which flow into the Fergus Estuary. Therefore, there is potential for the proposed development to result in significant effects which could have implications for the conservation objectives of the Lower River Shannon SAC as a result of invasive species spread.

7.1.4 Summary

209 Table 9 below presents a summary of the potential impacts of the proposed development on the qualifying interests of Lower River Shannon SAC, and how these impacts relate to affecting the site's conservation objectives.

[48] Species Profiles: Otter. Vincent Wildlife Trust (VWT). Accessed here: https://www.vincentwildlife.ie/species/otter

Table 9 Potential Impacts/Effects on the Conservation Objectives of Lower River Shannon SAC

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Lower River Shannon SAC			
Sandbanks which are slightly covered by sea water all the time [1110] To maintain the favourable conservation condition of Sandbanks which are slightly covered by sea water all the time in the Lower River Shannon SAC, which is defined as follows:			
Habitat distribution / Occurrence / The distribution of sandbanks is stable, subject to natural processes.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its habitat area or habitat distribution. This habitat is located in the Mouth of the Shannon coastal waterbody (NPWS, 2012), *c.* 65km west of the proposed development site.	No	No
Habitat area / Hectares / The permanent habitat area is stable or increasing, subject to natural processes		No	No
Community distribution / Hectares / Conserve the following community type in a natural condition: Subtidal sand to mixed sediment with *Nephtys* spp. community complex.	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, an accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to protect water quality in the receiving environment will ensure that surface water quality in Spancelhill Stream, the River Fergus, and the Fergus Estuary is protected during construction and operation of the proposed development. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Estuaries [1130] To maintain the favourable conservation condition of Estuaries in the Lower River Shannon SAC, which is defined as follows:			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat area / Hectares / The permanent habitat area is stable or increasing, subject to natural processes	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on area of the habitat.	No	No
Community distribution / Hectares / Conserve the following community types in a natural condition: Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Estuarine subtidal muddy sand to mixed sediment with gammarids community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Fucoid-dominated intertidal reef community complex; Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to protect water quality in the receiving environment will ensure that surface water quality in Spancelhill Stream, River Fergus, and the Fergus Estuary is protected during construction and operation of the proposed development. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Mudflats and sandflats not covered by seawater at low tide [1140] To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in the Lower River Shannon SAC, w which is defined as follows:			
Habitat area / Hectares / The permanent habitat area is stable or increasing, subject to natural processes.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on area of the habitat.	No	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Community distribution / Hectares / Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex.	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to protect water quality in the receiving environment will ensure that surface water quality in the Spancelhill Stream, River Fergus, and the Fergus Estuary is protected during construction and operation of the proposed development. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Coastal Lagoons [1150] To restore the favourable conservation condition of Coastal lagoons in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Hectares / Area stable or increasing, subject to natural processes. Favourable reference area 33.4ha- Shannon Airport Lagoon 24.2ha; Cloonconeen Pool 3.9ha; Scattery Lagoon 2.8ha; Quayfield and Poulaweala Loughs 2.5ha.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its habitat area, habitat distribution or hydrological structure. The nearest example of this habitat located downstream of the proposed development site is the Shannon Airport Lagoon (NPWS, 2012), *c.* 20km south of the proposed development.	No	No
Habitat distribution / Occurrence / No decline, subject to natural processes			
Salinity regime / practical salinity units (psu) / Median annual salinity and temporal variation within natural ranges.			
Hydrological regime / Metres / Annual water level fluctuations and minima within natural ranges.			
Barrier: connectivity between lagoon and sea / Permeability / Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Water quality: chlorophyll a / µg/L / Annual median chlorophyll a within natural ranges and less than 5µg/L	Yes Although it is considered to be very unlikely due to the distance between the proposed development site and this QI habitat, an accidental pollution event during construction or operation of a sufficient magnitude and/or an increase in the concentration of hydrocarbons in runoff during operation could potentially result in a reduction in water quality at the QI habitat and in turn negatively affect the water chemistry and vegetation/faunal composition of this QI habitat. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	Yes The mitigation measures described in Section 7.1.5 to protect water quality in the receiving environment will ensure that surface water quality in the Spancelhill Stream, River Fergus, and the Fergus Estuary is protected during construction and operation of the proposed development. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Water quality: Molybdate Reactive Phosphorus (MRP) / mg/L / Annual median MRP within natural ranges and less than 0.1mg/L			
Water quality: Dissolved Inorganic Nitrogen (DIN) / mg/L / Annual median DIN within natural ranges and less than 0.15mg/L			
Depth of macrophyte colonisation / Metres / Macrophyte colonisation to maximum depth of lagoons			
Typical plant species / number and m² / Maintain number and extent of listed lagoonal specialists, subject to natural variation			
Typical animal species / number / Maintain listed lagoon specialists, subject to natural variation			
Negative indicator species / Number and % cover / Negative indicator species absent or under control			
Large shallow inlets and bays [1160] To maintain the favourable conservation condition of Large shallow inlets and bays in the Lower River Shannon SAC which is defined as follows:			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat area / Hectares / The permanent habitat area stable or increasing, subject to natural processes.	No Works are not taking place within or adjacent to this habitat, which is located *c.* 47km south west of the proposed development site (NPWS, 2012), therefore there will be no impact on the area of the habitat.	No	No
Community distribution / Hectares / Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex.	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Reefs [1170] To maintain the favourable conservation condition of Reefs in the Lower River Shannon SAC, which is defined as follows:			
Habitat distribution / Occurrence / The distribution of Reefs is stable, subject to natural processes	No Works are not taking place within or adjacent to this habitat therefore there	No	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat area / Hectares / The permanent habitat area stable, subject to natural processes.	will be no impact on its distribution or area. The nearest example of this habitat located downstream of the proposed development site is *c.* 9km south of the proposed development (NPWS, 2012).		
Community distribution / Hectares / Conserve the following reef community types in a natural condition: Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, an accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Perennial vegetation of stony banks [1220] To maintain the favourable conservation condition of Perennial vegetation of stony banks in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Hectares / Area stable or increasing, subject to natural processes, including erosion and succession	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution or physical structure. The nearest known example of this habitat located is *c.* 43km south west of the proposed development site at Ballymacrinan Bay (NPWS, 2012).	No	No
Habitat distribution / Occurrence / No decline, or change in habitat distribution, subject to natural processes			
Physical structure: functionality sediment supply / Presence/ absence of physical barriers / Maintain natural circulation of sediments and organic matter, without any physical obstructions			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Vegetation structure: zonation / Occurrence / Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Vegetation composition: typical species and sub-communities / Percentage cover at a representative sample of monitoring stops / Maintain the typical vegetated shingle flora including the range of sub- communities within the different zones			
Vegetation composition: negative indicator species / Percentage cover / Negative indicator species (including non-native species) to represent less than 5% cover			
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] To maintain the favourable conservation condition of Vegetated sea cliffs in the Lower River Shannon SAC, which is defined as follows:			
Habitat length / Kilometres / Area stable or increasing, subject to natural processes, including erosion. For sub- sites mapped: Kilbaha- 4.1km; Ladder Rock- 1.0km; Moyarta- 0.9km; Lisheencrony- 1.1km; Burrane- 0.2km; Kerry Head- 33.4km; Ballybunion- 15.6km; Kilclogher- 4.9km; Loop Head- 6.1km.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution	No	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat distribution / Occurrence / No decline, subject to natural processes.	or physical structure. The nearest known example of this habitat located within the SAC is *c.* 39km south west of the proposed development site at Burrane (NPWS, 2012).		
Physical structure: functionality and hydrological regime / Occurrence of artificial barriers / No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures.			
Vegetation structure: zonation / Occurrence / Maintain the range sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession.	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Vegetation structure: vegetation height / Centimetres / Maintain structural variation within sward			
Vegetation composition: typical species and sub-communities / Percentage cover at a representative sample of monitoring stops / Maintain range of sub- communities with typical species listed in the Irish Sea cliff survey (Barron et al., 2011)			
Vegetation composition: negative indicator species / Percentage / Negative indicator species (including non-natives) to represent less than 5% cover			
Vegetation composition: bracken and woody species / Percentage / Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%			
Salicornia and other annuals colonising mud and sand [1310] To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Hectares / Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle - 0.005ha; Inishdea, Owenshere - 0.003ha; Knock - 0.029ha; Querin - 0.185ha; Rinevilla Bay - 0.001ha.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution or physical structure.	No	No
Habitat distribution / Occurrence / No decline, or change in habitat distribution, subject to natural processes			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Physical structure: sediment supply / Presence/ absence of physical barriers / Maintain natural circulation of sediments and organic matter, without any physical obstructions			
Physical structure: creeks and pans / Occurrence / Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession			
Physical structure: flooding regime / Hectares flooded; frequency / Maintain natural tidal regime			
Vegetation structure: zonation / Occurrence / Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Vegetation structure: vegetation height / Centimetres / Maintain structural variation within the sward			
Vegetation structure: vegetation cover / Percentage cover at a representative sample of monitoring stops / Maintain more than 90% of area outside creeks vegetated			
Vegetation composition: typical species and sub-communities / Percentage cover / Maintain the presence of species-poor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)			
Vegetation structure: negative indicator species- *Spartina anglica* / Hectares / No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in the Lower River Shannon SAC,which is defined as follows:			
Habitat area / Hectares / Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 6.774ha; Barrigone, Aughinish- 10.288ha; Beagh- 0.517ha; Bunratty- 26.939ha; Shepperton, Fergus Estuary- 37.925ha; Inishdea, Owenshere- 18.127ha; Killadysert, Inishcorker- 2.604ha; Knock- 0.576ha; Querin- 3.726ha; Rinevilla Bay- 11.883ha.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution or physical structure. The nearest known example of this habitat located within the SAC is c. 7km south of the proposed development site (NPWS, 2012).	No	No
Habitat distribution / Occurrence / No decline or change in habitat distribution, subject to natural processes			
Physical structure: sediment supply / Presence/ absence of physical barriers / Maintain natural circulation of sediments and organic matter, without any physical obstructions			
Physical structure: creeks and pans / Occurrence / Maintain creek and pan structure, subject to natural processes, including erosion and succession			
Physical structure: flooding regime / Hectares flooded; frequency / Maintain natural tidal regime			
Vegetation structure: zonation / Occurrence / Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition)	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Vegetation structure: vegetation height / Centimeters / Maintain structural variation within sward			
Vegetation structure: vegetation cover / Percentage cover at a representative sample of monitoring stops / Maintain more than 90% of the saltmarsh area vegetated			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Vegetation composition: typical species and sub-communities / Percentage cover at a representative sample of monitoring stops / Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	
Vegetation structure: negative indicator species- *Spartina anglica* / Hectares / No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%			
Mediterranean salt meadows (*Juncetalia maritimi*) [1410] To restore the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in the Lower River Shannon SAC,which is defined as follows:			
Habitat area / Hectares / Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 4.193ha; Barrigone, Aughinish- 2.407ha; Bunratty- 0.865ha; Inishdea, Owenshere- 11.609ha; Killadysert, Inishcorker- 0.705ha; Knock- 0.143ha, Querin- 0.008ha; Rinevilla Bay- 2.449ha.	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution or physical structure. The nearest known example of this habitat located within the SAC is *c.* 14km south west of the proposed development site at Ballycorick Creek (NPWS, 2012).	No	No
Habitat distribution / Occurrence / No decline, or change in habitat distribution, subject to natural processes.			
Physical structure: sediment supply / Presence/absence of physical barriers / Maintain natural circulation of sediments and organic matter, without any physical obstructions			
Physical structure: creeks and pans / Occurrence / Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession			
Physical structure: flooding regime / Hectares flooded; frequency / Maintain natural tidal regime			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Vegetation structure: zonation / Occurrence / Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Vegetation structure: vegetation height / Centimetres / Maintain structural variation within sward			
Vegetation structure: vegetation cover / Percentage cover at a representative sample of monitoring stops / Maintain more than 90% of area outside creeks vegetated			
Vegetation composition: typical species / Percentage cover / Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)			
Vegetation structure: negative indicator species - *Spartina anglica* / Hectares / No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%			
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Kilometres / Area stable or increasing, subject to natural processes.	No Works are not taking place within or adjacent to this habitat therefore there	No	No
Habitat distribution / Occurrence / No decline, subject to natural processes			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Hydrological regime: river flow / Metres per second / Maintain appropriate hydrological regimes	will be no impact on its area, distribution, hydrological regimes or physical structure. The nearest known example of this habitat located within the SAC is *c.* 20km south east of the proposed development site on the Owenogarney River (NPWS, 2012).		
Hydrological regime: tidal influence / Daily water level fluctuations - metres / Maintain natural tidal regime			
Hydrological regime: freshwater seepages / Metres per second / Maintain appropriate freshwater seepage regimes			
Substratum composition: particle size range / Millimetres / The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)			
Water quality: nutrients / Milligrammes per litre / The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	No
Vegetation composition: typical species / Occurrence / Typical species of the relevant habitat sub-type should be present and in good condition			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Floodplain connectivity / Area / The area of active floodplain at and upstream of the habitat should be maintained	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution, hydrological regimes or physical structure. The nearest known example of this habitat located within the SAC is *c.* 20km south east of the proposed development site on the Owenogarney River (NPWS, 2012).	No	No
Riparian habitat / Area / The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained			
***Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]** To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt laden soils (Molinion caeruleae) in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Hectares / Area stable or increasing, subject to natural processes, including erosion and succession	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution, hydrological regimes or physical structure.	No	No
Habitat distribution / Occurrence / No decline, or change in habitat distribution, subject to natural processes			
Vegetation structure: broadleaf herb: grass ratio / Percentage / Broadleaf herb component of vegetation between 40 and 90%	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition)	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Vegetation structure: sward height / Percentage / 30-70% of sward between 10 and 80cm high			
Vegetation composition: typical species / Number / At least 7 positive indicator species present, including 1 "high quality" species			
Vegetation composition: notable species / Number / No decline, subject to natural processes			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Vegetation composition: negative indicator species / Percentage / Negative indicator species collectively not more than 20% cover, with cover by an individual species less than 10%. Non-native invasive species, absent or under control	and area/distribution of intertidal/coastal habitats. The nearest known location of this Annex I habitat within the SAC is on the eastern bank of the River Shannon north of Castleconnell in Co. Limerick, c. 27km south east of the proposed development site (NPWS, 2012). This site is located within a different groundwater body to that of the proposed development site. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	
Vegetation composition: negative indicator moss species / Percentage / Bog mosses (Sphagnum spp.) not more than 10% cover; hair mosses (Polytrichum spp.) not more than 25% cove			
Vegetation structure: woody species and bracken (*Pteridium aquilinu*m) / Percentage / Cover of woody species and bracken not more than 5% cover			
Physical structure: bare ground / Percentage / Not more than 10% bare ground	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution, hydrological regimes or physical structure.	No	No
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*) in the Lower River Shannon SAC, which is defined as follows:			
Habitat area / Hectares / Area stable or increasing, subject to natural processes, at least c.8.5ha for sites surveyed.	No	No	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat distribution / Occurrence / No decline.	Works are not taking place within or adjacent to this habitat therefore there will be no impact on its area, distribution, hydrological regimes or physical structure. The nearest known example of this habitat located within the SAC is *c.* 32km south east of the propose development site on the River Shannon (NPWS, 2012).		
Woodland size / Hectares / Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Woodland structure: cover and height / Percentage and metres / Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi- mature trees and shrubs; and well-developed herb layer			
Woodland structure: community diversity and extent / Hectares / Maintain diversity and extent of community types			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Woodland structure: natural regeneration / Seedling: sapling: pole ratio / Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	
Hydrological regime: flooding depth/height of water table / Metres / Appropriate hydrological regime necessary for maintenance of alluvial vegetation	No Works are not taking place within or adjacent to this habitat therefore there will be no impact on hydrological regime required to maintain the habitat or degree of dead wood present within the habitat.	No	No
Woodland structure: dead wood / m^3 per hectare; number per hectare / At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)			
Woodland structure: veteran trees / Number per hectare / No decline	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and this QI habitat, an accidental pollution event during construction or operation could	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the	No
Woodland structure: indicators of local distinctiveness / Occurrence / No decline			
Vegetation composition: native tree cover / Percentage / No decline. Native tree cover not less than 95%			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Vegetation composition: typical species / Occurrence / A variety of typical native species present, depending on woodland type, including alder (Alnus glutinosa), willows (Salix spp) and, locally, oak (Quercus robur) and ash (Fraxinus excelsior)	affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats. The introduction and/or spread of invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat.	receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 will prevent the introduction and/or spread of invasive species to downstream European sites during construction	
Vegetation composition: negative indicator species / Occurrence / Negative indicator species, particularly non-native invasive species, absent or under control			
***Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]** To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined as follows:			
Distribution / Kilometres / Maintain at 7km	No The freshwater pearl mussel population of the Lower River Shannon SAC is located in the Cloon River, which is located in a different river catchment to that of the proposed development, *c.* 27km south west of the proposed development (NPWS, 2012); therefore there is no potential for impacts on freshwater pearl	No	No
Population size / Number of adult mussels / Restore to 10,000 adult mussels			
Population structure: recruitment / Percentage per size class / Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length			
Population structure: adult mortality / Percentage / No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Habitat extent / Kilometres / Restore suitable habitat in more than 3.3km (see map 15) and any additional stretches necessary for salmonid spawning	mussel arising from the proposed development.		
Water quality: macroinvertebrate and phytobenthos (diatoms) / Ecological quality ratio (EQR) / Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93			
Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants) / Percentage / Restore substratum quality- filamentous algae: absent or trace (<5%)			
Substratum quality: sediment / Occurrence / Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment			
Substratum quality: oxygen availability / Redox potential / Restore to no more than 20% decline from water column to 5cm depth in substrate			
Hydrological regime: flow variability / Metres per second / Restore appropriate hydrological regimes			
Host fish / Number / Maintain sufficient juvenile salmonids to host glochidial larvae			
***Petromyzon marinus* (Sea Lamprey) [1095** To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC, which is defined as follows:			
Distribution: extent of anadromy / % of river accessible / Greater than 75% of main stem length of rivers accessible from estuary	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition)	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Population structure of juveniles / Number of age/size groups / At least three age/size groups present			
Juvenile density in fine sediment / Juveniles/m² / Juvenile density at least 1/m²			
Extent and distribution of spawning habitat / m² and occurrence / No decline in extent and distribution of spawning beds			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Availability of juvenile habitat / Number of positive sites in 3rd order channels (and greater), downstream of spawning areas / More than 50% of sample sites positive	and area/distribution of intertidal/coastal habitats. Direct habitat loss as a result of the installation of culvert, headwall and mattress for the surface water drainage pipes could result in significant effects of this QI species in the Spancelhill Stream.	associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.5.1 to ensure lamprey species within the Spancelhill Stream are protected during construction of the surface water drainage outfall pipes and associated culvert, will be implemented to prevent lamprey species from the Lower River Shannon SAC from impacts of the proposed development.	
***Lampetra planeri* (Brook Lamprey) [1096]** To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC, which is defined as follows:			
Distribution / % of river accessible / Access to all water courses down to first order streams	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition)	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Population structure of juveniles / Number of age/size groups / At least three age/size groups of brook/river lamprey present			
Juvenile density in fine sediment / Juveniles/m² / Mean catchment juvenile density of brook/river lamprey at least 2/m²			
Extent and distribution of spawning habitat / m² and occurrence / No decline in extent and distribution of spawning beds			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Availability of juvenile habitat / Number of positive sites in 2nd order channels (and greater), downstream of spawning areas / More than 50% of sample sites positive	and area/distribution of intertidal/coastal habitats. Direct habitat loss as a result of the installation of culvert, headwall and mattress for the surface water drainage pipes could result in significant effects of this QI species in the Spancelhill Stream.	associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.5.1 to ensure lamprey species within the Spancelhill Stream are protected during construction of the surface water drainage outfall pipes and associated culvert, will be implemented to prevent lamprey species from the Lower River Shannon SAC from impacts of the proposed development.	
***Lampetra fluviatilis* (River Lamprey) [1099]** To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC, which is defined as follows:			
Distribution / % of river accessible / Access to all water courses down to first order streams	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition)	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on	No
Population structure of juveniles / Number of age/size groups / At least three age/size groups of river/brook lamprey present			
Juvenile density in fine sediment / Juveniles/m² / Mean catchment juvenile density of river/brook lamprey at least 2/m²			
Extent and distribution of spawning habitat / m² and occurrence / No decline in extent and distribution of spawning beds			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Availability of juvenile habitat / Number of positive sites in 2nd order channels (and greater), downstream of spawning areas / More than 50% of sample sites positive	and area/distribution of intertidal/coastal habitats. Direct habitat loss as a result of the installation of culvert, headwall and mattress for the surface water drainage pipes could result in significant effects of this QI species in the Spancelhill Stream.	associated habitats in the Lower River Shannon SAC are avoided. The mitigation measures described in Section 7.5.1 to ensure lamprey species within the Spancelhill Stream are protected during construction of the surface water drainage outfall pipes and associated culvert, will be implemented to prevent lamprey species from the Lower River Shannon SAC from impacts of the proposed development.	
***Salmo salar* (Atlantic Salmon) [1106]** To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined as follows:			
Distribution: extent of anadromy / % of river accessible / 100% of river channels down to second order accessible from estuary	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided	No
Adult spawning fish / Number/ Conservation Limit (CL) for each system consistently exceeded			
Salmon fry abundance / Number of fry/5 minutes electrofishing / Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling			
Out-migrating smolt abundance / Number / No significant decline			
Number and distribution of redds / Number and occurrence / No decline in number and distribution of spawning redds due to anthropogenic causes			
Water quality / EPA Q value / At least Q4 at all sites sampled by EPA			
***Tursiops truncatus* (Common Bottlenose Dolphin) [1349]** To maintain the favourable conservation condition of Bottlenose Dolphin in the Lower River Shannon SAC, which is defined as follows:			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Access to suitable habitat / Number of artificial barriers / Species range within the site should not be restricted by artificial barriers to site use.	No The proposed development site is not located on or near suitable habitat for this QI species. The nearest critical habitat is located *c.* 38km south west of the proposed development site, while other suitable habitat is located *c.* 11.6km south west of the site (NPWS, 2012).	No	No
Habitat use: critical areas / Location and hectares / Critical areas, representing habitat used preferentially by bottlenose dolphin, should be maintained in a natural condition.	Yes Although it is considered to be extremely unlikely due to the distance between the proposed development site and the nearest critical area, an accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided	No
Disturbance / Level of impact / Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	No The proposed development site is not located on or near suitable habitat for this QI species. The nearest critical habitat is located *c.* 38km south west of the proposed development site, while other suitable habitat is located *c.* 11.6km south west of the site (NPWS, 2012).	No	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
***Lutra lutra* (Otter) [1355]** To restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined as follows:			
Distribution / Percentage positive survey sites / No significant decline	Yes Potential indirect impacts on this QI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary (*i.e. c.* two weeks in duration), and relatively insignificant. In consideration of these points, potential impacts on this QI species as a result of habitat loss is considered to be not significant. An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided The mitigation measures described in Section 7.1.5 to manage a range of potential disturbance risks will avoid any long-term potential impacts to the QI otter population.	No
Extent of terrestrial habitat / Hectares / No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	No Works are not taking place within the SAC therefore there will be no impact on its extent of terrestrial, marine or freshwater habitat or couching sites and holts.	No	No
Extent of marine habitat / Hectares / No significant decline. Area mapped and calculated as 4,461.6ha			
Extent of freshwater (river) habitat / Kilometers / No significant decline. Length mapped and calculated as 500.1km			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Extent of freshwater (lake/lagoon) habitat / Hectares / No significant decline. Area mapped and calculated as 125.6ha			
Couching sites and holts / Number / No significant decline			
Fish biomass available / Kilograms / No significant decline	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either along or cumulatively with other pollution sources, could potentially affect the quality (vegetation structure and composition) and area/distribution of intertidal/coastal habitats.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided	No
Barriers to connectivity / Number / No significant increase	No Works are not taking place within the SAC therefore there will be no impact on connectivity within the SAC.	No	No

