



Shannon Technology and Energy Park (STEP) 220kV Grid Connection

Appropriate Assessment and Natura Impact
Statement

July 2024

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July 2024

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1 Introduction

1.1 Overview

The proposed development will provide a connection (two 220 kV cables and fibre optic cables) between the proposed STEP Power Plant via two substations (1No. onsite EirGrid/ESBN Gas Insulated Switchgear (GIS) substation and 1No. SLNG GIS substation), and a connection point (a Line Cable Interface Mast (LCIM) in the vicinity of the existing ESBN/EirGrid Kilpaddoge 220 kV substation. The LCIM is part of the Kilpaddoge – Tarbert 220 kV Circuit, which is located approximately 5 km east of the proposed STEP facility. A 50 MVar reactor will also be installed adjacent to the EirGrid GIS substation. A fibre optic line will be laid alongside the 220kV cables.

The cable route will be located adjacent to the STEP Power Plant facility access road (ca. 0.6 km). Kerry County Council, or their subcontractors, will install the ducting and joint bays along the L-1010 (ca. 2.5km) under a Part 8 consent and therefore this does not form part of the proposed development. These works will be fully funded by the Applicant by means of a special development contribution under section 48(2)(c) of the Planning and Development Act 2000 to cover the full cost of the upgrade works including the ducting and joint bay installation. The last 1.8km of cabling will be located off road in private lands and terminate at the LCIM. Following the installation of ducts, the cables will be pulled through the full length of ducting.

One of the underground cables will be jointed to the existing cable on the LCIM from where it will connect to the Tarbert substation via the existing overhead line. The other underground cable will connect to an existing underground cable route, via a joint bay, to feed into the Kilpaddoge substation. No works are proposed at the Kilpaddoge 220 kV substation.

Upon completion of the works, the proposed onsite EirGrid/ESBN 220kV GIS Substation and the underground transmission cable will be handed over to EirGrid, who in conjunction with ESB Networks (ESBN), will carry out the final commissioning and energisation of the proposed substation and transmission line connections. Once energised, the proposed development will form part of the ESBN infrastructure (in their role as Transmission Asset Owner (TAO)), and EirGrid will be responsible for operating the system (in their role as Transmission System Operator (TSO)). The Shannon LNG 220kV GIS substation will remain in the ownership of Shannon LNG Ltd.

1.2 Purpose and Scope of this Document

This report has been prepared to assist the relevant competent national authority (An Bord Pleanála) in assessing the proposed development, to fulfil the requirements of Article 6(3) of the EU Habitats Directive 92/43/EEC ('The Habitats Directive').

1.3 Requirements for Appropriate Assessment

1.3.1 European Law

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) requires that where a plan or project is likely to have a significant effect on a European Site, while not directly connected with or necessary to the nature conservation management of the site, it will be subject to 'Appropriate Assessment' (AA) to identify any implications for the European site in view of the site's Conservation Objectives. Specifically, Article 6(3) of the Habitats Directive states:

“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”.

1.3.2 Irish Law

In the context of the Proposed Development, the Habitats Directive is transposed into Irish law by Part XAB of the Planning and Development Act 2000 (as amended) (‘the Planning Acts’), and the Planning and Development Regulations 2001 as amended (‘the Planning Regulations’).

Under Section 177T of the Planning Acts,

“(1)(b) A Natura impact statement means 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.

(2) Without prejudice to the generality of subsection (1), a Natura impact report or a Natura impact statement, as the case may be, 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.”

Under Section 177U(1) of the Planning Acts,

“A screening for AA of the Proposed Development shall be carried out by the competent authority to assess in view of best scientific knowledge, if the Proposed Development, individually or in combination with another plan or project, is likely to have a significant effect(s) on any European sites.”

Under Section 177U(4) of the Planning Acts, the competent authority (in this case, An Bord Pleanála) shall determine that an AA 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(s).

AA is the process provided for under Article 6(3) of the Habitats Directive to determine whether a project or plan could ‘adversely affect the integrity’ of any European sites, either alone or in combination with other plans or projects, in light of the conservation objectives of the European sites in question.

Under Section 177V(1) of the Planning Acts, an AA shall include a determination by the competent authority under Article 6.3 of the Habitats Directive as to whether or not a draft Land use plan or Proposed Development would adversely affect the integrity of a European site.

Under Section 177V(2) of the Planning Acts, the competent authority (in this case, An Bord Pleanála) shall, in carrying out an appropriate assessment under subsection (1), take into account each of the following matters:

- a. “the Natura impact report or Natura impact statement, as appropriate;*
- b. any supplemental information furnished in relation to any such report or statement;*
- c. if appropriate, any additional information sought by the authority and furnished by the applicant in relation to a Natura impact statement;*

- d. any additional information furnished to the competent authority at its request in relation to a Natura impact report;*
- e. any information or advice obtained by the competent authority;*
- f. if appropriate, any written submissions or observations made to the competent authority in relation to the application for consent for proposed development;*
- g. any other relevant information.”*

1.3.3 European Sites and Features

A network of European sites of conservation importance has been identified by each Member State, hosting habitats and/or species identified in the Directives as needing to be either maintained at or returned to ‘favourable conservation status’.

The sites of conservation importance known as European sites comprise the Natura 2000 network.

European sites comprise areas designated as Special Areas of Conservation (SACs) and/or Special Protection Areas (SPAs) in Ireland.

The process of designating Candidate Special Areas of Conservation (cSACs) as SACs is ongoing in Ireland. Candidate sites (in Ireland comprising cSACs) have the same legal protection as those whose designation is complete.

The designation features of SACs are referred to as Qualifying Interests (QIs), and these comprise both species (excluding birds), and habitats.

The designation features of SPAs are referred to as Special Conservation Interests (SCIs), and these comprise bird species, as well as wetland bird habitats.

The designation features of European sites are identified in the Statutory Instruments for European sites where such sites have completed the designation process. In all cases, designation features are also identified in Conservation Objectives published by the National Parks and Wildlife Service (NPWS). Any Conservation Objectives referred to in this NIS are referenced to identify the date of publication and version number.

1.4 Statement of Authority

Authors

Ryan Boyle MSc, BSc (Senior Ecologist, Mott MacDonald) drafted this report. Ryan has eight years of professional and voluntary experience in the ecological, environmental and conservation sector having worked as a herpetological keeper at Chester Zoo working on conservation breeding programmes with the aim of wild reintroductions, a zookeeper at Belfast Zoo, environmental assistant at GRAHAM, volunteered with the Belfast Hills Partnership partaking in a number of surveys such as bats, Phase 1 habitat surveys, preliminary ecological appraisals, environmental farming schemes, soil carbon surveys, river fly surveys and is the chair for the Northern Ireland Amphibian and Reptile Group as well as a board member for the Ecology Detection Dog Working Group. He is experienced in species identification, management and mitigation, badger surveys, otter surveys, biodiversity checklists, bat roost potential surveys, newt surveys and bird surveys. With experience on working on a wide variety of projects of varying scale and carrying out Appropriate Assessment Screening reports, Natura Impact Statements, Strategic Environmental Assessment and biodiversity chapters for larger EIA submissions.

Erin Johnston PhD, MSc, BSc, MCIEEM (Principal Ecologist, Mott MacDonald) drafted this report. Erin is an experienced ecologist with more than ten years of post-graduate experience

including three years in malacological (mollusc) research and seven years in Ecological consultancy. She has prepared Ecological Impact Assessments, Appropriate Assessments Screening Reports, and Natura Impact Statements for a variety of projects at a range of scales. Erin has significant experience in carrying out field surveys for protected gastropods, along with vegetation surveys, extended phase 1 habitat surveys, and targeted invasive species surveys. Other protected species surveys Erin has experience of include smooth newt, crayfish, badger, otter, marsh fritillary and bats.

Eliot Taylor PhD BSc (Senior Associate Ecologist, Mott MacDonald) checked this report. Eliot is a highly experienced environmental, ecological and technical specialist with +30 years' experience. He has extensive experience working in ecological and environmental impact assessment. He also has extensive experience of working as a Project Manager and Team Leader on large and complex projects. He is experienced in the provision of technical advice to clients, development and implementation of plans and reports, managing and facilitating workshops, as well as community and broader stakeholder consultation and participation. He has advised on the development / implementation of policy, plans and assessments in liaison with development partners, private sector clients and a range of governments.

Surveyors

Fintan Damer (BSc) (Ecologist, Mott MacDonald). Fintan Damer is a qualified and experienced ecologist with over 4 years full time experience in ecological consultancy. He has thirty years of practical knowledge in undertaking ornithological field studies and surveys, consisting of breeding bird surveys, winter wetland surveys and marine seabird surveys including a competent knowledge of ESAS (European seabirds at Sea) ship-based seabird survey methodologies. Fintan has conducted numerous baseline ecological surveys including those for otter, badger, invasive species, terrestrial botanical surveys, and bat surveys on a wide variety of project types. He also has good working knowledge for the baseline execution of freshwater aquatic surveys. He has been involved in preparation of Ecological Impact Assessments and Appropriate Assessments Screening Reports as well as more focused biotic Environmental Reports

Eoin Underwood (BSc) (MSc) (Ecologist, Mott MacDonald). Eoin is a qualified ecologist who has 2 years full time experience in ecological consultancy. He has conducted numerous baseline ecological surveys including extended phase 1 habitat surveys, invasive species and protected species (namely bat, badger and otter). He also has experience in undertaking ornithological field studies including breeding, wintering and wetland bird surveys. Eoin has carried out more targeted pre-construction surveys and Ecological Clerk of Works (ECoW) duties. He has prepared Appropriate Assessments Screening Reports, Natura Impact Statements, more focused Ecological Reports and assisted in drafting Ecological Impact Assessments for a variety of projects.

2 Methodology

2.1 Desk Study

2.1.1 General

This report has been prepared in accordance with the following European Commission Guidance:

- European Commission (EC) (2021) 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 (2021/C 437/01)
- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC Commission Notice C (2018) 7621.
- Department of the Environment, Heritage and Local Government (DEHLG) (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (Revised 2010).
- Office of the Planning Regulator (OPR) (2021) Practice Note PN01 - Appropriate Assessment Screening for Development Management.
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of alternative solutions and imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.

This report has similarly been prepared in accordance with principles and law laid down by relevant rulings of the Court of Justice of the European Union (CJEU) and the Superior Courts of Ireland.

This assessment includes a desk-based review conducted between March and April 2024 of available records of protected species and habitats including where appropriate the following sources:

- Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive;
- Site Synopsis and Conservation Objective Reports available from NPWS;
- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, Species Action Plans, and Conservation Management Plans; and
- Existing relevant mapping and databases, e.g. waterbody status, species and habitat distribution etc. (sourced from the Environmental Protection Agency - <http://gis.epa.ie/>, the National Biodiversity Data Centre - <http://maps.biodiversityireland.ie> and the National Parks and Wildlife Services - <http://www.npws.ie/mapsanddata/>

2.1.2 Historic Survey Data

2.1.2.1 Wintering Bird Surveys

Historic Wintering Bird surveys were conducted by DixonBrosnon in 2018/2019, 2020/2021 and 2022/2023 wintering bird seasons at the main STEP Power Plant site which partially includes the proposed site.