7.1.5 Mitigation Measures

210 This section presents the mitigation measures that will be implemented during construction and operation to avoid or reduce the potential impacts of the proposed development on Lower River Shannon SAC. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect the receiving environment.

Measures to Protect Surface Water Quality during Construction

211 A site-specific outline Construction Environmental Management Plan (oCEMP) is also included with the applicant's planning documentation submitted to Clare County Council. The Principal Contractor and all construction contractors will implement the mitigation measures specified in the CEMP. The mitigation measures are further described in the construction Surface Water and Pollution Management Plan[49]

212 These measures have been developed in consideration of the following standard best international practice including but not limited to:

- Construction Industry Research and Information Association (CIRIA) (2005) *Environmental Good Practice on Site (C692)*
- CIRIA, (2001) *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532)*
- CIRIA, (2000) *Environmental Handbook for Building and Civil Engineering Projects (C512)*
- CIRIA, (2007) *The SUDS Manual (C697)*
- CIRIA C648: *Control of water pollution from linear construction projects: Technical guidance*
- CIRIA (2006) *Control of water pollution from linear construction projects: Site guide (C648)*
- IFI (2016) *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*
- *UK Pollution Prevention Guidelines (PPG)* UK Environment Agency, 2004
- BPGCS005, *Oil Storage Guidelines*

213 The construction contractor will be required to implement the following specific mitigation measures as a condition if granted by Clare County Council all of which will be incorporated into the CEMP, for release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control:

- Specific measures to prevent the release of sediment over baseline conditions in the downstream receiving water environment, during the construction work. These measures include, but are not limited to, the use of silt fences, silt curtains, settlement lagoons and filter materials.
- Provision of exclusion zones and barriers (*e.g.* silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment.
- Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence.
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site.
- Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to any surface water drainage features, or drainage features connected to same. Pumped concrete will be monitored to ensure no accidental

[49] *Surface Water and Pollution Management Plan, Art Data Centre*. Clifton Scannell Emerson Associates, June 2021.

discharge. Mixer washings and excess concrete will not be discharged to existing surface water drainage systems. Concrete washout areas will be located remote any surface water drainage features, where feasible, to avoid accidental discharge to watercourses. Washing out of any concrete trucks on site will be avoided.

- Any fuels or chemicals (including hydrocarbons or any polluting chemicals) will be stored in a designated, secure bunded area(s) to prevent any seepage of potential pollutants into the local surface water network. These designated areas will be clearly sign-posted and all personnel on site will be made aware of their locations and associated risks.
- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked. Care and attention will be taken during refuelling and maintenance operations. Particular attention will be paid to gradient and ground conditions, which could increase risk of discharge to waters.
- A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and/or groundwater contamination) will be established and maintained. This register will be available at all times and shall include as a minimum:
    - Valid Safety Data Sheets;
    - Health & Safety, Environmental controls to be implemented when storing, handling, using and in the event of spillage of materials;
    - Emergency response procedures/precautions for each material; and,
    - The Personal Protective Equipment (PPE) required when using the material.
- Implementation of response measures to potential pollution incidents.
- Robust and appropriate Spill Response Plan and Environmental Emergency Plan will be prepared prior to works commencing and they will be communicated, resourced and implemented for the duration of the works. Emergency procedures/precautions and spillage kits will be available and construction staff will be trained and experienced in emergency procedures in the event of accidental fuel spillages.
- All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points.
- If groundwater is encountered during the proposed works and temporary pumping at a very localised location is required:
    - An appropriate dewatering system and groundwater management system specific to the site conditions will be designed and maintained. These will include measures to minimise any surface water inflow into the excavation, where possible, and the prolonged exposure of groundwater to the atmosphere will be avoided.
    - Qualitative and quantitative monitoring will be adopted to ensure that the water is of sufficient quality to discharge. The use of silt traps will be adopted if the monitoring indicates the requirement for same with no silt or contaminated water permitted to discharge to the receiving water environment.
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites.
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licensed facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same.
- The site investigation did not encounter any contaminated soil. However, If any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication

entitled 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills.

- In the event that Asbestos containing materials (ACMs) are found during demolition works, the removal will only be carried out by a suitably permitted waste contractor, in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010. All asbestos will be taken to a suitably licensed or permitted facility.
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).
- All the above measures implemented on site will be monitored throughout the duration of construction to ensure that they are working effectively, to implement maintenance measures if required/applicable and to address any potential issues that may arise.

Measures to Protect Surface Water Quality during Operation

Foul water

A temporary trench excavation along the Tulla road will be undertaken to facilitate pipe laying for connection with the existing public wastewater sewer and mains water supply.

There is no trade effluent proposed for this development. Foul sewage will be collected from site (*i.e.* from the data storage facility, offices and energy centre washroom facilities and canteen) and discharged through a new pumping station which will be constructed as part of this proposed development, to the foul drainage network which runs along the Tulla Road and ultimately discharges to Ennis North (Clonroadmore) WWTP Reg D0048. Ennis North WWTP has no capacity issues and consultation with Clare County Council has confirmed that sufficient wastewater capacity is available and a pre-connection enquiry PCE application form has been submitted to Irish Water (IW).

Surface water

The proposed surface water drainage service to the development comprises various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage System (SuDS) elements. Stormwater will be attenuated on site for the 1:1,000 year flood event. An over flow subsurface pipeline will discharge at current discharge rates (greenfield) to the Spancelhill Stream (Ballymacahill River).

The roofs, yards and internal access roads proposed throughout and within the footprint of the proposed development will be drained through a sealed drainage system that will ultimately be collected by gullies and conveyed through a series of proposed storm water pipes prior to discharging into a proposed open attenuation basin. The proposed stormwater drainage networks will range from 225mm to 1050mm pipe diameter depending on the required flow capacity. It is proposed to drain the site using a network of SuDS swales along the edge of the internal road network where possible. Reinforced grass-crete or similar will also be used along parts of the road network to increase infiltration on less heavily trafficked access roads. These drains and swales will discharge to a surface water retention pond/attenuation pond where the discharge will be controlled using a vortex flow control to limit the maximum discharge for the 0.1% Annual Exceedance Pollution event (1:1000-year return period). The attenuation pond to be constructed to retain a constant volume of water to promote settling and reduce conveyance of suspended solids and other particles to the receiving waters. An attenuation volume of 6864 m^3 is designed as part of the proposed development. Further details are provided in Chapter 7 of the EIAR and within the CSEA engineering report prepared for planning.

Measure to prevent the spread of invasive species during construction

Pre-Construction Survey

Invasive plant species were not identified within the proposed development site. A pre-construction invasive species survey must be carried out prior to any construction activities (including enabling works) by a suitably qualified specialist to confirm the presence or absence and extent of any invasive species within the proposed development site prior to the development. Data collected as part of this survey will also include the approximate area of any respective colonies (m^2) and a detailed description of the infestations (e.g. approximate total number of stems, pattern of growth and information on other vegetation present), if invasive species are identified. This information will inform calculations of volumes of infested soils to be excavated, as part of the measures outlined below.

General Measures to Avoid Spreading Invasive Species during Construction or Soil Movement

The species noted in Section 6.4 are invasive and are particularly effective at colonising disturbed ground (*e.g.* construction sites). Some species spread by the re-growth of cut fragments or root material, they can readily re-grow in new areas if the existing stands are disturbed *e.g.* by machinery, people, livestock *etc.*

The most common ways that these species can be spread is:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of plant fragments during the movement or transport of soil;
- Spread of plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with plant fragments which are then transported to other areas; and;
- Importation of soil from off-site sources contaminated with invasive species plant material.

It is preferable to eradicate invasive species prior to the onset of construction of any proposed development in close proximity. If control programmes have not been achieved before construction begins then the affected areas must be fenced off prior to and during construction in order to avoid spreading seeds or plant fragments around or off the construction site. Earthworks or machinery movement must be avoided in these areas until the relevant species have been eradicated.

If soil is imported to the site for landscaping, infilling or embankments, the contractor must gain documentation from suppliers that the material is free from invasive species.

Disposal of Material if species identified

If any invasive species plant material is collected (*e.g.* by hand-pulling or mowing), it is important that its disposal does not lead to a risk of further spread. The movement of plant material of any plants listed on the Third Schedule requires a licence from the National Parks and Wildlife Service (NPWS) under Section 49 of *the European Communities (Birds and Natural Habitats) Regulations*, 2011 (as amended). Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation, for example; Section 32 of the Waste Management Act, 1996 to 2008; Section 4 of the Air Pollution Act, 1987; relevant local authority byelaws and any other relevant legislation. All disposals must be carried out in accordance with the relevant Waste Management legislation (as per guidance from NRA, 2008).

It should be noted that some invasive species plant material or soil containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Acts, and both categories may require special disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

As noted above, additional specific measures for the management of Japanese knotweed cuttings or contaminated soil can be found in the UK Environment Agency document *The Knotweed Code of Practice: Managing Japanese Knotweed on development sites* (UK Environment Agency, 2013 (withdrawn 2016)).

Measures to be Followed During the Application of Herbicides

The control options for some species will require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, a qualified and experienced contractor, and qualified Herbicide Advisor, must be employed to carry out all work.

It is advised that the appointed contractor refer to the following documents, which provide detailed recommendations for the control of invasive species and noxious weeds:

- TII Publication: *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance* (TII, 2020)
- *Managing invasive non-native plants in or near fresh water* (Environment Agency, 2010)

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals, methodology for chemical control, and for measures to avoid environmental damage during the use of herbicides.

Measures to Protect Otter from habitat loss/fragmentation and Disturbance/Displacement impacts

214 This section presents the mitigation measures that will be implemented during construction to avoid the potential impacts of the proposed development on QI otter populations associated with the Lower River Shannon SAC. All of the mitigation measures will be implemented in full. They are in accordance with best practice, and tried and tested, effective control measures to protect otter.

Pre-Construction Survey

- Prior to construction works commencing, the appointed contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction otter survey of the proposed development. The survey will be undertaken within 10 months in advance of construction and supplemented by a further inspection of the proposed development immediately prior to site clearance to ensure that no new holts have been established in the intervening period. These surveys will be carried out in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2006).
- Where any new active holts/couches are recorded within 150m of the proposed development the appointed ecologist will ensure that adequate mitigation is provided in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2006), and a derogation licence is sought from the NPWS where necessary.

Mitigation measures for new active holts/couches recorded within 150m of the development

215 Until such time as otters have been successfully evacuated from active holts, the following provisions should apply to all construction works:

- No works should be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place - provided appropriate mitigation measures detailed below are in place.
- No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence.
- The prohibited working area associated with otter holts should, where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Fencing should be in accordance with

Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure should be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site should be made fully aware of the procedures pertaining to each affected holt.

Ecological Clerk of Works/Retained Ecologist

- Were a new holt to be encountered within 150 metres (up and downstream) of watercourse crossing, NPWS consultation will be sought, and the services of an Ecological Clerk of works or retained Ecologist (both with experience with otter survey/mitigation) would be required.
- The appointed contractor shall employ the services of an Ecological Clerk of Works (EcOW) with experience in otter, to oversee and advise works at watercourse crossings for the proposed development (they may also undertake the preconstruction survey). The EcOW will have the authority to:
    - Review method statements;
    - Oversee works;
    - Provide instruction to the appointed contractor(s); and,
    - Require the temporary cessation of works, where necessary.
- Access to and from the M18 Motorway culvert mammal ledge will be maintained at all times, with no works to be carried out at this location.
- The EcOW will deliver a toolbox talk on biodiversity including otter to the appointed contractor(s). This talk will include instructions on identifying otter and details on the protections afforded to otter under Irish and EU legislation. The EcOW will outline the actions which will be taken by the contractor(s) if otter are noted on or near the Proposed development during construction works.

Measures to Prevent/Reduce Disturbance and Displacement of otters

- Night working within/directly adjacent to watercourses where otter are known to commute will be avoided and will only be permitted with the prior approval of the planning authority.
- Where night-working adjacent to watercourses known to support otter, is required, the advice of a suitably qualified ecologist must be sought and a derogation licence, if necessary, will be sought from NPWS permitting such works.

Measures to prevent disturbance and/or displacement of lamprey species

216 An Ecological Clerk of Works will supervise the following mitigation strategy at the location of the drainage outfall in the banks of the Spancelhill Stream:

- A silt curtain and spill boom will be put in place across the width of the river immediately downstream of the works location, to capture any sediment which is mobilised during the works and any hydrocarbon escape or spill during construction works;
- The works will be undertaken either by placement of sandbags or cofferdam to ensure working in the dry, or as close to dry conditions as possible. Once in place, water will be pumped out of the sandbagged/cofferdam area.
- Prior to pumping commencing the area will be inspected and hand and net searched by the EcOW to check for any lamprey present. Repeat inspections will be undertaken as water levels are lowered during the course of pumping. A sieve will be placed over the in-take pipe of the pump to prevent any accidental uptake of lamprey that may be present.
- Once the area has been substantially de-watered, if net and manual searches cannot comprehensively exclude the possibility of lamprey remaining, then an excavator located out of the water and on the bankside, will carefully excavate the area small sections at a time and will

deposit spoil in excess of 10m from the edge of the river bankside for inspection. The ECoW will manually search these spoil heaps for any lamprey present.

- Any lamprey recovered will be handled with care, temporarily stored in buckets of water and released back to the river at a downstream location within 20 minutes of capture.
- Once the outfill pipe has been fully constructed the ECoW will supervise the removal of the sandbags/cofferdam. The silt curtain and spill boom must remain in place until these have been removed and for a period until silt has settled/been captured.
- There will be no concrete pouring and all materials (i.e. pipe, headwall and mattress) will be pre-cast prior to installation.
- The mitigation measures relating to the protection of surface water quality in receiving watercourses during construction are detailed above in Section 7.1.5 and apply for the works at this location, and will be adhered to at all times.
- The culvert, headwall and mattress have been designed in consultation with IFI and in accordance with the design criteria set out in Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016).
- IFI's guidelines on bio-security measures (IFI, 2010) must be adhered to during works at Spancelhill Stream.

7.1.6 Residual Impacts

217 Following the implementation of mitigation measures proposed in Section 7.1.5, the proposed development poses no risk of affecting the conservation objectives, or the favourable conservation condition, of the qualifying interests of Lower River Shannon SAC, and there are therefore, no residual direct or indirect impacts associated with the proposed development that could adversely affect the integrity of Lower River Shannon SAC. The conclusions of each qualifying interest and the subsequent conclusions on residual impacts are indicated in Table 9 above.

7.1.7 Conclusion of Assessment for Lower River Shannon SAC

218 Following an examination, analysis and evaluation in light of best scientific knowledge, of all relevant information in respect of the qualifying interests of Lower River Shannon SAC, the potential impacts, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition of the qualifying interests, it has been concluded that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of Lower River Shannon SAC.

7.2 Dromore Woods and Loughs SAC [000032]

7.2.1 Ecological Baseline Description for Dromore Woods and Loughs SAC

219 The great ecological value of this area lies in the mosaic of vegetation types present and the animals they support (NPWS, 2018). Habitats present include: scrub, limestone pavement, lakes, lake shore communities, reed beds and grassland. Approximately 9% of the site consists of the Annex I priority habitat limestone pavement, while 13% comprises naturally eutrophic lakes, also an Annex I habitat. Eutrophic tall herb vegetation is also represented. Otter and pine marten are both recorded within this site. The population of lesser horseshoe bat is of international importance and one of the largest breeding sites in the country. Wintering waterfowl populations are of local importance.

7.2.2 Qualifying Interests and Conservation Objectives of Dromore Woods and Loughs SAC

220 The qualifying interests of Lower River Shannon SAC, and the overall conservation objective, are listed below in Table 10.