The report states in relation to methodology for the survey:

“Surveys were carried out from four vantage points on the southern shores of the Shannon Estuary between Richard’s Rock and east of Ardmore Point. Initially the survey focused on three points (Figure 5 Points A, B and C). A fourth survey site, Point D, was added in February of 2019. In 2021 surveys were extended in the summer months (May to July 2021) and two additional survey sites were added to the east of the Proposed Development site. All wildfowl, waders and gulls encountered on the beach between Points A and B (Beach and Lagoon), and in the bay between Points B and C (Bay) were recorded as separate subsites. The survey locations were chosen based on previous winter bird surveys, information gathered during the original site walkover and the location of the Proposed Development site. Boundaries of the count areas were selected primarily to delineate patches of relatively homogenous habitat within the study area in order to compare bird usage of these habitats and spatial areas; but were also selected to be easily perceived by the observer. This was done by use of sight-lines to prominent landmarks such as permanent marker buoys, coastal features and features on the horizon.”

The report notes that these sites were chosen due to their location near potentially valuable bird habitat relative to the Proposed STEP Power Plant site. The location of the vantage point and subsites are provided below in Figure 2.1.

Figure 2.1: Vantage Point Locations and Subsites for Winter Bird Counts



Source: DixonBrosnan (2021) STEP Estuarine Bird Report

The full report is provided in Appendix A

2.1.2.2 Breeding Bird Surveys

Historic breeding bird surveys were conducted DixonBronson in 2023.

The breeding bird survey was based on the British Trust for Ornithology (BTO) Common Bird Census (CBC) methodology (Bibby et al., 2000 and Gilbert et al., 1998) which aims to capture a snapshot of breeding bird activity within the study area.

The study area focused on terrestrial habitats within the Proposed STEP Development site. The aim of the breeding bird surveys was to identify any valuable bird habitats within the site boundary and to identify birds present within the site and surrounding landscape. This survey area encompassed terrestrial habitats along the survey route including hedgerows, treelines and agricultural fields.

Breeding bird surveys were carried out on the:

- 27th of March 2023,
- 30th of April 2023,
- 12th of May 2023, and
- 29th of June 2023.

The full report is provided in Appendix B.

2.2 Field Survey Data

2.2.1 Habitat Survey

Site surveys were conducted during the spring/summer period in 2023 and 2024 by Mott MacDonald ecologists and by DixonBrosnan Environmental Consultants in March 2024.

A habitat survey was carried out with regard to 'Best Practice Guidance for Habitat Survey and Mapping' (Heritage Council, 2011).

Habitats were classified to Fossitt level three in accordance with 'A Guide to Habitats in Ireland' (Fossitt, 2000). Fossitt habitat classifications are not directly comparable to the descriptions of Annex 1 habitats, e.g. CW2 - Tidal Rivers under Fossitt are linked to Estuaries (1130) under the EU Interpretation Manual for EU Habitats. Thus, the habitat classification system and the corresponding European Annex 1 habitats was informed with reference to the EU Interpretation Manual for EU Habitats (European Commission, 2013) having regard to the Irish Vegetation Classification where relevant.

The area was searched for evidence of invasive plant species listed in Part 1 of the Third Schedule of S.I No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011. Species protected under Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) were also searched for.

The habitat survey had regard for habitats which may offer supporting habitat for Qualifying Interests (QI) and Special Conservation Interests (SCI) associated with European Sites.

Equipment used for this survey included base maps, binoculars, and vegetative keys.

2.2.2 Mammal Surveys

Otter

Otter surveys were carried out by DixonBrosnan Environmental Consultants in 2007, 2011 2019-2021 and 2022-2024.

Otter surveys were also carried out by Mott MacDonald ecologists on the 4th and 5th of July 2023, 29th and 30th of August 2023 as well as the 5th and 6th of March 2024.

The survey followed 'Monitoring the Otter *Lutra lutra*' (Chanin, 2003). The extent of survey area was defined with regard to 'Guidelines for the Treatment of Otters during the Construction of National Road Schemes' (NRA, 2008) and therefore included survey of accessible watercourses plus riparian habitat 200m upstream and downstream. Signs of Otter searched for included:

- Individual otters
- Holts
- Couches/resting sites
- Spraints (categorised as dried fragmented, dried intact; not fully dry) and gland secretions
- Footprints and paths
- Slides
- Feeding remains

2.2.3 Aquatic Surveys

Aquatic surveys were carried out by Triturus Environmental Ltd. who were commissioned by Mott MacDonald to prepare and assessment on the aquatic ecological environment to inform on constraints regarding the proposed development.

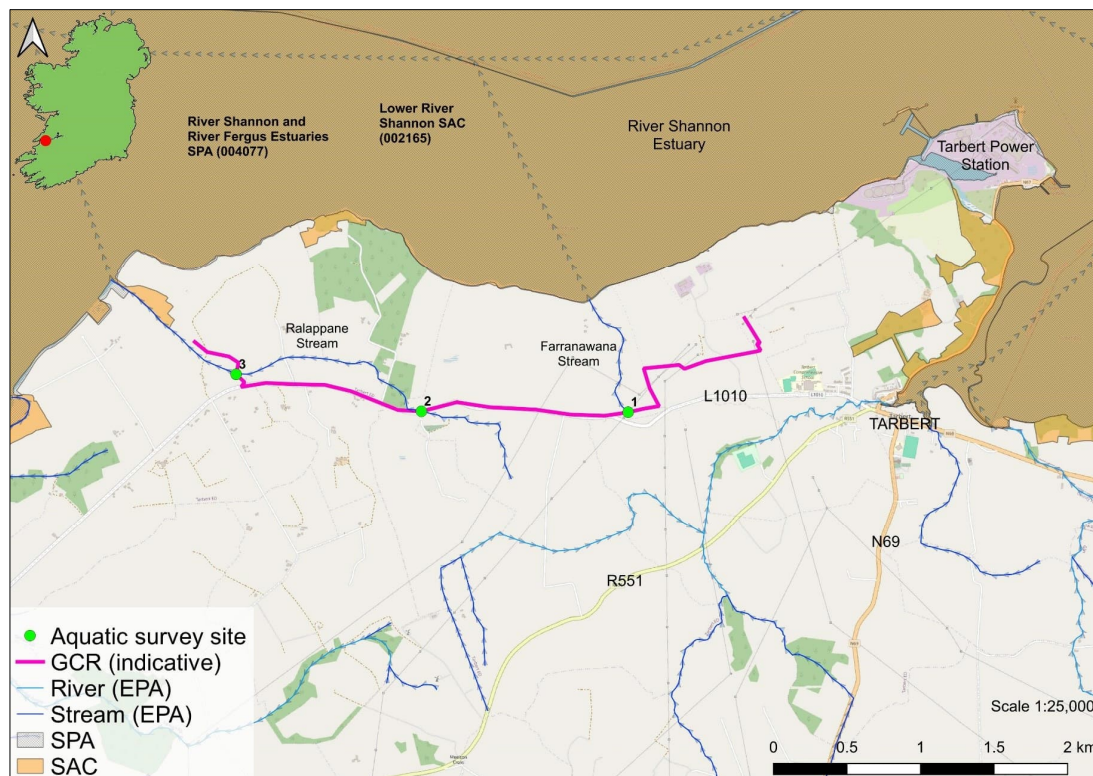
Three small streams are crossed by the proposed cable route and are considered as part of the current aquatic and fisheries assessment, however, it is only one crossing of the Ralappane stream which could be affected by the proposed development. The baseline surveys focused on the detection of freshwater habitats and species of high conservation value including surveys for macroinvertebrates (biological water quality) and fish of high conservation value, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities, including potential Annex I habitat associations in the vicinity of the proposed development, surveys were carried out in October 2023.

Three small streams intersect with the Proposed Development and are considered as part of the current aquatic and fisheries assessment as they were the only freshwater habitats in the footprint of the proposed development. Of these, works will only be required at one stream, the Ralappane stream. While not within the boundary of a European site there is potential downstream hydrological connectivity between the proposed project and the River Shannon and River Fergus Estuaries SPA and the Lower River Shannon SAC.

Aquatic Site Surveys

Aquatic surveys of the watercourses within the vicinity of the proposed pipeline project were conducted by Triturus Ltd on the 30th October 2023. Survey effort focused on both instream and riparian habitats at each aquatic sampling location. Survey locations are presented below in Figure 2.2.

Figure 2.2: Overview of Aquatic Survey Sites



Source: Triturus 2023

Surveys at each of these sites included a fisheries assessment (habitat appraisal), as sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*) and Atlantic salmon (*Salmo salar*) (only in fresh water) are all QIs for the Lower River Shannon SAC (002165), the closest European site. Although freshwater pearl mussel (*Margaritifera margaritifera*) is a QI for the Lower River Shannon SAC (002165), it has not been recorded historically in this catchment and so was not included in the aquatic surveys. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the proposed project and ensured that any aquatic habitats and species of high conservation value would be detected to best inform aquatic ecological constraints.

In addition to the ecological characteristics of the site, a broad aquatic and riparian habitat assessment was conducted. This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth etc) including associated evidence of historical drainage;
- Substrate type, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition

Fisheries Appraisal

A fisheries habitat appraisal survey of the three stream sites was also undertaken to establish their fisheries value. These surveys focused on evaluating the presence, absence and quality of aspects such as spawning, nursery and/ or holding habitat for salmonids and lamprey species.

Environmental DNA (eDNA)

To validate site surveys and to detect potentially critically low populations, i.e., ones which might not have been captured by physical survey methods, within the study area, eDNA samples were collected from the Ralappane Stream (2 crossing locations) and Farranawana Stream (single crossing). These were analysed for the presence of Atlantic salmon (*Salmo salar*).

The full report is provided in Appendix C.

2.3 Consultation

Pre-application consultations were carried out with prescribed bodies as detailed in Table 2.1 below. Key queries of relevance to this report are outlined.

Full responses are provided in Appendix D.

Table 2.1: Summary of Stakeholder Engagement

Consultee	Nature of Engagement	Key Responses/Comments
Development Applications Unit	A consultation letter was sent on the 8 th of May 2024 providing an overview of the Proposed Development.	<p>Comments relevant to the AA/NIS process</p> <ul style="list-style-type: none"> ● Request for inclusion of mitigation to prevent deterioration of water quality ● Request for otter surveys to ensure prevention of impacts to same ● A note that any works likely to damage breeding and resting places of otters and bats will require derogation licenses
Kerry County Council		<p>A response was received on the 6th of June 2024 outlining the following</p> <ul style="list-style-type: none"> ● Crossing of watercourses, including the Ralappane Stream, should have regard to the requirements of Inland Fisheries Ireland and flood risk management principles. In addition, care should be given to protect riparian vegetation. ● Fine Sediment Control proposals should have regard to S1.3.6 of Volume 6 of the Kerry CDP 2022-2028. ● The requirements of the Water Framework Directive should be taken into account. ● Selection of site compound locations should be informed by ecological survey. Areas of particular ecological / environmental sensitivity or in close proximity to sensitive watercourses, should be avoided. ● Any required accommodation works should be subject to environmental assessment. ● 'Soil and stone' generated from the proposal should be disposed of authorised places of disposal. Procedures / protocols should be put in place so as to ensure excavated material is not used to fill wetlands, or other lands of ecological value or semi-natural areas which

Consultee	Nature of Engagement	Key Responses/Comments
		<p>may support protected species – unless the necessary consents have first been obtained.</p> <ul style="list-style-type: none"> ● Invasive species protocols should be provided for, as part of the proposal. As part of this, 'Ireland's invasive alien species soil and stone pathway action plan 2023 – 2027' should be taken into account. ● Proposals including construction related lighting should have regard to the 'Lesser Horseshoe Bat Species Action Plan 2022-2026'. As part of this, the connectivity of lesser horseshoe bat populations in Kerry and Clare should not be adversely impacted. ● Should an NIS be required, any mitigation measures contained therein should be presented in a clear and specific manner, compatible with the recommendations of S3.2.4 of the following EC Commission Notice 2021/C 437/01 guidance document 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'.

2.4 Limitations

No significant limitations were experienced when carrying out site surveys for the proposed development. No constraints were experienced during the habitat mapping and site investigations, however; it should be noted that ecological habitats can change over time and season. This includes temporal changes in flora and fauna assemblages, and these changes can be augmented or induced by alterations of land use within any given site.

In addition to surveys carried out to support the assessment, this NIS has incorporated and considered historic data from extensive surveys conducted in the area over many years. Full details relating to these surveys are provided in various appendices as outlined in sections 2.2.

3 Screening for Appropriate Assessment

3.1 Process for Screening for Appropriate Assessment

The European Commission Guidance ‘*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*’ (2021) prescribes a 4-step process in Screening for Appropriate Assessment as follows:

- Determine whether the project or plan is directly connected with or necessary to the management of the site.
- Describe the project or plan and describe and characterise other projects or plans that in combination have the potential for having significant effects on the Natura 2000 site.
- Identify the potential effects on the Natura 2000 site.
- Assess the significance of any effects on the Natura 2000 site.

This report has been structured to reflect the 4-step screening process set out in the European Guidelines.

3.2 Management of European Sites

The proposed development is not directly connected with or necessary to the ‘management’ of European sites within the Natura 2000 Network having regard to Article 6 of the Habitats Directive. As such it is appropriate that the proposed development is subjected to screening for AA.

This screening assessment investigates, in view of best scientific knowledge, whether the proposed development, individually or in combination with other plans and projects, would be likely to have a significant effect on European sites. This report considers the likelihood of significant effects on European sites from the construction, operation, and decommissioning of the proposed development.

Measures intended to avoid or reduce the harmful effects of the proposed development on European sites (i.e. “mitigation measures”) or best practice measures have not been taken into account in the screening stage appraisal.

A description of the proposed development has been described in Section 2. The location of the proposed development in relation to European sites is presented in Appendix A

3.3 Project Description

3.3.1 The Proposed Development

The proposed development consists of two 220kV substations and two 220kV underground cable circuits between the Shannon Technology and Energy Park (STEP) Power Plant and the existing line cable interface mast adjacent to the existing Kilpaddoge Substation, which in turn feeds into the electricity network. The proposed development will be known as the Shannon Technology and Energy Park 220kV Grid Connection.

The proposed development will include:

- Approximately 5km of two 220kV underground cables (ca. 2.2km within the L-1010 and ca. 2.8km off road in greenfield land).

- Two 220kV Gas Insulated Switchgear (GIS) substations, including two-storey GIS buildings and associated transmission infrastructure.
- A 50MVA_r shunt reactor including all ancillary equipment.
- Buried optical fibre within the cable ducts from the proposed Glansillagh GIS substation to the Line Cable Interface Mast at Kilpaddoge.

The cable route originating at the substations, will then be routed adjacent to the STEP facility access road, public road and private lands. The cable will be installed on STEP-owned lands, ca. 2.2km will be installed under public roadway (L-1010) by Kerry County Council with the last section located off road in private lands (the total off road sections are ca. 2.8km), as shown in Figure 5.1.

The cable route terminates at a Line Cable Interface Mast (LCIM) in proximity to Kilpaddoge substation. One of the underground cables will be jointed into an existing cable on the existing LCIM and the other underground cable will connect to an existing underground cable route, via a joint bay, to feed into the Kilpaddoge substation.

The proposed substations will comprise an EirGrid/ESBN 220kV substation, named Glansillagh 220kV substation and one SLNG 220kV GIS substation, named Knockfinglas 220kV substation, located adjacent to each other and adjacent to the Shannon Technology and Energy Park (STEP) Power Plant, as shown in Figure 3.1.

The proposed substations and reactor will be located directly to the west of the proposed STEP Power Plant, approximately 250m south of Shannon Estuary and approximately 400m north of the nearest public road, the L-1010. The proposed substations are located within the planning application boundary of the STEP Power Plant project.

Figure 3.1: Proposed Development for the Shannon LNG Grid Connection project



Source: Mott MacDonald

Kerry County Council has obtained Part 8 planning for the widening of the L-1010. The road widening works will include the ducting and joint bay installation for the 220kV cables under the L-1010 and will be undertaken by Kerry County Council, or their subcontractors, in advance of the proposed development. These works will be fully funded by the Applicant by means of a special development contribution under section 48(2)(c) of the Planning and Development Act 2000 to cover the full cost of the upgrade works including the ducting and joint bay installation.

3.3.2 Overview of the Receiving Environment

The proposed development is located in County Kerry, south of the Shannon Estuary, west of Tarbert.

The substations associated with the proposed development will be located adjacent to the proposed power plant facility, approximately 4.5km to the west of Tarbert and approximately 3.5km to the east of Ballylongford. The proposed development occupies part of the following townlands; Ralappane, Kilcolgan Lower, Kilcolgan Upper, Carhoonakineely, Carhoonakilla, Cockhill, Carhoona, Coolnagoonagh, Farranawana and Kilpaddoge.

At the westerly point of the proposed development, the Lower River Shannon Special Area of Conservation (SAC) is approximately 150m to the north and west of the proposed substation/cable route. The River Shannon and River Fergus Estuaries Special Protection Area (SPA) is approximately 500m to the north and west, Ballylongford Bay proposed Natural Heritage Area (pNHA) is approximately 400m to the west. At the easterly point of the proposed development, where the connection to the existing network is proposed, the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA are approximately 400m from the proposed development.

The proposed substations are to be located in agricultural pastoral lands which comprise primarily of improved agricultural grassland, dry calcareous and neutral grassland, scrub, hedgerows and drainage ditches and depositing/lowland rivers immediately to the southwest and northwest of the proposed substation site.

The proposed underground cable route will cross the Ralappane Stream which discharges into the Shannon Estuary and is fed by smaller drainage ditches along its course. The Ralappane Stream drains directly to the Shannon Estuary via a tidal wetland area to the west of the STEP Power Plant site.

The topography of the land along the proposed development cable route is generally undulating and there are some occupied properties, along and adjacent to the L-1010 carriageway. Tarbert Comprehensive School is located along the L-1010. There is a ferry which runs from Tarbert to Killimer in Co. Clare, this is located to the east of the proposed development.

3.3.3 GIS Substations

The proposed 220kV substations are approximately 50m by 18.5m. The proposed layout is shown in Figure 5.2. Access to the site will be via the STEP Power Plant site access road from the junction of the L-1010 to the site, detailed under the STEP Power Plant Planning Application ABP-PA08.319566.

As set out in the drawing number 229100682-MMD-04-XX-DR-E-0100, the key components of the each of the two proposed 220kV substations and compounds comprise:

- 220kV GIS building
- Lightning Protection Rods
- Lighting Poles;
- Interface kiosks (1 No.)

- Property Fence/gates
- Palisade Fence/gates
- Distribution System Operator (DSO) Compound; and

The EirGrid/ESBN Substation includes external Air Insulated Switchgear (AIS) equipment comprising:

- Cable Sealing End
- Surge Arrestors
- Shunt Reactors
- Current Transformers
- Lightning Masts
- Lighting Poles

The external electrical equipment will not exceed 10m in height with the exception of the lightning protection monopoles which are approximately 18.5m in height.

Figure 3.2: 220kV Gas Insulated Switchgear (GIS) substations and construction compound following landscaping



Each 220kV GIS building will comprise a two-storey over partial basement structure. It will house the new gas insulated switchgear, comprising Sulphur Hexafluoride (SF₆) insulated circuit breakers, disconnectors and other high voltage equipment. Auxiliary services equipment, such as control and telecoms equipment, low voltage switchgear, an emergency diesel generator, and batteries. Welfare facilities (i.e. toilets, sinks, messroom, workshop.) will also be located within the EirGrid/ESBN substation building. The underground cables will connect with the substation via the partial basement, which will be designed to prevent any water ingress.

A below ground earth grid will be installed in a grid arrangement approximately 600 – 750 mm below the finished surface. The earth grid will consist of bare stranded copper conductor with an outside diameter of approximately 95mm². The purpose of the earth grid is to ensure personnel and public safety during electrical faults that may occur on the transmission grid.

Fencing around the entire EirGrid/ESBN substation compound, with the exception of the site entrances/gates, will comprise of external 1.4m high post-and-rail property fencing and internal 2.6m high galvanised steel palisade security fencing with black powder coat. Fencing around the SLNG Substation Compound will comprise a 2.6m high galvanised steel palisade fence with black powder coat.

The dimensions of the proposed structures on the GIS substation and compound site are summarised in Table 3.1.

Table 3.1: Approximate Dimensions of GIS Substation Building and Overground Structures

Structure	Number of Structures	Length (m)	Width (m)	Height (m)
EirGrid/ESBN 220kV Substation Building – Glansillaigh	1	49	18.5	17.0
SLNG 220kV Substation Building - Knockinglas	1	50	18.5	17.0
Lightning Rods (6 per building)	12	n/a	n/a	2
Lightning Masts	2	n/a	n/a	18.5
Shunt Reactor	3	3.4	3.4	10
Cable Sealing End (with associated steelwork)	3	n/a	n/a	6.2
Post Insulators (with associated steelwork)	6	n/a	n/a	6.2
Surge Arrestors (with associated steelwork)	6	n/a	n/a	6.2
Lighting poles	4	n/a	n/a	2.5
DSO compound	1	5	5	2.6 (fence)
Property Fence	1	n/a	n/a	1.4
Palisade Fence	1	n/a	n/a	2.6

Source: Mott MacDonald

The building will comprise a typical industrial form, with a structural steel frame clad with profiled metallic sheet wall and roof cladding. Internal walling of masonry will be adopted, except where specific load carrying requirements necessitate the use of reinforced concrete walls.