Table 10 *Qualifying Interests and Conservation Objectives of Dromore Woods and Loughs SAC*

Qualifying Interest(s)	Conservation Objective(s)
Dromore Woods and Loughs SAC 3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels 8240 Limestone pavements 1303 *Rhinolophus hipposideros* (Lesser Horseshoe Bat) 1355 *Lutra lutra* (Otter) S.I. No. 114/2020 - European Union Habitats (Dromore Woods and Loughs Special Area of Conservation 000032) Regulations 2020 NPWS (2018) Conservation Objectives: Dromore Woods and Loughs SAC 000032. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected

221 In conjunction with considering the generic conservation objective for this SAC "To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected", the site specific conservation objectives document for Dromore Woods and Loughs SAC also informed this assessment.

222 The site specific conservation objectives document sets out the attributes, measures and targets that define the favourable conservation condition of the qualifying interests within the European site. Affecting the conservation condition of the qualifying interests/special conservation interests is deemed to constitute an adverse effect on the integrity of a European site. The specific attributes and targets used to define the conservation objectives of the qualifying interests of Dromore Woods and Loughs SAC are presented in Section 7.2.3, Table 11.

7.2.3 Examination and Analysis of Potential Direct and Indirect Impacts

223 The direct and/or indirect impacts by which the proposed development could (in the absence of mitigation measures) potentially affect the conservation objective attributes and targets supporting the conservation condition of the qualifying interests of Dromore Woods and Loughs SAC, are:

- Habitat loss and fragmentation
- Habitat degradation/effects on QI/SCI species as a result of hydrological impacts
- Disturbance and displacement impacts

- Habitat degradation as a result of introducing/spreading non-native invasive species

7.2.3.1 Habitat loss and fragmentation

224 Otter are a QI species for Dromore Woods and Loughs SAC, which is upstream of the proposed development. Research carried out by Ó Néill et al. (2008) on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged c. 7.5km while male otter home ranges varied between c. 7-19km. Evidence of otter was identified within the proposed development site along Spancelhill Stream. As there is a hydrological connection between the proposed development and the European site (located c.12km downstream), it is considered that the proposed development site is within the potential home range of male otters associated with the Dromore Woods and Loughs SAC and, therefore, otter present within Spancellhill Stream at this location may be connected with this SAC population. Construction works within the Spancelhill Stream will include the installation of a grated culvert with associated headwall and mattress, with a total loss of $2m^3$ of bankside habitat. This habitat loss is considered to be temporary (2-3 weeks), and will be reinstated following completion of this. The total area of this installation will be $2m^3$. Therefore, the predicted habitat loss impact will not have any long-term effects on the QI otter population in terms of distribution/range, extent of available habitat, couch/holt sites, and barriers to connectivity. Therefore the impact on otter populations connected to the Dromore Woods and Loughs SAC as a result of direct habitat loss/fragmentation, is not considered to be significant.

225 However, indirect habitat loss as a consequence of severe habitat degradation arising from a reduction in water quality and/or change to the hydrological regime, could affect the conservation status of this QI species from Dromore Woods and Loughs SAC.

226 Lesser horseshoe bat is a QI species for Dromore Woods and Loughs SAC which is located *c.* 4.5km north west of the proposed development site. This species has been recorded using the proposed development site for foraging and/or commuting during surveys carried out in 2018 and 2020. No roosts were identified within the site. However, records from BCI (as discussed in Section 3.2.4), identified nine lesser horseshoe roosts within 2km of the proposed development site, with the closest being *c*. 430m south. Research carried out on this species has suggested that the majority of feeding activity takes place within c. 2-3km of roosts during the year with occasional movements in excess of *c.* 4km (Bontadina, 2002 and Biggane, 2003). This distance can reduce down to a few hundred metres in the birthing season whilst larger scale movements of up to 15km are not unreasonable when bats move between winter and summer roosts. The Core Sustenance Zone (CSZ) for this species is described as the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. A review carried out by BCT of radio-tracked individuals, has defined the CSZ as within 2.5km of their roosts[11]. From research carried out in Galway on radio-tracked lesser horseshoe bats, this species has been shown to travel as far as c. 5.15km from roosts for foraging (Rush and Billington, 2014). In consideration of this, a precautionary approach has been adopted and it has been assumed for the purposes of this assessment that the lesser horseshoe bats recorded within the proposed development site may be connected with the lesser horseshoe bat populations of Dromore Woods and Loughs SAC. Although there will be a loss of suitable habitats within the site for this species including 2.7km of hedgerows and 30 trees, the design layout of the proposed development has been designed to minimise the amount of suitable foraging and/or commuting habitat removal through an iterative process. However, as there will be a loss of lesser horseshoe bat foraging and/or commuting habitat to facilitate the development, therefore there is potential for the conservation status of this species to be compromised by the development in the absence of mitigation.

227 As Dromore Woods and Loughs SAC is located upstream of the proposed development site, there is no impact pathway for effects on designated QI habitats at risk of habitat loss and fragmentation.

7.2.3.2 Habitat degradation/effects on QI/SCI species as a result of hydrological impacts

228 As the Dromore Woods and Loughs SAC is located upstream of the proposed development, there is no potential for a pollution event of any magnitude to affect any QI habitats or associated plant species for which this European site is designated. However, as the proposed development is hydrologically connected

to the River Fergus and there is potential for impacts to occur on otter populations (a mobile species) associated with Dromore Woods and Loughs SAC. The release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and, the accidental spillage and/or leaks of containments (*e.g.* fuel, oils, lubricants, paints, bituminous coatings, preservatives, weed killer, lime and concrete) into receiving waters. The associated effects of a reduction of surface water quality which could in turn negatively affect the otter population through direct contact with pollutants or a decline in fish prey. These potential impacts could occur to such a degree that the conservation objectives of Dromore Woods and Loughs SAC QI species are undermined.

229 Therefore, (albeit very unlikely due to the distance between the main construction activities and watercourses) there is potential for the Proposed development to result in effects which could have implications for the conservation objectives of Dromore Woods and Loughs SAC as a result of hydrological impacts.

7.2.3.3 Disturbance and displacement impacts

230 A temporary and/or permanent increase in noise, vibration and/or human activity levels during the construction and/or operation of the proposed development could result in the disturbance to and/or displacement of the otter population present in the vicinity of the proposed development. Disturbance and/or displacement effects on otter populations connected to Dromore Woods and Loughs SAC are as described above in Section 7.1.3.3., and are considered to be a temporary potential impact on this QI species.

231 Lesser horseshoe bat, a QI species for Dromore Woods and Loughs SAC, have been identified using the site as foraging and/or commuting grounds predominately located along hedgerows and treelines within the site, and along the woodland area in the north west of the proposed development. There are no lesser horseshoe bat roosts within the proposed development site. The closest roost identified to the site is approximately c. 430m south, in Kilfelim. It is considered likely that Dromore Woods and Loughs SAC is within the normal core foraging range and the normal commuting range of this species. Research carried out on this species has suggested that the majority of feeding activity takes place within *c.* 2-3km of roosts during the year with occasional movements in excess of c. 4km (Bontadina, 2002 and Biggane, 2003). This distance can reduce down to a few hundred metres in the birthing season, with research carried out in Galway on radio-tracked lesser horseshoe bats, this species has been shown to travel as far as c. 5.15km from roosts for foraging (Rush and Billington, 2014). Larger scale movements of up to c. 15km are not unreasonable when bats move between winter and summer roosts. The Core Sustenance Zone (CSZ) for this species is described as the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. A review carried out by BCT of radio-tracked individuals, has defined the CSZ as within 2.5km of their roosts. There will be removal of treelines and hedgerows within the footprint of the development, and additional lighting proposed. In the absence of mitigation, removal of suitable foraging and commuting habitat within the proposed development site, and an increase in light levels may potentially indirectly impact on lesser horseshoe bat species that utilise the site for roosting, foraging and/or commuting by making it unsuitable.

232 Therefore, there is potential for the proposed development to result in effects which could have implications for the conservation objectives of Dromore Woods and Loughs SAC as a result of disturbance/displacement impacts.

7.2.3.4 Habitat degradation as a result of introducing/spreading non-native invasive species

233 As Dromore Woods and Loughs SAC is located upstream of the proposed development site, there is no impact pathway for effects on designated QI habitats at risk of habitat degradation as a result of introducing/spreading non-native invasive species.

7.2.4 Summary

234 Table 11 below presents a summary of the potential impacts of the proposed development on the qualifying interests of Dromore Woods and Loughs SAC, and how these impacts relate to affecting the site's conservation objectives.

Table 11 Potential Impacts/Effects on the Conservation Objectives of Dromore Woods and Loughs

Conservation Objectives Attribute/Measure/Target	**Potential Impacts Requiring Mitigation?**	**Are mitigation measures required?**	**Residual Impacts?**
Dromore Woods and Loughs SAC			
Lesser Horseshoe Bat *Rhinolophus hipposideros* [1303] To maintain the favourable conservation condition of lesser horseshoe bat in Dromore Woods and Loughs SAC, which is defined as follows:			
Population per roost / Number / Minimum number of 261 bats for the summer roost (roost id. 109 in NPWS database). Summer roosts / Condition / No decline Auxiliary roosts / Number and condition / No decline	Yes No roosts are present within the proposed development site. However, individuals that may be connected to the population of Dromore Woods and Loughs SAC could potentially be impacted by loss of commuting and/or foraging habitat within the proposed development site. In absence of mitigation, an increase in the existing light levels within and adjacent to the proposed development site may potentially indirectly impact on lesser horseshoe bat species that utilise the site for foraging and/or commuting by making it unsuitable.	Yes The mitigation measures described in Section 7.2.5, describe the supplementary planting that will be implemented to ensure there is no net loss of commuting and/or foraging habitat for lesser horseshoe bats within the proposed development. The mitigation measures described in Section 7.2.5 describe the measures to ensure no impacts on lesser horseshoe bats as a consequence of an increase in light levels.	No
Extent of potential foraging habitat / Hectares / No significant decline within 2.5km of qualifying roost Linear features / Kilometres / No significant loss within 2.5km of qualifying roost. Light pollution / Lux / No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost.	No The proposed development is located *c.* 4.4km north from the SAC; therefore, there is no potential for impacts on the extent of its potential foraging habitat, linear features or light levels within 2.5km of the qualifying interest SAC roost.	No	No
Otter *Lutra lutra* [1355] To maintain the favourable conservation condition of Otter in Dromore Woods and Loughs SAC, which is defined as follows:			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Distribution / Percentage positive survey sites / No significant decline	Yes Potential indirect impacts on this QI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary (*i.e. c.* two weeks in duration for the laying of a pipe between the proposed attenuation tank and the Spancelhill bankside), and relatively insignificant. In consideration of these points, potential impacts on this QI species as a result of habitat loss is considered to be not significant. An accidental pollution event during construction or operation, of a sufficient magnitude, and/or an increase in the concentration of hydrocarbons in runoff during operation could potentially result in a reduction in water quality and in turn negatively affect this QI species by altering the habitat conditions and prey species abundances it relies upon.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats and subsequently the pray species it relies on are avoided. The mitigation measures described in Section 7.1.5 to manage a range of potential disturbance risks will avoid any long-term potential impacts to the QI otter population.	Yes
Extent of terrestrial habitat / Hectares / No significant decline. Area mapped and calculated as 33.6ha	No Works are not taking place within the SAC therefore there will be no impact on its extent of terrestrial or freshwater habitat or couching sites and holts	No	No
Extent of freshwater (river) habitat / Kilometres / No significant decline. Length mapped and calculated as 8.4km			
Extent of freshwater (lake) habitat / Hectares / No significant decline. Area mapped and calculated as 96.2ha			
Couching sites and holts / Number / No significant decline			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Fish biomass available / Kilograms / No significant decline	Yes An accidental pollution event during construction or operation, of a sufficient magnitude, and/or an increase in the concentration of hydrocarbons in runoff during operation could potentially result in a reduction in water quality and in turn negatively affect this QI species by altering the habitat conditions and prey species abundances it relies upon.	Yes The mitigation measures described in Section 7.1.5 to maintain water quality in receiving watercourses during construction or operation will be implemented to ensure that the receiving environment is protected and that impacts downstream of the proposed development on associated habitats in the Lower River Shannon SAC are avoided	No
Barriers to connectivity / Number / No significant increase	No Works are not taking place within the SAC therefore there will be no impact on connectivity within the SAC.	No	No

7.2.5 *Mitigation Measures*

235 This section presents the mitigation measures that will be implemented during construction and operation to avoid or reduce the potential impacts of the proposed development on Dromore Woods and Loughs SAC. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect the receiving environment.

Measures to Protect Surface Water Quality during Construction

236 The mitigation measures presented above in Section 7.1.5 will protect surface water quality during construction of the Proposed development.

Measures to Protect Surface Water Quality during Operation

237 The mitigation measures presented above in Section 7.1.5 will protect surface water quality during operation of the Proposed development.

Measures to Protect Otter from habitat loss/fragmentation and Disturbance/Displacement impacts

238 The mitigation measures presented above in Section 7.1.5 will protect otters from habitat loss/fragmentation and disturbance/displacement impacts during operation of the Proposed development.

Measures to Protect Lesser Horseshoe bat from habitat loss/fragmentation impacts

239 Any vegetation (including trees, hedgerows or scrub adjacent to, or within, the proposed development boundary) which is to be retained shall be afforded adequate protection during the construction phase in accordance with the Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes (National Roads Authority, 2006b), as follows:

- All trees along the proposed development boundary that are to be retained, both within and adjacent to the proposed development boundary (where the root protection area of the tree extends into the proposed development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10 m of any retained trees, hedgerows and treelines
- A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the proposed development boundary but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist
- A buffer zone of at least 5m will be maintained between construction works and retained hedgerows to ensure that the root protection areas are not damaged.