Industrial claddings will be factory finished according to EirGrid specification and will match the Shannon Technology and Energy Park (STEP) Power Plant. The roof will be shallow pitched and constructed of profiled metal decking on purlins spanning between rafters. The buildings will have access gantries and walkways for access to equipment. These will be constructed of stainless/galvanised steel open grating type flooring supported on steel beams and columns.

External doors and escape doors will generally comprise metal flush doors and mild steel frames. Fire doors will comply with BS 476-22:1987 - Fire tests on building materials and structures.

The ultimate choice of finish and colour of the metal cladding coating will be made considering the specified service life, resistance to degradation under long term exposure to climatic

conditions and will comply with the requirements of the statutory approval, if granted. A typical 220kV GIS Substation Building is shown in Figure 3.3.

Figure 3.3: Typical 220kV GIS Substation Building



Source: Mott MacDonald

3.3.3.1 Operation and Maintenance

During the operational phase, the Glansillagh 220kV substation will be monitored/operated by EirGrid. Operations at the substation will involve six to eight visits per month by ESB personnel, a quarterly inspection site visit and maintenance visits when required. The Knockinglas substation will be operated and maintained by the Shannon LNG Limited and will be subject to the STEP Power Plant Industrial Emissions (IE) licence.

The EirGrid/ESBN substation and SLNG substation will be serviced with a low voltage electrical supply from a connection to the existing 400V overhead line adjacent to the site. This connection is exempt for planning purposes and will be subject to agreement with ESB. An emergency diesel generator (less than 400 KVA) will also be provided to supply back up power for the ancillary electrical services in each substation, and will be used in rare cases, such as the loss of main power. The generator will be located in a dedicated room within each GIS building with appropriate fire rating, ventilation and bunding.

3.3.4 Underground Cables

The proposed underground cable development will comprise two 220kV electricity cables and fibre optic cables to facilitate the connection of electricity generated at the power plant facility to the national grid.

Connection will be via two 220kV underground cables (UGC) approximately 5km in length passing adjacent to the site access road, the L-1010 and then through agricultural lands to a feed in loop adjacent to the existing Kilpaddoge Substation.

Access to the UGC will be via the access road to the STEP Power Plant facility, detailed under ABP-PA08.319566. Access to the greenfield lands to the east will be via existing private tracks. Access to the joint bays to the west of the LCIM and at the LCIM is required by EirGrid and stone access tracks will be provided.

The underground cable route also includes ancillary works such as, clearance of laydown areas, use of a temporary compound adjacent to the proposed substations, and three temporary laydown areas. The proposed development will incorporate the following:

- There are 14no. joint bays proposed (to accommodate both 220kV cable circuits), with communication chambers and link boxes;
- Water and utility crossings, including Horizontal Directional Drilling (HDD) at crossing of the Kilpaddock substation access road);
- Temporary construction compounds including associated site works and ancillary staff facilities and parking; and
- All associated and ancillary above and below ground site development works, including works comprising or relating to permanent and temporary construction and roadworks and excavation including HDD of substation access road and vegetation clearance.

The UGC will be installed in a flat formation. The assessments included in this EIAR is based on a flat formation which has a wider trench width.

3.4 Construction Phase

3.4.1 Substations

General construction phase activities associated with the substation are set out below.

The site preparation works will be undertaken as part of the STEP Power Plant project (described under Planning Application ABP-PA08.319566) and will include:

- Demarcation of construction works areas, clearance, and site levelling to prepare the works area. As the substations are to be located on an area set aside for the STEP Power Plant laydown area, the site levelling works are will be completed as part of the STEP Power Plant enabling works.
- Topsoil will be stripped using excavators. The topsoil will be stockpiled within the demarcated boundary. The grounds will be built up to a finished ground level of 18-20 metres above ordnance datum.
- Stone for compound surfacing will be graded into place using excavator.

The main civil works for constructing the new GIS buildings will include:

- Foundations works
- Structural steelwork erection
- Cladding and building finishing works
- Permanent water supply and drainage works
- Miscellaneous civil works: paving, landscaping, permanent fencing and completion of works.

3.4.1.1 Foundation Works

Foundation construction will commence after the completion of STEP Power Plant site clearance and grading. The foundation installation will involve excavation, form work, steel reinforcement, and concrete placement. Foundations will be designed in accordance with the appropriate and relevant EirGrid Technical Specifications. Excavated material will either be reused on-site or disposed of off-site in accordance with applicable requirements under the Waste Management Act 1996, as amended and associated regulations.

When the foundations have been set, the copper earth mat will be installed into the soil in and around the foundation and will cover the entire substation compound. The earth mat installation and permitted operating limits will be designed in accordance with the appropriate and relevant EirGrid Technical Specifications.

3.4.1.2 Structural steelwork erection

Following the installation of the foundation and earth mat, construction activities will shift to the erection of structural steelwork. The GIS Building will be a steel portal two storey building over partial basement constructed in accordance with EirGrid technical specification. The ground floor level will include service rooms, loading bay, generator room, relay room, battery room and access to the cable basement area. The first-floor area of the building will be constructed to accommodate the 220kV switchgear assembly and a storeroom.

3.4.1.3 Cladding and building finishing works

Cladding and building finishing works and the installation of building services, e.g. drainage, internal circulation road, will be undertaken once the structural frame and steel support structures are completed.

A fire detection and alarm system will be specified during the detail design of the substation in compliance with EirGrid requirements. A Fire Safety certificate application to Kerry County Council will be made in advance of construction in accordance with the standard approach for the construction of substations.

3.4.1.4 Miscellaneous civil works: paving, landscaping, permanent fencing and completion of works.

Fencing around the entire substation compound, with the exception of the site entrances, will comprise a 2.6m high palisade security fencing. The proposed EirGrid/ESBN GIS substation will also have a 1.4m high concrete post-and-rail property fence along the perimeter of the substation site. The installation of these fences will comprise root mounted posts (posts driven into ground). There will be negligible ground borne vibration due to relatively small diameter of these posts. This would negate the requirement for pad footings below each post.

Electrical Installation of GIS plant will be delivered to the substation compound and unloaded within the GIS building loading bay. The gantry crane located within the hoisting area will lift the GIS plant to the first storey of the building and position it appropriately within the GIS Equipment Room. The plant will then be bolted together in place. Following the installation of plant within the GIS building, wiring and cabling of GIS plant and associated protection and control cabinets will be undertaken to the specifications and standards set out by the manufacturer.

3.4.1.5 Outline Construction Schedule and Timing of Works - Substations

Subject to the grant of statutory approval, it is expected that construction will commence in October 2026, following the enabling, earthworks and site preparation works for the STEP Power Plant which are anticipated to start in January 2026 as per STEP Power Plant Planning Application (ABP-PA08.319566). These dates are indicative and subject to change.

The overall duration of the construction phase is expected to be approximately 27 months for both the substations and underground cables.

For the substations, construction activities will gradually phase out from pre-construction to predominantly civil activities followed by commissioning and testing of the substation and equipment. It is expected that the number of construction workers required throughout the duration of the construction phase will peak at approximately 60 persons for the substation, and up to three crews of 5 to 8 persons for the cable system. Some of the activities noted in Table 3.2 will be carried out in parallel.

The majority of the construction activities are not dependant on outages on the existing transmission system.

Table 3.2: Indicative Construction Programme - Substations

Construction Phase	Activity	Approximate Timeline
Site Preparation (GIS Substation)	Preliminary site Drainage Works Site Preparation and Groundworks Drainage Permanent Fencing Installation Ducting for cable circuits to Demand Customer from substation to transition pit	18 Weeks
GIS Substations (civils)	Civil construction of new GIS Substation Building Compound levelling and finishing surface	34 weeks
GIS Substations (electrical)	Electrical Installation Pre-commissioning	32 weeks
Substation Energisation	Final commissioning and energisation	12 weeks

3.4.2 Underground cabling

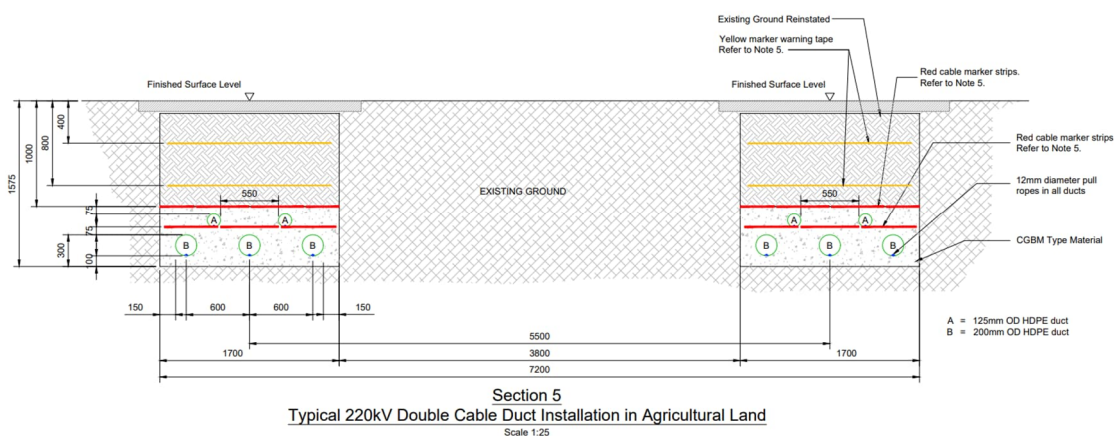
The following sections describe the proposed construction phase activities associated with the installation of the two proposed underground cables.

Following the consenting of the proposed development, should this be the case by ABP, there will be a process of pre-construction detailed design and micro-siting of the grid infrastructure. This will occur within the parameters and assessments of the approved development; any micro-siting which extends outside such parameters, for example outside the red line application area, will be subject to post-consent modification in accordance with the provisions of statutory legislation, as required. Throughout the design and assessment process, all reasonable and practically achievable measures have been taken to minimise and avoid impacts.

3.4.2.1 Trenching and Ducting

The standard trench dimensions for a single 220kV cable circuit in agricultural lands in flat formation is a width of 1.7m and depth of 1.575m with a centre-to-centre spacing of 5.5m, to allow for standard formation proposed for location within trenching for greenfield routes. Refer to Figure 3.4.

Figure 3.4: Double Trench Cross Section within agricultural lands



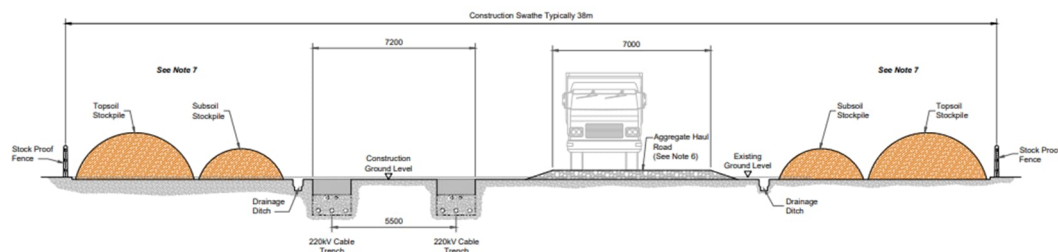
Following excavation of the trench, bedding material, Cement Bound Granular Material (CBGM) will then be laid, the ducts put in place, protection strips laid on top and the trench will be backfilled.

The duct installation will progress sequentially starting at one joint bay and moving towards the next joint bay along the route. The construction area will move in tandem with the progress of the duct installation, with only the relevant portion of the section cordoned off while under construction.

If there are excavations required where there are existing utilities, hand digging and the use of smaller excavators may also be required.

For cross-country sections, a temporary working strip of approximately 38m in width is proposed (Figure 3.5).

Figure 3.5: 220kV Cable Trench in Flat Formation Typical Construction Swathe in Private Lands



The working strip is required for the following reasons:

- To facilitate the storage of topsoil which must be removed from:
 - The footprint of the temporary construction access track (typically up to 5m in width).
 - The footprint of the cable trench.
 - A buffer strip between the temporary access track and the trench (for safety).
 - Subsoil storage area.
 - Materials storage areas.
- To facilitate the laying of the temporary construction access track alongside the cable trench to allow for the movement of construction equipment and materials along the section of the route on the farmland.
- To facilitate the excavation of the cable trench and the installation of the cable ducting.
- To facilitate the storage of distinct layers of subsoils excavated from the cable trench in segregated piles for later reinstatement to the original soil profile.

Approximately 30-50 m of trenching and ducting is completed in a day, dependent on conditions and location. Figure 3.6 illustrates a trench within agricultural lands.

Figure 3.6: Typical underground cable construction in agricultural lands



3.4.2.2 Cable Installation and Jointing

The cables will be brought to site on cable drums which will then be placed into position. Once the drum is set up, a winch system at the remote joint bay location(s), including pulling cable, will be attached to the nose of the cable and rollers will be used to guide the cable end towards the duct. The cables will then be pulled into the duct with lubrication being applied to the cable and duct throughout the process in order to control pulling tensions.

A bend radius of typically 20m or greater is used to navigate changes in direction for the cable route. The bend radius can be reduced to 6m to navigate very tight corners however as this introduces increased pulling tensions when installing the cable, it is used sparingly and only where required.

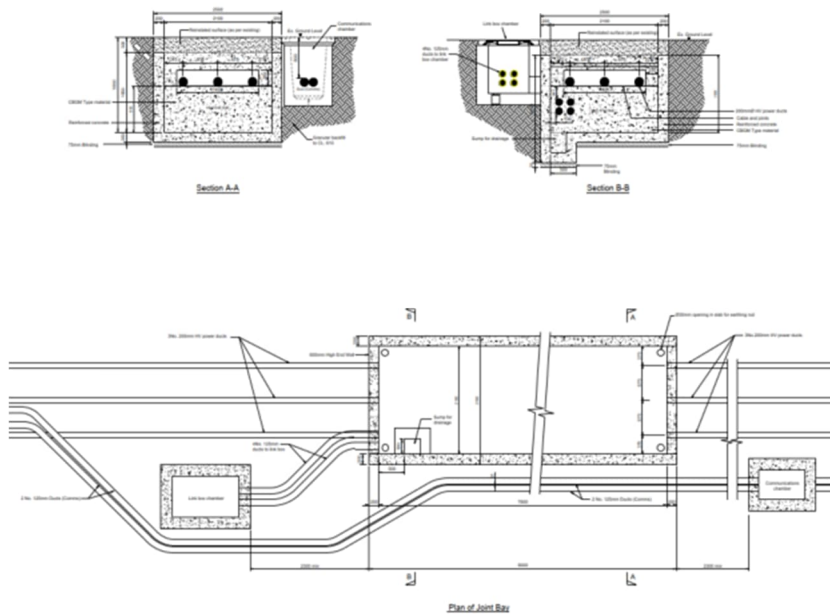
As detailed previously, joint bays will be required to be installed along the cable route to join consecutive lengths of cable and to facilitate cable pulling.

The width of the joint bays and the nature of the road network in the area means that partial road closures and diversions may be required in some areas along the route during cable installation. However, all reasonable and practically achievable measures, such as moving of equipment and placing temporary covers over the joint bays to allow essential access for vehicles, will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes. Specific traffic management requirements and localised arrangements will be developed by the appointed contractor(s) and will be agreed in advance of implementation with the appropriate local authority.

Joint bays generally consist of precast concrete walls and base located below ground with typical approximate dimensions of 8m length x 2.5m width x 2.3m depth for 220kV joint bays. The length of the joint bays may be longer subject to the requirements of the cable manufacturer. Sand or lean mix concrete will be used as required as a blinding layer to the underside of the chamber. The ducts will be installed to each end of the chamber, then proven,

cleaned and sealed. Figure 3.7 illustrates an indicative joint bay with Figure 3.8 illustrating a pre-cast joint bay and Figure 3.9 illustrates the cable pulling set up.

Figure 3.7: Indicative Joint Bay



Source: Mott MacDonald

Figure 3.8: Pre-cast Joint Bay prior to Cable Installation



Figure 3.9: Typical Set-Up of HV Cable Pulling Procedure



3.4.2.3 Cable Crossing

Underground cabling crossings on the Kilpaddoge substation access road are proposed to be crossed by HDD. Crossing underneath overhead power lines will require consideration during the construction phase ensuring that a suitable distance from the cabling is maintained by construction equipment and staff and staff welfare and safety is maintained.

3.4.2.4 Water crossings

There will be a crossing at the Ralappane Stream which will be crossed by open cut method.

Kerry County Council will construct a second crossing of the Ralappane stream and a crossing of the Farranawana stream under their Part 8 consent for the L-1010 road widening works.

3.4.2.5 Connection to Kilpaddoge and Tarbert substations

The two underground cables will connect to the national transmission network via two separate connections.

The connection to the Tarbert substation is via a LCIM (Line Cable Interface Mast), as shown in Figure 3.10.

Figure 3.10: Line Cable Interface Mast



Source: Mott MacDonald

One of the underground cables will be jointed into the conductor on the existing LCIM, from where it will connect to the Tarbert substation via the existing overhead line.

The second underground cable will connect to an existing underground cable at the LCIM, via a joint bay, to feed into the Kilpaddoge substation.

The connection of the underground cables to the existing cable and conductor will require an outage.

From the Kilpaddoge and Tarbert substations there will be connection to the wider existing grid network.

3.4.2.6 Indicative Construction Programme – Underground Cabling

Table 3.3: Indicative Construction Programme – Underground Cabling

Construction Phase	Activity	Approximate Timeline
Civil Works		
	Pre-construction	12 weeks
	Trenching and ducting works and temporary reinstatement	30 weeks
Total		42 weeks
Electrical Works		
	Pre-construction works	4 weeks

Construction Phase	Activity	Approximate Timeline
	HV cable joint bay re-excavation	3 weeks
	Proving of ducting/HV cable jointing	2 weeks
	HV cable jointing	28 weeks
	HV cable commissioning (sheath test, cross bonding and HV/AC testing)	4 weeks
	Permanent re-instatement of joint bays (Civils contractor)	3 weeks
Total		44 weeks

3.4.3 Temporary Construction Compounds

A main temporary laydown area will be located adjacent to the proposed substations, beside the main STEP Power Plant. Three smaller temporary laydown areas are also proposed, one south of the main temporary compound and adjacent to the access road and two to the east of the proposed development in proximity to the LCIM.

Temporary facilities will be provided at the main compound which will include construction phase car parking, welfare facilities and laydown areas as necessary. Any discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility.

3.5 Operation and Maintenance Phase

3.5.1 Permanent water supply and drainage works

3.5.1.1 Water Supply

A new potable water supply is required for proposed welfare facilities (toilet and wash hand basin) within the GIS buildings. The potable water demand will be relatively low as the proposed substations will normally be 'unmanned' and operated remotely.

It is conservatively estimated that the peak potable water demand for each GIS building will be 330 l/week. This is a conservative estimate based on the following assumptions:

- Site will normally be 'unmanned' but a 4 person operation and maintenance crew will visit the site once per week;
- Only one toilet on site, no urinals;
- Automatic flushing mechanism in place for the toilet which operates twice per day;
- Taps incorporate automatic shut-off mechanism; and
- Peaking factor of 1.25 applies as per Uisce Éireann requirements.

The potable water supply for the GIS buildings is proposed to be sourced from the existing public watermain system via a new connection to the watermain which is proposed to supply the STEP Power Plant facility. The Applicant has submitted a pre-connection agreement application to Uisce Éireann for this supply.

In addition it is proposed that both substations are provided with a hydrant for firefighting purposes.

3.5.1.2 Foul Water Drainage

During construction, portable chemical toilets will be provided for the duration of the works and all waste material will be removed from site and disposed of to an appropriately licensed facility. Once the new GIS buildings are operational, domestic type wastewater will be produced by the onsite welfare facilities (toilet, wash hand basin and mess room sink).

It is proposed that wastewater will be discharged by gravity sewer to a sealed foul water holding tank located adjacent to the entrance of the Glansillaigh substation compound. The holding tank is proposed to have a capacity of approximately 8m³ to allow for an emptying frequency of once every six months. The holding tank will be monitored by a high-level alarm which will alert the site operators when the tank capacity is approaching full.

3.5.1.3 Storm Water Drainage - GIS Buildings and Substation

A new storm water drainage system is required to collect and manage runoff from hardstanding areas, building roofs, internal access roads and landscaped surfaces within the substation compounds.

Storm water will be collected via a catch basin in the northeastern corner of the compound and will be conveyed to the fire water retention tank. All storm water will pass through an attenuation system including a silt trap and Class 1 hydrocarbon interceptors prior to discharge. The storm water will be discharged from the fire water retention tank to the Shannon Estuary via an outfall pipe (constructed as part of the STEP Power Plant project) located 5m beyond the low water mark and in a water depth of ca. 2.4m.