240 Surveys carried out confirmed that lesser horseshoe bat use the treelines and hedgerows located within the proposed development site as foraging and commuting habitat. The proposed development will result in a total loss of *c.* 2.7km hedgerows, and 30 trees; therefore replacement planting is required to ensure that there will be no net loss of lesser horseshoe bat foraging and commuting habitat as a result of the proposed development. This will comprise of *c.* 4.86km of hedgerow and 57 new trees within the proposed development site (see the Landscape Design Strategy, and Chapter *12 Landscape and Visual Impact Assessment* being submitted as part of this application for location map, planting schedule and specific details of proposed species). Native hedgerow planting will include the following species; Alder *Alnus glutinosa*, hazel *Corylus avellana* , hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, honeysuckle

Lonicera periclymenum, crab apple *Malus sylvestris*, wild cherry *Prunus avium* , blackthorn *Prunus spinosa*, dog rose *Rosa canina*, elder *Samucus nigris*, and guelder rose *Viburnum opulus*. Tree planting will include semi-mature species such as: Sessile oak *Quercus petraea*, beech *Fagus sylvatica*, strawberry tree *Arbustus unedo*, Scot's pine *Pinus sylvestris,* multistem birch *Betula pendula*, rowan *Sorbus acuparia*, double flowering wild cherry *Prunus avium plena*, and crab apple. This will ensure the proposed development complies with Objective 14.11 of the *Clare County Development Plan 2017-2023 (as varied)*, and the requirement that there is no net loss of lesser horseshoe bat habitat within the proposed development. This proposed planting has been designed to ensure that connectivity for foraging and commuting bats is maintained - *i.e.* along the peripheries of the site, and within the site from the woodland in the north west to suitable foraging habitats such as Toureen Lough, and along hedgerows in the north to woodland and wetland habitats in the east. Existing hedgerows along the southern boundary that are less species rich, will be enhanced through additional planting of native species. The proposed planting will occur in phases, with the earliest planting occurring along important foraging and/or commuting routes in the north, south and east of the site, at pre-construction stage and prior to removal of any habitats. This will ensure that suitable foraging and commuting habitat for lesser horseshoe bat is established prior to the removal of such habitat during the construction of the proposed development; therefore maintaining the site's suitability for lesser horseshoe bat. Cattle grazed fields are known to have higher rates of bat activity than ungrazed grassland (Downs et al. 2010)[50], therefore in addition to the hedgerows and treeline planting, areas of cattle grazed grassland will be maintained as they are currently in the east, north and west of the site with additional hedgerows separating fields, to provide further suitable habitat for lesser horseshoe bat.

Measures to protect lesser horseshoe bats from disturbance/displacement impacts

241 A light spill model study was undertaken by Hurley Palmer Flatt (February 2022)[51] to determine the effects of artificial light and Artificial Light At Night (ALAN) on bats as a result of the proposed development and identify how to reduce or eliminate ALAN onsite, based on information from both Eurobats Guideline No.8, the Institution of Lighting Professionals (ILP) Guidance Note No.8. and Bat Conservation Ireland *Guidance Notes for: Planners engineers, architects and developers*[52]. Potential impacts of lighting during construction will be slight and short-term as construction works will generally be confined to daylight hours (07:30-17:30). Where works are required during hours of darkness, portable lighting will be used, which will be pointed downwards at a 45-degree angle and away from any sensitive receptors (hedgerows, treelines, confirmed bat roosts, Toureen Lough, and Spancelhill Stream). During operation, the strategies in place are to limit the duration of the lighting at night and also limit lux levels wherever possible. However there is potential for light spill from the proposed development on suitable areas of foraging and/or commuting habitats used by lesser horseshoe bats. There will also be the addition of lighting along new pathways on the Tulla Road, which will be turned on during the hours of darkness for safety reasons. A light spill modelling drawing has been used to indicate where any areas of light spill may be within and beyond the proposed development, prior to mitigation[51]. The following mitigation measures will be in place to ensure the habitats on site remain suitable for lesser horseshoe bats:

- Street lighting within the development is required for safety and will not be operational at night unless in an emergency and site evacuation, and will consist of minimal number of light fixtures and installed on short poles with the use of shields to restrict beam angles and avoid light spillage where illuminance is not required;

[50] Downs, N., & Sanderson, L. (2010). Do Bats Forage Over Cattle Dung or Over Cattle?. *Acta Chiropterologica*, *12*(2), 349-358.

[51] Site Lighting Analysis Report and Light Spill Modelling Study, Project Art, produced by Hurley Palmer Flatt (February 2022)

[52] *Guidance Note for: Planners, engineers, architects and developers.* Bat Conservation Ireland (2010)

- Tree and hedgerow planting will be implemented around the buildings and along the access roads to screen the development, planted at pre-construction to ensure sufficient screening is in place to prevent any light spill on areas of sensitivity for bats within the proposed development;
- The use of berms along adjacent to the main entrance of the site will further screen any lighting on Tulla Road, by increasing the height of initial planting carried out;
- Office lighting will be controlled to avoid light spill to the outdoors through the glass windows, using black-out blinds from dusk until dawn;
- External lighting for pedestrian pathways and low-traffic roads will be controlled and dimmed and will only be at higher Lux levels when required, i.e. during emergencies, and with the use of shields to limit the light emitted to above or to the sides;
- LED luminaries will be used to ensure light pollution is kept to a minimum and to avoid uplighting. Where practical, directional luminaries will be utilised to enable precise projection of light;
- External lighting will normally be turned off, and internal building lighting will be controlled by PIR switching;
- The light spill model demonstrates that prior to mitigation light spill from the Tulla Road lighting will be more than 0.1 Lux in areas of bat sensitivity, this does not take into account the planting that will be in place, which will develop over time, reducing any light spill onto adjoining areas used by local bat species to negligible levels (0.1 Lux or lower);
- During night-time hours, lighting will only be provided for circulation areas with no lighting on surrounding areas, including protected important foraging and/or commuting areas for bats; and
- There will be no light trespass over 0.1 Lux on surrounding areas beyond the buildings by the use of shielded luminaries, lighting beam angles, low height street lighting columns, and minimal numbers of luminaries used.

7.2.6 Residual Impacts

242 Following the implementation of mitigation measures proposed in Section 7.1.5 and 7.2.5, the proposed development poses no risk of affecting the conservation objectives, or the favourable conservation condition, of the qualifying interests of Dromore Woods and Loughs SAC, and there are therefore, no residual direct or indirect impacts associated with the proposed development that could adversely affect the integrity of Dromore Woods and Loughs SAC. The conclusions of each qualifying interest and the subsequent conclusions on residual impacts are indicated in Table 11 above.

7.2.7 Conclusion of Assessment for Dromore Woods and Loughs SAC

243 Following an examination, analysis and evaluation in light of best scientific knowledge, of all relevant information in respect of the qualifying interests of Dromore Woods and Loughs, the potential impacts, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition of the qualifying interests, it has been concluded that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of Dromore Woods and Loughs.

7.3 Old Domestic Building (Keevagh) SAC [002010] & Old Domestic Buildings, Rylane SAC [002314]

7.3.1 Ecological Baseline Description for Old Domestic Building (Keevagh) SAC & Old Domestic Buildings, Rylane SAC

<u>Old Domestic Building (Keevagh) SAC</u>

244 This site is considered to be of international importance as more than 100 lesser horseshoe bats are known to use this site as a summer breeding site (NPWS, 2018). It is also important because it is situated along the eastern limit of the species' distribution in Ireland.

Old Domestic Buildings, Rylane SAC

245 This site supports an internationally important summer roost of lesser horseshoe bat (NPWS, 2018). The cottage is in good condition and provides stable and undisturbed summer roosting conditions for the bats. It is one of a number of maternity roosts known from within a 5km radius and is located in an area with a large population of lesser horseshoe bats. Foraging areas and winter hibernation sites have not yet been established although it may be linked to a known hibernaculum situated approximately 3km away (*i.e.* Newgrove House).

7.3.2 Qualifying Interests and Conservation Objectives of Old Domestic Building (Keevagh) SAC & Old Domestic Buildings, Rylane SAC

246 The qualifying interests of Old Domestic Building (Keevagh) SAC & Old Domestic Buildings, Rylane SAC, and the overall conservation objective, are listed below in Table 12.

Table 12 *Qualifying Interests and Conservation Objectives of Old Domestic Building (Keevagh) SAC & Old Domestic Building, Rylane*

Qualifying Interest(s)	Conservation Objective(s)
Old Domestic Building (Keevagh) SAC 1303 *Rhinolophus hipposideros* (Lesser Horseshoe Bat) S.I. No. 91/2016 - European Union Habitats (Old Domestic Building (Keevagh) Special Area of Conservation 002010) Regulations 2016. NPWS (2018) Conservation Objectives: Old Domestic Building (Keevagh) SAC 002010. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	To maintain or restore the favourable conservation condition of the Annex II species for which the SAC has been selected.
Old Domestic Buildings, Rylane SAC 1303 *Rhinolophus hipposideros* (Lesser Horseshoe Bat) S.I. No. 175/2016 - European Union Habitats (Old Domestic Buildings, Rylane Special Area of Conservation 002314) Regulations 2016. NPWS (2018) Conservation Objectives: Old Domestic Buildings, Rylane SAC 002314. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	To maintain or restore the favourable conservation condition of the Annex II species for which the SAC has been selected.

247 In conjunction with considering the generic conservation objective for this SAC "To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected", the site specific conservation objectives document for Old Domestic Building (Keevagh) SAC and Old Domestic Buildings, Rylane SAC also informed this assessment.

248 The site specific conservation objectives document sets out the attributes, measures and targets that define the favourable conservation condition of the qualifying interests within the European site. Affecting the conservation condition of the qualifying interests/special conservation interests is deemed to constitute an adverse effect on the integrity of a European site. The specific attributes and targets used to define the conservation objectives of the qualifying interests of Old Domestic Building (Keevagh) SAC and Old Domestic Buildings, Rylane SAC are presented in Section 7.3.3, Table 13.

7.3.3 Examination and Analysis of Potential Direct and Indirect Impacts

249 The direct and/or indirect impacts by which the proposed development could (in the absence of mitigation measures) potentially affect the conservation objective attributes and targets supporting the conservation condition of the qualifying interests of Old Domestic Building (Keevagh) SAC and Old Domestic Buildings, Rylane SAC, are:

- Habitat loss and fragmentation
- Disturbance and displacement impacts

7.3.3.1 Habitat loss and fragmentation

250 Lesser horseshoe bat is a QI species for Old Domestic Building (Keevagh) SAC which is located c. 4.3km south east of the proposed development site, and Old Domestic Buildings, Rylane SAC, located c. 5.9km north east. This species has been recorded using the proposed development site for foraging and/or commuting during surveys carried out in 2018 and 2020. Habitat loss and fragmentation impacts on lesser horseshoe bat populations from Old Domestic Building (Keevagh) SAC and Old Domestic Buildings, Rylane SAC, are as described above in Section 7.2.3.1. As there will be a loss of lesser horseshoe bat foraging and/or commuting habitat to facilitate the development, therefore there is potential for the conservation status of this species to be compromised by the development in the absence of mitigation.

7.3.3.2 Disturbance and displacement impacts

251 A temporary and/or permanent increase in noise, vibration and/or human activity levels during the construction and/or operation of the proposed development could result in the disturbance to and/or displacement of QI populations present in the vicinity of the proposed development. Lesser horseshoe bat, a QI species for Old Domestic Building (Keevagh) SAC, and Old Domestic Buildings, Rylane SAC, have been identified using the site as foraging and/or commuting grounds, predominately located along hedgerows and treelines within the site, and along the woodland area in the north west of the proposed development. Results from the surveys carried out within the proposed development site can be found above in Section 6.6. There will be removal of treelines and hedgerows within the footprint of the development, and additional lighting proposed. In the absence of mitigation, removal of suitable foraging and commuting habitat within the proposed development site, and an increase in exiting light levels may potentially indirectly impact on lesser horseshoe bat species that utilise the site for roosting, foraging and/or commuting by making it unsuitable.

252 Therefore, there is potential for the proposed development to result in significant effects in the absence of mitigation which could have implications for the conservation objectives of Old Domestic Building (Keevagh) SAC, and Old Domestic Buildings, Rylane SAC as a result of disturbance/displacement impacts.

7.3.4 Summary

253 Table 13 below presents a summary of the potential impacts of the proposed development on the qualifying interests of Old Domestic Building (Keevagh) SAC and Old Domestic Building, Rylane SAC, and how these impacts relate to affecting the site's conservation objectives.