Upon completion of the works, the proposed onsite EirGrid/ESBN 220kV GIS Substation and the underground transmission cable will be handed over to EirGrid, who in conjunction with ESB Networks (ESBN), will carry out the final commissioning and energisation of the proposed substation and transmission line connections.

Once energised, the EirGrid/ESBN substation and 220kV grid connection will form part of the ESBN infrastructure (in their role as Transmission Asset Owner (TAO)), and EirGrid will be responsible for operating the system (in their role as Transmission System Operator (TSO)). The SLNG 220kV GIS substation will continue to be owned and operated by Shannon LNG Limited.

Gas handling on-site is primarily limited to the construction and decommissioning phases of a substation development. Specialised gas handling and maintenance procedures and training are incorporated into ESB management systems. Maintenance of Sulphur Hexafluoride (SF₆) containing equipment will be undertaken by ESB in accordance with these operating procedures. Alternatively, a specialist switchgear provider (such as the original equipment provider) may be employed by ESB, to undertake maintenance of SF₆ containing equipment. The electrical switchgear equipment will also be equipped with a pressure or density monitoring device which will detect any loss of SF₆. Maintenance of SF₆ containing equipment for the SLNG substation will be undertaken by a specialist provider.

The cable route will not require specific or routine maintenance activities along the cable trench or joint bay locations. Access may be required on a rare occasion to facilitate cable replacement if a failure occurs.

3.6 Decommissioning Phase

Subject to the granting of statutory approval, the EirGrid/ESBN substation and grid connections will form part of the national electrical grid infrastructure. The design life of the substation is approximately 40 years. It is expected that the substation site will remain a permanent part of

the national electricity transmission network and will be refurbished and / or redeveloped as required rather than be decommissioned.

The SLNG substation is expected to have a design life of 25 years. Where decommissioning takes place, all above-ground components associated with the substation will be disassembled and removed from the site and effects are likely to be similar or of a lesser magnitude than the construction effects. As part of the STEP Power Plant, it is expected that it would be a condition of the IE Licence for the SLNG substation that a closure and residuals management plan, including a detailed decommissioning plan, be submitted to the EPA for their approval.

It is not intended to decommission the proposed electricity cabling. Equipment will be replaced but decommissioning is not intended. In the highly unlikely event that decommissioning is required, the effects would be similar but less than those assessed during construction of the underground cables.

Decommissioning activities will include, as a minimum:

- All wastes at the facility at time of closure will be collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- Utilities will be drained of all potential pollutants such as lubricating oils or sealed to prevent leakage if being moved offsite or reused elsewhere.
- All raw materials, oils, fuels, etc. onsite at the time of closure will be returned to the supplier, or collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- All buildings and equipment will be decontaminated, decommissioned and demolished in accordance with a phased demolition plan, and either sold for reuse or recycled, or disposed of by an authorised waste contractor, as appropriate. In general, specialist equipment, pipelines and storage tanks will be sold for reuse, where possible, or disposed of offsite.
- All hazardous and non-hazardous process substances to be removed.
- All roads and hardstanding areas to be removed and recycled or disposed of by an authorised waste contractor, as appropriate.
- Landscaped will be reinstated in accordance with a landscape reinstatement plan.
- On completion of safe decommissioning of equipment, the potable water, fire water and electrical power supplies could be disconnected, and removed or abandoned in place.

3.7 Summary of Potential Impacts

In the absence of mitigation measures, there is the potential for the following impacts.

Construction Phase

- Potential for direct impact to habitats and species within the footprint of the proposed development.
- Potential for generation of dust.
- Potential for generation of surface-water pollution/sedimentation.
- Potential for noise effects.
- Potential for visual disturbance effects.
- Potential for local increases in air emissions

Operation Phase

No potential for impacts associated with the operational phase is identified.

Decommissioning Phase

Effects would be similar but less than those assessed during construction of the underground cables.

3.8 European Sites in the Zone of Influence

In the context of an ecological impact assessment generally (CIEEM, 2018) the zone of influence (Zol) for a proposed development is defined as:

“the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries” and that “the zone of influence will vary for different ecological features depending on their sensitivity to an environmental change.”

The Zol varies depending on the construction and operational activity and the sensitivity of the receptor (e.g., flora, birds, terrestrial mammals) to the effect encountered.

In order to establish the Zol of the Proposed Development, desktop and field survey data on protected habitats and species was mapped using a Geographic Information System (GIS). This data was interrogated for source-pathway-receptor connectivity.

The Zol identified for various ecological receptors, having regard to the potential for impact as outlined previously are as detailed below:

- The footprint of the proposed development for direct damage to habitats.
- No significant dust effects are likely based on the proposed development. However, localised dust deposition may occur during construction. Dust effects to ecological receptors was identified as 50m. As such, the Zol is taken as 50m for dust effects within this NIS.
- High noise effects (70dB and higher) are restricted to within 50m of the Proposed Development. Cutts et al. (2013) note that noise levels of below 55dB is often below background noise levels in estuaries. Noise modelling carried out indicates that the noise levels drop to below 55dB within approximately 230m of the proposed development (worst case scenario based on noise levels at construction compounds). As such 230m is taken as a worst-case scenario noise effect Zol.
- Zol.150m for breeding otter holts.¹
- Catchment wide Zol for surface waterbodies.
- 250m for groundwater dependant terrestrial ecosystems (GWDTEs).²

3.8.1 Source Pathway Receptor and Impact Assessment

Projects have the potential to impact on European sites beyond the footprint of the project itself. National Guidance³ states that screening for AA should be carried out for any European site within the likely Zol of a plan or project. For projects, the guidance recommends that Zol must

¹ National Roads Authority (2006). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.

² Kilroy G, Dunne F, Ryan J, O'Connor A, Daly D, Craig M, Coxon C, Johnston P and Henning M (2008). A Framework for the Assessment of Groundwater Dependent Terrestrial Ecosystems under the Water Framework Directive. Environmental Research Centre Report. Environmental Protection Agency Ireland.

³ Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government, 2009.

be evaluated on a case-by-case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects.

In order to establish the ZOI of the Proposed Development, desktop and field survey data on protected habitats and species was mapped using a Geographic Information System. This data was interrogated for source-pathway-receptor connectivity.

The source (potential impacts from the Proposed Development with ZOIs as outlined above), pathways (hydrological, physical or ecological connectivity) and receptors (QIs and SCIs of the European sites) were identified through a combination of bespoke field survey, and desktop survey including use of Geographic Information System software and through examination of aerial photography. Any European sites identified to have a viable source-pathway-receptor link to the Proposed Development were then examined further to determine the potential for significant effects.

The potential environmental effects of the Proposed Development can be summarised as:

- Direct impact to mobile QIs/SCIs, and supporting habitat (direct damage to vegetation) for same
- Indirect impacts to QIs/SCIs via:
 - Dust deposition
 - Noise and vibration
 - Lighting (temporary and permanent)
 - Accidental release of pollutants into surface waters
 - Introduction, dispersal or spread of invasive species
 - Sedimentation of surface waters from site runoff and dewatering of excavations

The location of the red line boundary for the Proposed Development in relation to European sites is provided in Appendix E.

Table 3.1 includes the source-pathway-receptor assessment for the Proposed Development. All European sites within the Natura 2000 network were considered in the course of compiling the below table. Additional European sites in the wider landscape such as Tullagher Lough and Bog SAC (002343), and Moanveanleagh Bog SAC (002351) were also considered. However, given their location (approximately 14.5km, and 12km from the Proposed Development respectively), the nature of the QIs for which they are designated, and the potential impacts identified for the Proposed Development, no viable source pathway receptor links have been identified.

Table 3.4: Source-Pathway Receptor Assessment

Site Name (Code), and Conservation Objectives	Distance between the works and European site (straight line) at closest point	Qualifying Interests / Special Conservation Interests (SCI) of the European site (* denotes priority habitat, breeding birds only noted otherwise wintering)	Source-Pathway-Receptor Assessment	Potential for Significant Effects
Lower River Shannon SAC (002165) (NPWS 2012)	0.08km	<ul style="list-style-type: none"> Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritima) [1330] Mediterranean salt meadows (<i>Juncetalia</i> <i>32etanus</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and 	<p>Lower River Shannon SAC is located 0.08km north of the proposed development at its nearest point. While no works are proposed to occur within the designated site, the proposed developments 500m Zol extends over the designated site and there is a direct hydrological link between the site and the Lower River Shannon SAC via the Ralappane stream</p> <p>There is potential for QI species to occur outside of the site boundary for the SAC. Aquatic surveys carried out by Triturus concluded that the Ralappane and Farranawana Streams are not salmonid water courses. However, otter surveys confirmed the use of the extended site by otters. Evidence of otters was found primarily along the Ralappane Stream from the shoreline in the SAC to within the proposed development's Zol for otter.</p> <p>The proposed development therefore presents a potential risk to the QI <i>Lutra lutra</i> (Otter) [1355] due to disturbance effects during construction. The construction</p>	Yes T– viable source pathway receptor links were identified with potential for impacts via surface water emissions, and disturbance effects to <i>ex situ</i> QI species.

Site Name (Code), and Conservation Objectives	Distance between the works and European site (straight line) at closest point	Qualifying Interests / Special Conservation Interests (SCI) of the European site (* denotes priority habitat, breeding birds only noted otherwise wintering)	Source-Pathway-Receptor Assessment	Potential for Significant Effects
		<p><i>Callitriche-Batrachion</i> vegetation [3260]</p> <ul style="list-style-type: none"> • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • <i>Margaritifera margaritifera</i> (freshwater pearl mussel) [1029] • <i>Petromyzon marinus</i> (sea lamprey) [1095] • <i>Lampetra planeri</i> (brook lamprey) [1096] • <i>Lampetra fluviatilis</i> (river lamprey) [1099] • <i>Salmo salar</i> (salmon) [1106] • <i>Tursiops truncatus</i> (common bottlenose dolphin) [1349] • <i>Lutra lutra</i> (otter) [1355] 	<p>phase also presents a small potential risk of impact from pollutant ingress to the water course thereby adversely impacting water quality.</p> <p>Given the location of the SAC in relation to the Proposed Development, there is potential for both direct and indirect impacts to Qis of the Lower River Shannon SAC</p>	
River Shannon and River Fergus Estuaries SPA (004077) (NPWS 2012)	0.08km	<ul style="list-style-type: none"> • Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Whooper swan (<i>Cygnus cygnus</i>) [A038] • Light-bellied brent goose (<i>Branta bernicla hrota</i>) [A046] 	<p>River Shannon and River Fergus Estuaries SPA is located 0.08km north of the proposed development at its nearest point. No works are proposed to occur within the designated site. As such, there is no source or</p>	<p>Yes – viable source pathway receptor links were identified with potential for impacts via surface water emissions, and disturbance effects to <i>ex situ</i> SCI species. .</p>