Table 13 Potential Impacts/Effects on the Conservation Objectives of Old Domestic Building (Keevagh) SAC and Old Domestic Building, Rylane SAC

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Old Domestic Building (Keevagh) SAC			
Lesser Horseshoe Bat *Rhinolophus hipposideros* [1303] To maintain the favourable conservation condition of lesser horseshoe bat in Old Domestic Building (Keevagh) SAC, which is defined as follows:			
Population per roost / Number / Minimum number of 279 bats for the summer roost (roost id. 13 in NPWS database); minimum number of 129 bats for the summer roost with roost id. 14.	Yes No roosts are present within the proposed development site, however individuals that may be connected to the population of Old Domestic Building (Keevagh) SAC could potentially be impacted by loss of commuting and/or foraging habitat within the proposed development. In absence of mitigation, an increase in the existing light levels within and adjacent to the proposed development site may potentially indirectly impact on lesser horseshoe bat species that utilise the site for roosting, foraging and/or commuting by making it unsuitable.	Yes The mitigation measures described in Section 7.2.5, describe the supplementary planting that will be implemented to ensure there is no net loss of commuting and/or foraging habitat for lesser horseshoe bats within the proposed development. The mitigation measures described in Section 7.2.5 describe the measures to ensure no impacts on lesser horseshoe bats as a consequence of an increase in light levels, will be implemented.	No
Summer roosts / Condition / No decline			
Auxiliary roosts / Number and condition / No decline			
Extent of potential foraging habitat / Hectares / No significant decline within 2.5km of qualifying roost	No The proposed development is located *c.* 4.3km south-east from the SAC; therefore, there is no potential for impacts on the extent of its potential foraging habitat, linear features or light levels within this 2.5km of the SAC.	No	No
Linear features / Kilometres / No significant loss within 2.5km of qualifying roost.			
Light pollution / Lux / No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost.			
Old Domestic Building, Rylane SAC			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Lesser Horseshoe Bat *Rhinolophus hipposideros* [1303] To maintain the favourable conservation condition of lesser horseshoe bat in Old Domestic Building, Rylane SAC, which is defined as follows:			
Population per roost / Number / Minimum number of 279 bats for the summer roost (roost id. 13 in NPWS database); minimum number of 129 bats for the summer roost with roost id. 14.	Yes No roosts are present within the proposed development site, however individuals that may be connected to the population of Old Domestic Buildings, Rylane SAC could potentially be impacted by loss of commuting and/or foraging habitat within the proposed development. In absence of mitigation, an increase in the existing light levels within and adjacent to the proposed development site may potentially indirectly impact on lesser horseshoe bat species that utilise the site for roosting, foraging and/or commuting by making it unsuitable.	.Yes The mitigation measures described in Section 7.2.5, describe the supplementary planting that will be implemented to ensure there is no net loss of commuting and/or foraging habitat for lesser horseshoe bats within the proposed development. The mitigation measures described in Section 7.2.5 describe the measures to ensure no impacts on lesser horseshoe bats as a consequence of an increase in light levels, will be implemented.	No
Summer roosts / Condition / No decline			
Auxiliary roosts / Number and condition / No decline			
Extent of potential foraging habitat / Hectares / No significant decline within 2.5km of qualifying roost	No The proposed development is located *c.* 5.9km north east from the SAC; therefore, there is no potential for impacts on the extent of its potential foraging habitat, linear features or light levels within this 2.5km of the SAC.	No	No
Linear features / Kilometres / No significant loss within 2.5km of qualifying roost.			
Light pollution / Lux / No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost.			

7.3.5 Mitigation Measures

254 This section presents the mitigation measures that will be implemented during construction and operation to avoid or reduce the potential impacts of the proposed development on Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect the receiving environment.

Measures to Protect Lesser Horseshoe bat from habitat loss/fragmentation and disturbance/displacement impacts.

The mitigation measures presented above in Section 7.2.5 will protect lesser horseshoe bats from habitat loss/fragmentation and disturbance/displacement impacts.

7.3.6 Residual Impacts

255 Following the implementation of mitigation measures proposed in Section 7.2.5, the proposed development poses no risk of affecting the conservation objectives, or the favourable conservation condition, of the qualifying interest habitats of Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC, and there are therefore, no residual direct or indirect impacts associated with the proposed development that could adversely affect the integrity of Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC. The conclusions of the qualifying interest and the subsequent conclusions on residual impacts are indicated in Table 11 above.

7.3.7 Conclusion of Assessment for Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC.

256 Following an examination, analysis and evaluation in light of best scientific knowledge, of all relevant information in respect of the qualifying interests of Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC, the potential impacts, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition of the qualifying interests, it has been concluded that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of Old Domestic Buildings (Keevagh) and Old Domestic Buildings, Rylane SAC.

7.4 Ballyallia Lough SPA [004041], River Shannon and River Fergus Estuaries SPA [004077], Slieve Aughty Mountains SPA [004168], Corofin Wetlands SPA [004220]

7.4.1 Ecological Baseline Description for Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA

Ballyallia Lough SPA

257 The site supports a good diversity of wintering waterfowl, including swans, dabbling duck, diving duck and some waders (NPWS, 2021). Habitat quality is good and the site provides both feeding and roost sites for the birds. Seven of the species have populations of national importance: wigeon, gadwall, teal, mallard, shoveler *Anas clypeata,* coot and black-tailed godwit *Limosa limosa*. The shoveler population is the largest in the country (*i.e.* 9.6% of all-Ireland total), while that of gadwall is also very notable (*i.e.* 10.3% of all-Ireland total). There is a regularly occurring flock of whooper swan *Cygnus cygnus*. Some of the birds, especially black-tailed godwit, commute to the nearby River Fergus-River Shannon estuary. The site is a Wildfowl Sanctuary.

River Shannon and River Fergus Estuaries SPA

258 This is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (NPWS, 2012). It has internationally important populations of dunlin *Calidris alpina,* black-tailed godwit and commn redshank *Tringa totanus*. A further 16 species have populations of national importance. The site is particularly significant for dunlin (*i.e.* 11% of national total), grey plover *Pluvialis squatarola* (*i.e.* 7.5% of total), northern lapwing *Vanellus vanellus* (*i.e.* 6.5% of total), common redshank (*i.e.* 6.1% of total) and shelduck *Tadorna tadorna* (*i.e.* 6.0% of total). It has whooper swan, golden plover *Pluvialis apricaria* and bar-tailed godwit *Limosa lapponica* in significant numbers. The site was formerly frequented by a population of greater white-fronted goose *Anser albifrons flavirostris* but these have now abandoned the area. The site provides both feeding and roosting areas for the wintering birds and habitat quality for most of the estuarine habitats is good.

Corofin Wetlands SPA

259 Corofin Wetlands SPA is of high ornithological importance for supporting nationally important numbers of whooper swan and black-tailed godwit, supporting 1.3% and 2.4% of the all-Ireland population respectively (NPWS, 2021). Corofin Wetlands supports a further 3 species of national importance; little grebe *Tachybaptus ruficollis* (3.3% of all-Ireland population), wigeon (3.2%) and teal (1.8%). It is also notable for its wintering gadwall population

Slieve Aughty Mountains SPA

260 The site supports over 12% of the all-Ireland population of hen harrier and is among the top five sites in the country for this species (NPWS, 2021). It provides excellent habitat for both nesting and foraging. The site also supports a breeding population merlin. The population size is not well known but is likely to exceed five pairs. Willow ptarmigan *Lagopus lagopus* is found on many of the unplanted areas of bog and heath - this is a species that has declined in Ireland and is now Red-listed.

7.4.2 Qualifying Interests and Conservation Objectives of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA

261 The special conservation interests of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA and the overall conservation objective, are listed below in Table 14 and in each respective section above.

Table 14 *Qualifying Interests and Conservation Objectives of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA*

Qualifying Interest(s)	Conservation Objective(s)
Ballyallia Lough SPA A052 Teal*(Anas crecca*) A125 Coot(*Fulica atra*) A053 Mallard(*Anas platyrhynchos*) A050 Wigeon(*Anas penelope*) A156 Black-tailed Godwit(*Limosa limosa*) A056 Shoveler(*Anas clypeata*) A051 Gadwall(*Anas strepera*) A999 Wetland and Waterbirds S.I. No. 58/2010 - European Communities (Conservation of Wild Birds (Ballyallia Lough Special Protection Area 004041)) Regulations 2010 NPWS (2022) *Conservation objectives for Ballyallia Lough SPA [004041].* Generic Version 9.0. Department of Housing, Local Government and Heritage.	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. To maintain or restore the favourable conservation condition of the wetland habitat at Ballyallia Lough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.
River Shannon and River Fergus Estuaries SPA A179 Black-headed Gull*(Chroicocephalus ridibundus)* A141 Grey Plover*(Pluvialis squatarola)* A038 Whooper Swan*(Cygnus cygnus)* A140 Golden Plover*(Pluvialis apricaria)* A048 Shelduck*(Tadorna tadorna)* A157 Bar-tailed Godwit*(Limosa lapponica)* A046 Light-bellied Brent Goose*(Branta bernicla hrota)* A137 Ringed Plover*(Charadrius hiaticula)* A156 Black-tailed Godwit*(Limosa limosa)* A160 Curlew*(Numenius arquata)* A164 Greenshank*(Tringa nebularia)* A050 Wigeon*(Anas penelope)* A162 Redshank*(Tringa totanus)* A142 Lapwing*(Vanellus vanellus)* A017 Cormorant*(Phalacrocorax carbo)* A056 Shoveler*(Anas clypeata)* A052 Teal*(Anas crecca)* A143 Knot*(Calidris canutus)* A062 Scaup*(Aythya marila)* A054 Pintail*(Anas acuta)* A149 Dunlin*(Calidris alpina)* A999 Wetland and Waterbirds S.I. No. 329/2019 - European Union Conservation Of Wild Birds (River Shannon And River Fergus Estuaries Special Protection Area 004077) Regulations 2019 NPWS (2012) Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0.	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. To maintain the favourable conservation condition of the wetland habitat in the River Shannon and River Fergus Estuaries SPA as a resource for the regularly - occurring migratory waterbirds that utilise it.
Slieve Aughty Mountains SPA A082 Hen Harrier (*Circus cyaneus)* A098 Merlin (*Falco columbarius)*	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA

Qualifying Interest(s)	Conservation Objective(s)
S.I. No. 83/2012 - European Communities (Conservation of Wild Birds (Slieve Aughty Mountains Special Protection Area 004168)) Regulations 2012. NPWS (2022) *Conservation objectives for Slieve Aughty Mountains SPA [004168].* Generic Version 9.0. Department of Housing, Local Government and Heritage	
Corofin Wetlands SPA A156 Black-tailed Godwit(*Limosa limosa)* A052 Teal(*Anas crecca*) A038 Whooper Swan(*Cygnus cygnus*) A050 Wigeon(*Anas penelope*) A004 Little Grebe(*Tachybaptus ruficollis*) A999 Wetland and Waterbirds *S.I. No. 117/2012 - European Communities (Conservation of Wild Birds (Corofin Wetlands Special Protection Area 004220)) Regulations 2012.* *NPWS (2022) Conservation objectives for Corofin Wetlands SPA [004220].* Generic Version 9.0. Department of Housing, Local Government and Heritage.	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. To maintain or restore the favourable conservation condition of the wetland habitat at Corofin Wetlands SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

262 In conjunction with considering the generic conservation objective for these SPAs "To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.", the site specific conservation objectives documents for River Shannon and River Fergus Estuaries SPA, Ballyallia Lough SPA, Slieve Aughty Mountains SPA, and Corofin Wetlands SPA also informed this assessment.

263 The site specific conservation objectives document sets out the attributes, measures and targets that define the favourable conservation condition of the qualifying interests/special conservation interests within the European sites. Affecting the conservation condition of the qualifying interests/special conservation interests is deemed to constitute an adverse effect on the integrity of a European site. The specific attributes and targets used to define the conservation objectives of the special conservation interests of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA are presented in Section 7.4.3, Table 15.

7.4.3 Examination and Analysis of Potential Direct and Indirect Impacts

264 The direct and/or indirect impacts by which the proposed development could (in the absence of mitigation measures) potentially affect the conservation objective attributes and targets supporting the conservation condition of the special conservation interests of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA are:

- Habitat degradation/effects on QI/SCI species as a result of hydrological impacts
- Disturbance and displacement impacts
- Habitat loss and fragmentation

7.4.3.1 Habitat degradation/effects on QI/SCI species as a result of hydrological impacts

265 The release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and, the accidental spillage and/or leaks of containments (*e.g.* fuel, oils, lubricants, paints, bituminous coatings, preservatives, weed killer, lime and concrete) into receiving waters. The associated effects of a reduction of surface water quality

could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge. The proposed development is hydrologically connected to the River Fergus, which discharges into the Fergus Estuary and thereafter the River Shannon and River Fergus Estuaries SPA. Whilst Ballyallia Lough SPA and Corofin Wetlands SPA are upstream of proposed development, some of the SCI species overlap with the River Shannon and River Fergus Estuaries SPA *i.e.* teal, wigeon, whooper swan, black-tailed godwit and wetland and waterbirds. Therefore it cannot be excluded that SCI species from Ballyallia Lough and Corofin Wetlands SPA also feed in the River Shannon and River Fergus Estuaries SPA.

266 Therefore, (albeit unlikely due to the distance between the main construction activities and watercourses) this reduction in water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present within River Shannon and River Fergus Estuaries SPA, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and/or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI bird species. These potential impacts could occur to such a degree that they result in significant effects which could have implications for the conservation objectives of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA.

7.4.3.2 Disturbance and displacement impacts

267 A temporary and/or permanent increase in noise, vibration and/or human activity levels during the construction and/or operation of the proposed development could result in the disturbance to and/or displacement of SCI bird species present within the footprint and/or the vicinity of the proposed development. Such disturbance effects would not be expected to extend beyond a distance of *c.* 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond. Construction activities such as piling could extend beyond a distance of c. 300m however, this will be occurring within the west of the footprint of the design, at Data Centre 6 and Data Centre 5.