Site Name (Code), and Conservation Objectives	Distance between the works and European site (straight line) at closest point	Qualifying Interests / Special Conservation Interests (SCI) of the European site (* denotes priority habitat, breeding birds only noted otherwise wintering)	Source-Pathway-Receptor Assessment	Potential for Significant Effects
		<ul style="list-style-type: none"> Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas Penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed plover (<i>Charadrius hiaticula</i>) [A137] Golden plover (<i>Pluvialis apricaria</i>) [A140] Grey plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed godwit (<i>Limosa limosa</i>) [A156] Bar-tailed godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa 34etanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] 	<p>pathway for direct, physical impact on the SPA and SCIs within it. As there is a direct hydrological link between the site and the River Shannon and River Fergus Estuaries SPA via the Ralappane and Farranawana Streams, there is, however, an indirect link between the proposed development and the SPA.</p> <p>There is also potential for SCI species to occur outside of the site boundary for the SPA, e.g., the Qis lapwing (<i>Vanellus vanellus</i>) [A142] and redshank (<i>Tringa 34etanus</i>) [A162] are often found feeding in agricultural land such as encompasses most of the proposed development site. As such, there is potential for impacts to <i>ex situ</i> feeding grounds, and disturbance effects to SCI species.</p> <p>Due to the close proximity of the proposed development site to the designated SPA, and the hydrological links identified, viable source-pathway-receptor links are identified.</p>	

Site Name (Code), and Conservation Objectives	Distance between the works and European site (straight line) at closest point	Qualifying Interests / Special Conservation Interests (SCI) of the European site (* denotes priority habitat, breeding birds only noted otherwise wintering)	Source-Pathway-Receptor Assessment	Potential for Significant Effects
		<ul style="list-style-type: none">Black-headed gull (<i>Chroicocephalus ridibundus</i>) [A179]Wetlands [A999]		

No additional European sites were identified within the Zol of the Proposed Development.

3.9 Plans and Projects Which Might Act in Combination

Article 6(3) of the Habitats Directive requires 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.

It is therefore required that the potential impacts of the Proposed Development are considered in combination with any other relevant plans or projects.

3.9.1 Overall Step Facility

The Proposed Development will form part of the wider STEP Facility. Additional projects in relation to this facility are detailed hereunder:

- Strategic Gas Reserve Facility – this is the subject of a SID pre-application (ABP-319245-24) comprising of a floating storage and regasification unit, jetty and access trestle, onshore receiving facilities and ancillary works.
- Combined Cycle Gas Turbines (CCGT) Power Plant, Battery Energy Storage System (BESS), Above Ground Installation and associated ancillary works – a planning application was lodged with An Bord Pleanála on 19th April 2024 (ABP-PA08.319566).
- Gas Pipeline – planning permission exists for the development of a 26km natural gas pipeline which will facilitate connection from the STEP facility to the GNI transmission network at Leahy's, west of Foynes, Co. Limerick.
- Data Centre Campus as part of the Masterplan, a data centre campus is proposed to the west of the STEP site.

In the case of the Strategic Gas Reserve Facility, and the Data Centre Campus, these projects have not been submitted for planning at the time of writing. These projects will be subject to the provisions of Article 6(3), i.e., requiring screening for Appropriate Assessment as a minimum, and AA, if necessary. These projects will be assessed for the potential for in-combination effects in their own rights as part of this process.

The gas pipeline referenced above was subject to environmental assessment in 2008 but has not yet been constructed. Given the location of the pipeline, in the event that construction timelines run concurrently, there is potential for in-combination effects.

An NIS was produced in support of the application for the Combined Cycle Gas Turbine Power Plant application. This report identified the potential for effects on the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA through noise effects and surface water degradation associated with the development. Mitigation measures were prescribed to ameliorate these effects. Given the location of this project and the nature of potential impacts from same, there is potential for in-combination effects should the construction phase of the project run concurrently to that of the Proposed Development.

There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in association with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant.

3.9.2 Plans and Projects

An assessment of plans and projects submitted within the last 5 years with the potential for in-combination effects in association with the proposed development was undertaken.

A search of planning applications⁴ in the vicinity of the proposed development was undertaken in May 2024 to examine projects with potential for incombination effects. Details relating to these projects are provided below in Table 4.2.

⁴ Planning Websites: Kerry County Council, EIAR portal, and An Bord Pleanála.

Table 3.5: Plans, projects and proposals that might act in-combination with the proposed development

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	18878	Kilpaddoge, Tarbert, Co. Kerry	23.09.2019	<p>This project comprises a 10-year permission for a proposal that would entail the construction of a 30 MW Battery Energy Storage System (BESS) Facility to provide grid balancing services to the Irish Electrical Grid.</p> <p>The BESS would include the following elements:</p> <p>Up to 26 self-contained battery container units with associated Heating Ventilation and Air Conditioning (HVAC) Systems, Power Conversion Systems (PCS), Step-up transformers, Control systems and ancillary electrical components, A single storey electricity control building (104.8 sqm), A 110kV ESB sub-station, A single storey sub-station control building (178.3 sqm) and associated electrical infrastructure, A 110kV Generator Transformer, All necessary ground and foundation works, Associated compound cabling and ducting, Palisade security fencing and lighting, CCTV cameras, New site access from existing private road, Temporary construction compound, and All associated ancillary infrastructure and site development works</p> <p>The proposal would also entail earthworks to the site, whereby it would be dug-out to provide a lower and a higher level. The former level would be over the northern and central portions of this site, and it would be laid out to accommodate the control buildings and accompanying equipment. The on-site access road would pass on N/S axis through these portions of the site. The latter level would be over the southern portion, and it would accommodate the battery containers. A retaining wall would be constructed between these levels and a further one adjacent to the southern boundary of the site.</p>	<p>Yes – A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon SAC and the River Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water degradation. Mitigation measures were proposed within the report to ameliorate this risk.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of</p>

⁵ Guidance of the nature of a plan or project is provided in Section 2.1 of the document Department of Environment, Heritage and Local Government (2009), Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant</p> <p>Given the location of the development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.</p>
Project	19115	Kilpaddoge, Tarbert Co. Kerry	07.02.2020	The development will consist of a grid stabilisation facility comprising of the construction up to 4 no. Rotating stabilisers, 5 no. Battery storage containers, 1 no. Control room, 2 transformers and ancillary equipment within a site area of 39pprox.. 1.46 hectares. It is proposed to connect the proposed development to the adjacent EirGrid substation by underground cable which will traverse the permitted and under construction peaking plant. The rotating stabilisers will be supported by 10 no. Electrical equipment rooms which will contain ancillary power supply products including a static frequency convert (sfc), mv switchgear, exciters and lv	No – A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
				distribution, and step-up / down transformers. A heating ventilation and air conditioning system (hvac) will be attached to each rotating stabiliser, 4 no. Auxiliary transformers are also proposed. The battery containers will house individual battery components with 2 no. Fitted external hvac system for each. 13 no. Inverter stations and 14 auxiliary transformers are proposed for the battery containers. The entire site will consist of various underground cables and ducts, boundary securing fence, compound lighting and palisade gates and fencing, new internal access track, security lighting, cctv, hardstanding areas and all necessary foundation works. Permission is also sought for 2 electrical transformers (up to 220kv), associated hv equipment and underground electrical grid connection cabling and ducting connecting the development to the national grid at the adjacent ESB/EirGrid substation. Planning permission is sought for a period of 10 years. A natura impact statement (nis) accompanies this application	SAC and the River Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water degradation. Mitigation measures were proposed within the report to ameliorate this risk. At the time of writing, this project has been constructed and has entered the operational phase of the development. As such, no potential for in-combination effects associated with this development have been identified.
Project	ABP 304807-19	Townlands of Aghanagran Middle, Aghanagran Lower, Ballyline West, Tullahennell South Ballylongford Co. Kerry	06.01.2020	Construction of a windfarm of six turbines, with a blade tip height of 126.5m, battery units, upgrading of the existing access track and the provision of new internal roads, the development and improvement of existing entrances onto the public road, an 80m wind anemometry mast, a peat deposition area, underground electricity cables, an electricity substation with control room, a temporary construction compound, all on a site of 21.45ha. The applicant is seeking a 10-year planning permission and an operational period of 25 years. The application was accompanied by an EIAR and appendices which includes a Landscape and Visual Assessment Photomontages and Zone of Theoretical Visibility Maps and a Natura Impact Statement.	Yes – A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon SAC and the River Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water degradation. Mitigation measures were proposed within the report to ameliorate this risk. Given the location of the development relative to

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					the Proposed Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	VA03.30779 8	Townland of Carrowdotia South Co.Clare and Kilpaddoge Co. Kerry.	04.06.2021	Installation of 400kV electricity transmission cables, extension to the existing Kilpaddoge Electrical Substation and associated works, between the existing Moneypoint 400kV Electrical Substation in the townland of Carrowdoita South County Clare and existing Kilpaddoge 220/110kV Electrical Substation in the townland of Kilpaddoge County Kerry. The development includes work in the foreshore.	Yes – A Natura Impact Statement was produced in relation to this development. The report identified the potential for impact to the Lower River Shannon SAC, and the River Shannon and River Fergus Estuary SPA. These are through impacts to water quality, and through disturbance to QI/SCI species during the construction phase. Given the location of this development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality, and through

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					disturbance. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	20850	Kilpaddoge, Tarbert, Co. Kerry	12.11.2020	For changes to the previously permitted peaker power plant development (planning ref. 13/138). It is proposed to change the energy source for the charging of the battery energy storage system (BESS) containers from diesel to charging off the national grid and to change the permitted layout for electrical equipment based on the consequence of the proposed change in energy source at an area located within the permitted development. It is also proposed to include a small metering enclosure adjacent to the constructed substation building within the permitted development. A five year planning permission is being sought for the proposed development	No - The planning application report for the project notes that as the application is for change of use to an existing facility the compound had already been constructed. There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant.</p> <p>As such, given the nature and scale of the development no potential for in-combination effects is identified.</p>
Project	21549	Kilpaddoge, Tarbert, Co. Kerry	20.08.2021	<p>(A) A high inertia synchronous compensator (HISC) compound containing 1 no. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 8 no. Electrical equipment containers (containing ancillary power supply products including a static frequency converts, mv switchgear, exciters, lv distribution, control room, welfare and office), main auxiliary and start-up electrical transformers, generator circuit breaker, switchgear equipment, external cooler units and 1 no. Back up diesel generator and associated diesel storage tank; (b) a 220kv high voltage gas insulated switchgear (GIS) substation compound containing a GIS substation building with all control and hv equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence; (c) a battery storage compound containing 5 no. Battery storage containers, enclosed in steel containers of dimensions approximately 13m by 2.5m by 3m, housing individual battery components with 2 no fitted external HVAC systems for each unit and supported by 13 no. Inverter stations, 14 no. Auxiliary transformers and control container; (d) 220kv underground cable to the existing adjoining EirGrid substation; (e) associated elements comprising various underground cables and ducts, equipment plinths, boundary security fence, compound lighting and palisade gates and fencing, security lighting, CCTV, internal access roads, hardstanding areas and all necessary foundations works for the above compounds. The planning application is on lands where grid stabilisation facility was previously permitted under planning register no 19/115. Planning permission to construct the development is sought for a period of 10 years. A natura impact statement (NIS) has been prepared in respect of the proposed development and accompanies the application</p>	<p>Yes – A Natura Impact Statement was produced in support of the planning application. The application noted the potential for impacts associated with water quality and habitat alteration, as well as noise and disturbance/displacement of key species.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air</p>