268 There were five SCI species identified within the proposed development site during wintering bird surveys carried out on the site, these included: coot, mallard, gadwall, teal and lesser black-backed gull (see Section 5.1.3.3). Sutibale habitat for these species was identified in the wetland habitats within the proposed development site, including; Toureen Lough, the M18 Attenuation Pond, the wetland in the east of the site (outwith the redline boundary), and the temporary pond features in the north west of the site. Toureen Lough, and the wetland feature in the north west, are within 300m of the footprint of the proposed development, and therefore are likely to be impacted by construction activities and SCI bird species may potentially be disturbed from these suitable habitats. The majority of the wetland habitat will be screened visually from the development by the existing planting and additional planting proposed (*i.e.* Toureen Lough and wetlands in the east, and attenuation pond in the west). During construction there will be an increase in noise and vibration within the site[41], however this is predicted to be a Moderate and Short-Term Impact at worst during initial ground works, reducing to Not Significant following this, as described in Section 6.6. The small temporary pond features in the north (floods in winter months only) will be directly adjacent to the proposed development construction. Whilst this alteration of suitable habitat will result in a temporary disturbance (*i.e.* over one winter period), due to the small numbers identified on this feature (<10 individuals), the size of the feature, and the suitable habitat in the surrounding lands (*i.e.* Ballymacahill Lough c. 250m north, Cahernalough Lough c. 550m north east, Holaan Lough c. 880m south east, O'Briens Big Lough c.3km north east) the disturbance and displacement impacts are not likely to result in effects which could have implications for the conservation objectives of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. There are no predicted impacts on SCI bird species during the operational phase of the proposed development, as noise levels are predicted to be Not Significant at the areas of suitable habitat within the site, and due to the establishment of additional and retained planting that will further screen wetland areas from any disturbance associated with the development.

269 The Slieve Aughty Mountains SPA is designated for breeding populations of hen harrier and merlin. There is no suitable breeding or foraging habitat within or near the proposed development for merlin, however suitable wintering roosting habitat for hen harrier was identified in the east of the site slightly outside the

red line boundary, where a wetland/swamp habitat was located. Winter surveys carried out here did not identify any hen harrier using the site within or surrounding the lands. However, as suitable winter foraging/roosting habitat was identified, it cannot be ruled out that hen harrier may be impacted by the proposed development as a result of disturbance/displacement impacts. The suitable habitat extends outside the proposed development site in the east, and other areas of suitable wintering roosting/foraging habitat exist in close proximity to the proposed development in lowland wetland habitats, and within the Fergus Estuary downstream of the site.

7.4.3.3 Habitat loss and fragmentation

270 Records of hen harrier, an Annex I bird species were returned from the vicinity of the proposed development. Hen harriers have been found to travel up to 9km from nests (Arroyo et al., 2014), and the nearest European site designated for this species is Slieve Aughty Mountains SPA, c. 4.5km from the proposed development. This species is known to breed and forage in the summer on heather moorland and young forestry plantations where they nest on the ground. They will then spend winter in more coastal and lowland areas throughout Ireland . Therefore, there is potential that hen harriers associated with the Slieve Aughty Mountains SPA may hunt and roost during winter in the vicinity of the proposed development. However, dedicated hen harrier vantage point surveys were carried out within the proposed development and no individuals were identified within or in the adjoining lands. Given that the proposed development will sit into the landscape and the nearest building to suitable habitat to be constructed will be over 250m away, there is no potential for the proposed development and predicted habitat loss impact to have any long-term effects on the QI populations in terms of population trends, distribution/range, extent of available habitat or loss of territory on SCI populations of hen harrier associated with the Slieve Aughty Mountains SPA.

7.4.4 Summary

271 Table 15 below presents a summary of the potential impacts of the proposed development on the qualifying interests of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SP, Slieve Aughty Mountains SPA and Corofin Wetlands SPA, and how these impacts relate to affecting the site's conservation objectives.

Table 15 Potential Impacts/Effects on the Conservation Objectives of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA, and Corofin Wetlands SPA.

Conservation Objectives Attribute/Measure/Target	**Potential Impacts Requiring Mitigation?**	**Are mitigation measures required?**	**Residual Impacts?**
Ballyallia Lough SPA			
Wigeon (*Anas penelope*) [A050], Gadwall (*Anas strepera*) [A051], Teal (*Anas crecca*) [A052], Mallard (*Anas platyrhynchos*) [A053], Shoveler (*Anas clypeata*) [A056], Coot (*Fulica atra*) [A125], Black-tailed Godwit (*Limosa limosa*) [A156], Wetland and Waterbirds [A999] There is no site-specific conservation objectives document available for this SPA. Therefore, the attributes, measures and targets below have been developed based on the specific conservation objectives available for Ballyallia Lough SPA			
Population trend / Percentage change / Long term population trend stable or increasing	Yes	Yes	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Distribution / Range, timing and intensity of use of areas / There should be no significant decrease in the range, timing or intensity of use of areas by all of the above species other than that occurring from natural patterns of variation	An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. Some designated SCI species for Ballyallia Lough SPA are also SCI species for the Lower River Shannon and River Fergus Estuaries SPA (*i.e*. black-tailed godwit and teal), therefore impacts downstream cannot be excluded. An accidental pollution event of a sufficient magnitude, either alone or cumulatively with other pollution sources, could potentially affect the quality the of intertidal/coastal habitats that support the special conservation interest bird species of the SPA. This could potentially affect the use of habitat areas by birds and have long-term effects on the SPA populations. Potential indirect impacts on these SCI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary, relatively insignificant and confined to areas beyond those of suitable habitat. In consideration of these points, potential impacts on these SCI species with regards to disturbance are considered to be negligible and will not give rise to any population level effects.	The mitigation measures described in Section 7.1.4 to protect water quality in the receiving environment will ensure that surface water quality in the Fergus Estuary is protected during construction and operation of the Proposed development.	
River Shannon and River Fergus Estuaries SPA			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Whooper Swan (*Cygnus cygnus*) [A038], Light-bellied Brent Goose (*Branta bernicla hrota*) [A046], Shelduck (*Tadorna tadorna*) [A048], Wigeon (*Anas penelope*) [A050], Teal (*Anas crecca*) [A052], Pintail (*Anas acuta*) [A054], Shoveler (*Anas clypeata*) [A056], Scaup (*Aythya marila*) [A062], Ringed Plover (*Charadrius hiaticula*) [A137], Golden Plover (*Pluvialis apricaria*) [A140], Grey Plover (*Pluvialis squatarola*) [A141], Lapwing (*Vanellus vanellus*) [A142], Knot (*Calidris canutus*) [A143], Dunlin (*Calidris alpina*) [A149], Black-tailed Godwit (*Limosa limosa*) [A156], Bar-tailed Godwit (*Limosa lapponica*) [A157], Curlew (*Numenius arquata*) [A160], Redshank (*Tringa totanus*) [A162], Greenshank (*Tringa nebularia*) [A164] and Black-headed Gull (*Chroicocephalus ridibundus*) [A179] To maintain the favourable conservation condition of the SCI species in the River Shannon and River Fergus Estuaries SPA, which is defined by the following list of attributes and targets:			
Population trend / Percentage change / Long term population trend stable or increasing Distribution / Range, timing and intensity of use of areas / There should be no significant decrease in the range, timing or intensity of use of areas by teal other than that occurring from natural patterns of variation	Yes An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. An accidental pollution event of a sufficient magnitude, either alone or cumulatively with other pollution sources, could potentially affect the quality the of intertidal/coastal habitats that support the special conservation interest bird species of the SPA. This could potentially affect the use of habitat areas by birds and have long-term effects on the SPA populations. Potential indirect impacts on these SCI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary, relatively insignificant and confined to areas beyond those of suitable habitat. In consideration of these points, potential impacts on these SCI species with regards to disturbance are considered to be negligible and will not give rise to any population level effects.	The mitigation measures described in Section 7.1.4 to protect water quality in the receiving environment will ensure that surface water quality in the Fergus Estuary is protected during construction and operation of the Proposed development.	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Corofin Wetlands SPA			
Little Grebe (*Tachybaptus ruficollis*) [A004], Whooper Swan (*Cygnus cygnus*) [A038], Wigeon (*Anas penelope*) [A050], Teal (*Anas crecca*) [A052], Black-tailed Godwit (*Limosa limosa*) [A156], Wetland and Waterbirds [A999] There is no site-specific conservation objectives document available for this SPA. Therefore, the attributes, measures and targets below have been developed based on the specific conservation objectives available for Corofin Wetlands SPA			
Population trend / Percentage change / Long term population trend stable or increasing	Yes	The mitigation measures described in Section 7.1.4 to protect water quality	No

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Distribution / Range, timing and intensity of use of areas / There should be no significant decrease in the range, timing or intensity of use of areas by all of the above species other than that occurring from natural patterns of variation	An accidental pollution event during construction or operation could affect surface water downstream in the Fergus Estuary. Some designated SCI species for Corofin Wetlands SPA are also SCI species for the Lower River Shannon and River Fergus Estuaries SPA (*i.e*. black-tailed godwit shoveler, and teal), therefore impacts downstream on Ballyallia Lough cannot be excluded. An accidental pollution event of a sufficient magnitude, either alone or cumulatively with other pollution sources, could potentially affect the quality the of intertidal/coastal habitats that support the special conservation interest bird species of the SPA. This could potentially affect the use of habitat areas by birds and have long-term effects on the SPA populations. Potential indirect impacts on these SCI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary, relatively insignificant and confined to areas beyond those of suitable habitat. In consideration of these points, potential impacts on these SCI species with regards to disturbance are considered to be negligible.	in the receiving environment will ensure that surface water quality in the Fergus Estuary is protected during construction and operation of the Proposed development.	
Slieve Aughty Mountains SPA			

Conservation Objectives Attribute/Measure/Target	Potential Impacts Requiring Mitigation?	Are mitigation measures required?	Residual Impacts?
Hen Harrier (*Circus cyaneus*), [A082] Merlin (*Falco columbarius*) [A098] There is no site-specific conservation objectives document available for this SPA. Therefore, the attributes, measures and targets below have been developed based on the specific conservation objectives available for Slieve Aughty Mountains SPA			
Population trend / Percentage change / Long term population trend stable or increasing	No Potential indirect impacts on these SCI species may arise due to construction-related activities resulting in an increase in disturbance; however, this disturbance will be temporary, relatively insignificant and confined to areas beyond those of suitable habitat. In consideration of these points, potential impacts on these SCI species with regards to disturbance are considered to be negligible.	No	No
Distribution / Range, timing and intensity of use of areas / There should be no significant decrease in the range, timing or intensity of use of areas by all of the above species other than that occurring from natural patterns of variation			

7.4.5 Mitigation Measures

272 This section presents the mitigation measures that will be implemented during construction and operation to avoid or reduce the potential impacts of the proposed development on Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA and Corofin Wetlands SPA. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect the receiving environment.

Measures to Protect Surface Water Quality during Construction

273 The mitigation measures presented above in Section 7.1.5 will protect surface water qualify during construction of the Proposed development.

Measures to Protect Surface Water Quality during Operation

274 The mitigation measures presented above in Section 7.1.5 will protect surface water qualify during operation of the Proposed development.

7.4.6 Residual Impacts

275 Following the implementation of mitigation measures proposed in Section 7.1.5, the proposed development poses no risk of affecting the conservation objectives, or the favourable conservation condition, of the special conservation interest species of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA and there are therefore, no residual direct or indirect impacts associated with the proposed development that could adversely affect the integrity of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA Slieve Aughty Mountains SPA and Corofin Wetlands SPA. The conclusions of the special conservation interests and the subsequent conclusions on residual impacts are indicated in Table 15 above.

7.4.7 Conclusion of Assessment for Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA

276 Following an examination, analysis and evaluation in light of best scientific knowledge, of all relevant information in respect of the qualifying interests of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA, the potential impacts, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition of the special conservation interests, it has been concluded that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, Slieve Aughty Mountains SPA, and Corofin Wetlands SPA.

8 In Combination Assessment

8.1 Analysis of Potential In Combination Effects

277 This section of the report presents the assessment carried out to examine whether any other plans or projects have the potential to act in combination with the proposed development to adversely affect the integrity of Lower River Shannon SAC, Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, River Shannon and River Fergus Estuaries SPA, Ballyallia Lough SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA. All other European sites fall beyond the zone of influence of the proposed development. Therefore, there is no potential for any other plans or projects to act in combination with the proposed development to adversely affect the integrity of any other European sites.

278 As assessed in Section 6, none of the potential impacts associated with the proposed development will result in any perceptible residual effect on the receiving environment or on the qualifying interests/special conservation interests of Lower River Shannon SAC, Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, River Shannon and River Fergus Estuaries SPA, Ballyallia Lough SPA, Slieve Aughty Mountains SPA and Corofin Wetlands SPA. Therefore, there will not be any residual impacts associated with the proposed development that will adversely affect the conservation objectives supporting the conservation condition of the qualifying interests/special conservation interests of those European sites, and the proposed development in isolation will not adversely affect the integrity of those European site.

279 There is the potential for other pollution sources flowing into the Spancellhill Stream, the River Fergus, the Shannon Estuary North WFD catchment and any other catchments that also drain to the Fergus Estuary to cumulatively affect water quality in the receiving estuarine and marine environments.

280 The majority of the immediate surrounding lands are not zoned currently. The lands to the north of the proposed development site are zoned as *O2 – General*, to the immediate east is the substation, *zoned* as N3.2 – Electricity, further east towards Ennis is mainly zoned as *R2 - Existing residential.* To the south east, there is a site zoned as *C2.1 - Industrial, enterprise, employment,* and to the west, there is a site also zoned for *O2 – General.* Beyond the residential zoning south east of the site, is a large area of land zones as *G3 - Conservation, amenity or buffer space, corridor/belt, landscape.* The most likely cumulative effect of other future development with the proposed development on the receiving environment is the potential for other pollution sources within the Fergus River subcatchment, the Shannon Estuary North catchment and the River Shannon Catchment, and any other catchments that also drain to the Shannon Estuary to cumulatively affect water quality in the receiving surface water, estuarine and marine environments. There is also potential for impacts from other developments to cumulatively affect QI/SCI species as a result of habitat loss/fragmentation, and disturbance/displacement.

281 There are a number of granted planning permissions, and appealed planning permissions, for residential or other small-scale developments such as construction of housing developments, sporting facilities, renovation of a school, telecommunications services, residential renovations etc. in the vicinity of the proposed development site as well as larger scale developments in close proximity to the proposed development site, some of which may be in construction at the same time as the proposed development. A list of these projects considered in the cumulative impacts assessment has been included in Chapter 3 *Planning and Development Context*, Appendix 3.1 of the EIAR.

282 The potential for in combination effects to arise in Fergus and Shannon Estuary, or on QI/SCI species from any existing or proposed land use plans or developments is regulated and controlled by the environmental protective policies and objectives of the *Clare County Development Plan 2017-2023*. Any existing/proposed plan or project that could potentially affect Lower River Shannon SAC, Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, River Shannon and River Fergus Estuaries SPA, and Ballyallia Lough SPA, or any other European site, in combination with the proposed development, must adhere to these overarching environmental protective policies and objectives. These policies and objectives will ensure the protection of the European site within the zone of influence of the proposed development, and include the requirement for any future plans or projects to undergo Screening

for Appropriate Assessment and/or Appropriate Assessment to examine and assess their effects on European sites, alone and in combination with other plans and projects.

- There are specific objectives and policies in the *Clare County Development Plan 2017-2023 Variation no. I* to protect biodiversity, and specifically European sites. Specific policies and objectives relating to AA were as follows:

  Development Plan Objective: Appropriate Assessment, Strategic Environmental Assessment and Strategic Flood Risk Assessment

  - CDP2.1 It is an objective of the development plan:
    - To require the preparation and assessment of all planning applications in the plan area to have regard to the information, data and requirements of the Natura Impact Report, SEA Environmental Report and Strategic Flood Risk Assessment Report contained in Volume 10 of this development plan;
    - To require projects to be fully informed by ecological and environmental constraints at the earliest stage of project planning and any necessary assessment to be undertaken, including assessments of disturbance to species, where required;
    - To require compliance with the objectives and requirements of the Habitats Directive, the Bird Directive, Water Framework Directive, all other relevant EU Directives and all relevant transposing legislation.

  Development Plan Objective: Environmental Impact Assessment

  - CDP14.9 It is an objective of Clare County Council:
    - To implement the EIA Directive, ensuring that all elements/stages or components of the project are included in one overall assessment and all reasonable alternatives are taken into consideration in choosing the option with the least environmental impact.
    - To have regard to 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments (2013)' when considering proposals for which an EIA is required;
    - To ensure full compliance with the requirements of the EU Habitats Directive, SEA Directive and associated legislation/regulations, including the associated European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), European Communities (Environmental Assessment of Certain Plans and Programmes) regulations 2004-2011, and the European Communities (Environmental Impact Assessment) Regulations 1989–2011 (or any updated/superseding legislation).

  Development Plan Objective: European Sites

  - CDP14.2 It is an objective of the development plan:
    - To afford the highest level of protection to all designated European sites in accordance with the relevant Directives and legislation on such matters;
    - 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 considered 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);

- To recognise and afford appropriate protection to any new or modified SPAs or SACs that are identified during the lifetime of this plan, having regard to the fact that proposals for development outside of a European site may also have an indirect effect.

Development Plan Objective: Requirement for Appropriate Assessment under the Habitats Directive

- CDP14.3 It is an objective of the development plan:
  - To implement Article 6(3) and where necessary Article 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). All assessments must be in compliance with the European Communities (Birds and Natural Habitats) Regulations 2011;
  - To have regard to 'Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities 2009' or any updated version.

Development Plan Objective: Protection of Water Resources

- CDP8.22 It is an objective of the development plan:
  - To protect the water resources of County Clare having regard to the requirements of the relevant EU Directives;
  - To ensure that developments that would have an unacceptable impact on water resources, including surface water and groundwater quality and quantity, designated sources protection areas, coastal and transitional waters, river corridors and associated wetlands are not permitted;
  - In areas of potable groundwater resources or over vulnerable aquifer areas, development proposals will only be considered if the applicant can clearly demonstrate that the proposed development will not pose a risk to the quality of the underlying groundwater;
  - To protect groundwater resources, in accordance with statutory requirements and specific measures as set out in the Shannon and Western River Basin Management Plans;
  - To ensure that proposals for development which infringe on a river boundary, or an associated habitat, including their connection by groundwater, will only be considered where it can be clearly demonstrated that:
  - The character of the area will be conserved;
  - An acceptable physical riparian zone will be maintained with all natural vegetation preserved;
  - There will be no impact on the ecological, aquatic or fishing potential of the waters or associated waters;
  - All proposals are in compliance with the requirements of the Habitats Directive, where appropriate.

Development Plan Objective: Habitat Protection

- DP14.11 It is an objective of the development plan:
  - To protect and promote the sustainable management of the natural heritage, flora and fauna of the county through the promotion of biodiversity, the conservation of natural habitats and the enhancement of new and existing habitats;
  - 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 ensure that there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within 3km of known roosts.

283 Policies CDP2.1 , CDP14.2 , CDP14.3, relate to the protection of European sites, AA and commitments to not permitting projects giving rise to adverse effects on the integrity of European sites without demonstrating there are no alternatives, there are imperative reasons of overriding public interest, and undertaking all compensation measures necessary to ensure the overall coherence of the network of European sites. The *Limerick County Development Plan 2010-2016* also includes policies to protect (from risk of pollution), manage and enhance the counties' surface water and groundwater resources, protect, conserve and enhance habitats, species and areas of European and national importance (*i.e.* CP 10, SE 01, ED P7, EH 01, EH 02, EH 03, EH 04, CP 10, SE 01 and IN P11).

284 The environmental protective policies and objectives set out in the C*lare County Development Plan 2017-23* are also captured in the *Shannon Town and Environs Local Area Plan 2012-2018* in terms of the protection of European sites (*i.e.* policy B2) and the protection of County Clare's surface water and groundwater resources (*i.e.* policies W1, W2, W4, W5 and W7).

285 Land use plans for the other local authorities (*e.g.* Galway County Council, and Kerry County Council) whose functional areas include surface water features which drain to Fergus and Shannon Estuaries, were examined and analysed and those land use plans also include protective environmental policies to protect European sites (Policy NHB 1 in Galway, and Policies NE-2, NE-11, NE-12 and NE-30 in Kerry) and the receiving surface water environments (i.e. policies FL 1, WW 1, WS 5, and NHB 4 in Galway, and Policies NE-18, NE-19, NE-20, NE-22, NE-23, NE-24 and NE-26 in Kerry).

8.2 Conclusion of In Combination Assessment

286 As the proposed development itself will not have any effects on the conservation objectives of any European sites, and considering the protective environmental policies and objectives in the *Clare County development plan 2017-2023 Variation No. 1*, *Limerick County Development Plan 2010-2016*, *Galway County Development Plan 2015-2021*, and *Kerry County Development Plan 2015-2021* and more widely across all of the other land use plans that seek to protect surface water quality in the catchments that drain to the Fergus and Shannon Estuary, there is no potential for any other plan or project to adversely affect the integrity of any European sites in combination with the proposed development.

9 NIS Conclusion

287 This NIS has examined and analysed the potential impact sources and pathways from the proposed development on European sites, and how these could impact on their qualifying interests/special conservation interests, and whether the potential impacts would adversely affect the integrity of; Lower River Shannon SAC, Dromore Woods and Loughs SAC, Old Domestic Building (Keevagh) SAC, Old Domestic Buildings, Rylane SAC, River Shannon and River Fergus Estuaries SPA, Ballyallia Lough SPA, Slieve Aughty Mountains SPA, and Corofin Wetlands SPA. This is in light of the best scientific knowledge, and with respect to those European sites within the zone of influence of the proposed development. There are no other European sites at risk of effects from the proposed development.

288 Avoidance, design requirements and mitigation measures are set out within this NIS and they ensure that any impacts on the conservation objectives of European sites will be avoided during the construction and

operation of the proposed development such that there will be no risk of adverse effects on these European sites.

289 It has been objectively concluded by Scott Cawley Ltd., following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed development, that the proposed development, either alone or in combination with other plans or projects, will not adversely affect (either directly or indirectly) the integrity of any European site.

References

Arroyo, B., Leckie, F., Amar, A., McCluskie, A., & Redpath, S. (2014) *Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland, Bird Study*, 61:1, 48-55.

Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

Bailey, M. and Rochford J. (2006) *Otter Survey of Ireland 2004/2005.* Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Biggane, S. (2003) *The lesser horseshoe bat Rhinolophus hipposideros (Bechstein 1800) at Dromore, Co. Clare: diet, foraging activity, habitat selection and nocturnal behaviour.* Ph.D. Thesis, National University of Ireland, Galway, Ireland.

Bontadina, F., Schofield, H. and Naef-Daenzer, B. (2002) *Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland.* Journal of Zoology 258: 281–290.

Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*.

Circular NPW 1/10 & PSSP 2/10. *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*.

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.)* The Bat Consevation Trust, London.

Department of Environment, Heritage and Local Government (2010 revision) *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.*

European Commission, (2001) *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.*

Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. RSPB: Sandy

Hardey J, Crick H, Wernham C, Riley H, Etheridge B and Thompson D (2009) *Raptors: A Field Guide to Survey and Monitoring, 2nd Edition.* TSO, Edinburgh.

Kelleher, C. (2006). *Summer Roost Preferences of Lesser Horseshoe bat Rhinolophus hipposideros in Ireland.* The Irish Naturalists' Journal, Vol. 18, No.6, pp. 229-231.

Lusby, J., Corkery, I., McGuiness, S., Fernández-Bellon, D., Toal, L., & Norriss, D. et al. (2017*). Breeding *ecology and habitat selection of Merlin Falco columbarius in forested landscapes. Bird Study*, *64*(4), 445-454.

Madders, M., & Whitfield, D. (2006). *Upland raptors and the assessment of wind farm impacts*. *Ibis*, *148*, 43-56.

Marsh, J.E., Lauridsen, R.B., Gregory, S.D. (2019). *Above parr: Lowland river habitat characteristics associated with higher juvenile Atlantic salmon (Salmo salar) and brown trout (S. trutta) densities.* Ecol Freshw Fish. 00: 1– 15.

McAney, K. (2014) *An overview of Rhinolophus hipposideros in Ireland (1994–2014)* Vespertilio 17: 115–125, 2014

NPWS (2012a) *Conservation Objectives: Lower River Shannon SAC 002165.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012b) *Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013a) *The Status of EU Protected Habitats and Species in Ireland*. Species Assessments Volume 2, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (2013c) *Lower River Shannon SAC [002165] Site Synopsis*.

NPWS (2013g) *Old Domestic Building (Keevagh) SAC [002010] Site Synopsis*.

NPWS (2018) *Conservation objectives supporting document – lesser horseshoe bat (Rhinolophus hipposideros) Version 1*. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (2018) *Conservation Objectives: Old Domestic Building (Keevagh) SAC 002010*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2018) *Conservation Objectives: Old Domestic Buildings, Rylane SAC 002314*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht

NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview.* Unpublished NPWS report.

NPWS (2021) *Conservation objectives for Ballyallia Lough SPA [004041].* Generic Version 8.0. Department of Housing, Local Government and Heritage.

NPWS (2021) *Conservation objectives for Slieve Aughty Mountains SPA [004168].* Generic Version 8.0. Department of Housing, Local Government and Heritage.

NPWS (2021) *Conservation objectives for Corofin Wetlands SPA [004220].* Generic Version 8.0. Department of Housing, Local Government and Heritage.

NRA (2006) *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.*

NRA (2011) *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes.*

Office of the Planning Regulator (2021) OPR Practice Note PN01. *Appropriate Assessment Screening for Development Management.*

Ó Néill L. (2008) *Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning.* PhD thesis. Trinity College, Dublin.

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) *National Otter Survey of Ireland 2010/12.* Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

Ruddock, M., Mee, A., Lusby, J., Nagle, A., O'Neill, S. & O'Toole, L. (2016). The 2015 National Survey of Breeding Hen Harrier in Ireland. Irish Wildlife Manuals, No. 93. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

Rush, T., Billington, G. (2014). *Galway bat radio-tracking project. Radio tracking studies of lesser horseshoe and vesper bat species, August and September 2014.* Greena Ecological Consultancy. Witham Friary, 2014.

Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

Stace, C. (2019) *New Flora of the British Isles*. *4th Edition*. C&M Floristics.

Thaxter, C., Ross-Smith, V., & Cook, A. (2015). *How high do birds fly? A review of current datasets and an appraisal of current methodologies for collecting flight height data: Literature review*. British Trust for Ornithology Research Report No. 666.

The Environment Agency (2010). *Fifth otter survey of England 2009-2010.* Environment Agency, Almondsbury, Bristol, England

Weekes, L.C. & FitzPatrick, Ú. (2010) *The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland.* Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.