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. Mitigation has been proposed to ameliorate these impacts, however, given the location of this development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	21305 and ABP 310521	Kilpaddoge, Tarbert, Co. Kerry	29.11.2021	Retain an existing telecommunications support structure (previously granted under Reg. Ref. 11/969 and ABP Ref. PL08.240232) together with associated ground equipment, security fencing and access track at Kilpaddoge, Tarbert, Co. Kerry.	No – given the nature, scale and location of this development no potential for in-combination impacts is identified.
Project	20438 and ABP appeal Ref. 308643	Meelcon, Carhoona, Farranawan a, Tarbert, Doonard upper and lower, Kilpaddoge, Ballyline west, Ballymacasy, Lislaughtin, Glamcollare south, Gurteenavall ig Co Kerry	21.06.2021	Amendment to previous granted permission which related to change in connection grid route for wind farm. A NIS was submitted with this application. The revised route will entail the construction of approximately 12.1km of 38kV underground electric cable connecting the existing permitted windfarm (19/381) to the 38Kva/110Kva substation at Kilpaddoge, Tarbert, County Kerry. The underground cables will be located along the public roads R-551, R552 and L-1010 and along 2 sections of private property. The development will also consist of the connection of the permitted windfarm (19/381), via existing permitted underground electricity cable.	Yes – A Natura Impact Statement was produced in support of the planning application. The application noted the potential for impacts associated with water quality and disturbance/displacement of species. Mitigation has been proposed to ameliorate these impacts, however, given the location of this development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects through impacts to <i>ex-situ</i> SPA SCI bird species in the surrounding lands. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	302681-18	Tullamore, Drombeg and Coolkeragh Listowel Co. Kerry	22.05.2019	<p>The proposed development comprises a ten-year planning application for:</p> <p>A solar pv farm with an operational lifespan of 35 years to export up to 50mw of electricity to the national grid.</p> <p>The development will comprise approx. 357,500 sq. m. of solar panels together with all ancillary cabling and electrical infrastructure including approx. 25 no. Combined inverter / transformer stations (with option to provide these as separate inverter transformer units);</p> <p>Provision of new access tracks and upgrading of existing agricultural access tracks; (approx. 5,936 m of internal access tracks)</p> <p>Landscaping;</p> <p>Temporary construction compound;</p> <p>Battery storage and control units;</p> <p>Boundary and security fencing; cctv security system on poles;</p> <p>New vehicular access point to the L-1009 (at site of existing agricultural gate to be used for construction and operational traffic);</p> <p>Approx. 4m telecommunications mast and</p> <p>All ancillary site development works all on a site of approximately 99.2ha.</p>	No – This development is located a significant distance from the Proposed Development. Given the nature of the project and its location relative to the Proposed Development no potential for in-combination effects is identified.
Project	1825	Beal East, Ballybunion Co. Kerry	19.01.2019	<p>For the development of a solar pv farm on a site. The development will consist of a solar PV array consisting of approximately 12.5 ha of solar panels within a total red line boundary of 14.16 ha on ground mounted steel frames, 1 no. Single story delivery substation, 2 no. Single story inverter / transformer units, 2 no. Single story battery storage containers, underground cable ducts on site, temporary construction compound (including site offices, portable toilets and parking area), boundary security fence, site entrance, access tracks, CCTV and all associated site works. This planning application is accompanied by an environmental report stage 1, screening for appropriate assessment, ecology report, archaeological impact assessment and photomontages</p>	<p>No – A screening for Appropriate Assessment was carried out in relation to this project which concluded that “...the proposed Beale Hill Solar Project will not cause adverse direct impacts on the conservation objectives and qualifying interests of any SACs or SPAs...”</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development</p>

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant.</p> <p>Given the nature, scale and location of this development no potential for in-combination effects is identified.</p>
Project	309156-21	Townlands of Ballyline West, Coolkeragh, Dromalivaun and Tullamore Co. Kerry	27.09.2022	<p>A detailed description of the proposed development is provided in the public notices and the EIAR submitted with the application. It includes the following:</p> <p>12 no. turbines (maximum tip height of 150m) with associated foundations and hard stand areas.</p> <p>Permanent meteorological mast (90m) and associated foundation and hardstand area.</p> <p>New (6.85km) and upgraded (4.43km) internal site service and access tracks.</p>	<p>No – outside the planning boundary and no pathway for in-combination impacts 6.7km south</p>

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
				<p>Underground 33 kV electric cabling between turbines within the wind farm and wind farm substation.</p> <p>6 no. peat deposition areas located across the windfarm site.</p> <p>2 no. site entrances, one permanent and one temporary.</p> <p>225m underground cable connection from the 110kV wind farm substation to the existing 110 kV transmission line due east of the windfarm.</p> <p>110 kV substation.</p> <p>New junction off the L6021 at the north-east of the site to facilitate construction and access.</p> <p>New junction off the L1009 on the west side of the site to facilitate construction and access.</p> <p>2 no. temporary construction compounds.</p> <p>Associated surface water management systems.</p> <p>Tree felling of c 3.15 ha of conifer trees to facilitate site development.</p> <p>Temporary works on sections of the public road along the turbine delivery route (including hedge/tree cutting, relocation of power lines/poles, lampposts, signage and local road widening).</p>	
Project	318540	At Tarbert Island, Tarbert Co. Kerry	Case is due to be decided by 05.06.2024	10 year planning permission for the proposed Open Cycle Gas Turbine (OCGT) power plant fuelled by Hydrotreated Vegetable Oil (HVO) and associated site works	<p>Yes – Works are likely to take place concurrently. Given the locations relative to the River Shannon SAC, there is therefore potential for in-combination impacts, e.g., via pollution to watercourses and/or by disturbance impacts to ex-situ SPA SCI bird species in the surrounding lands.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the</p>

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	23284	Ballymacasy , Coolnagraigue, Ballyline East, Ballyline West, Leanamore	17.10.2023	Apply for a 10 year permission and 40 year operation for a solar farm of 146.6 hectares, on 3 no. Land parcels consisting as described herein: west parcel(Ballymacasy, Ballyline east and Ballyline west townlands) c 58.48 hectares, central parcel (Coolnagraigue townland) c. 53.8 hectares and east parcel (Leanamore and Dromalivaun townlands) c 34.32 hectares, a route corridor for an under ground internal electrical cable connecting the west and central parcels to the east parcel consisting of c 3772 meters in length.	No – There is a potential risk for cumulative effects to air quality from increased traffic movements, during the construction phase, causing air emission deposits of nitrogen

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
		and Dromalivaun Co Kerry			oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. Given the location of this project relative to the Proposed Development (located 4.5km to the south east) and the nature of the development, no potential for in-combination effects is identified.
Project	318912	Tullamore Listowel Co. Kerry	Case is due to be decided by 27.05.2024	Substation and associated works to reduce quantum of solar panels required for solar farm. An NIS accompanies this application.	No – Given the location of this project relative to the Proposed Development (located 10km away) and the nature of the development, no potential for in-combination effects is identified.

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	2360050	Townlands Of Aghanagran Lower, Ballyline West, Kilgarvan, Coolkeragh and Tullamore Co. Kerry	Decision Date: 23.01.2024	A new grid connection route connecting the permitted Ballylongford windfarm (Kerry County Council planning ref 19/381) (An Bord Pleanala ref- PL08.304807) at Aghanagran Middle And Lower, Ballyline West And Tullahennel South, Ballylongford, to the proposed 38kVsubstation (Kerry County Council planning ref 23/431) at Tullamore, Listowel, Co Kerry. The route will entail the installation of approximately 7.3km of 38kv underground electric cable passing through townlands of Aghanagran Lower, Ballyline West, Kilgarvan, Coolkeragh, and Tullamore in County, Kerry The proposed grid route is proposed to be via underground cables located along the public roads : L10028, R552, and L-1009, and private property. The new grid route is a change a previously granted permission for a 12.1km grid connection route (Kerry County Council planning ref 20/438) (An Bord Pleanala ref- PL08308643) from the permitted wind farm to the 38kva /110kva substation at Kilpaddoge, Tarbert. The proposal includes alterations to the permitted windfarm (Kerry County Council planning ref 19/381) (An Bord Pleanala ref- PL08.304807), the permitted 38 kV substation at the wind farm is to be relocated and redesigned. The altered substation proposal will be located in a new substation compound that includes a control building, and all associated electrical plant and apparatus, fencing, and an access track within the townland of Aghanagran Lower. The proposed substation at the windfarm will be connected to the windfarm via underground cabling from Turbine T4. The project includes all ancillary and associated works necessary to facilitate the development, including three temporary construction compounds. A Natura Impact Statement has been prepared in respect of the proposed development and accompanies this application.	No – Given the location of this project relative to the Proposed Development (located 5km away) and the nature of the development, no potential for in-combination effects is identified.
Project					
Foreshore Licences	315838	Tarbert Power Station Tarbert in the townland of Tarbert Island Co. Kerry	Recommendation/ Conclusion that AA is required 29.03.23	Application received under Section 4 of the Development (Emergency Electricity Generation) Act 2022 (the Act) for a designated development (construction of a temporary, 5 year, 150MW emergency generation plant – limited to a maximum of 500 operational hours per annum) located at Tarbert Power Station, Tarbert, in the townland of Tarbert Island, Co. Kerry	Yes -These works were granted and are currently under construction. The works will be completed prior to construction for the Proposed Development taking place. As such, no potential for in-combination effects is identified. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the

Plan or project ⁵	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					integrity of European sites.
Project					
	319080	Moneypoint Generating Station, Co. Clare	Lodged Nov 2023	ESB intends to undertake a survey campaign at the Moneypoint Generating Station site to inform the engineering design of the proposed Moneypoint Hub Project. The marine surveys will include geophysical, geotechnical, environmental, and met ocean surveys.	No – Given the nature of these works, and their location relative to the Proposed Development (3km away) no potential for in-combination effects is identified.

3.10 Summary of Potentially Significant Effects

In the absence of mitigation, the potential for likely significant effects on European sites has been identified from the Proposed Development alone. In the absence of mitigation (at AA Screening Stage), the potential for likely significant in-combination effects has been identified to the European sites.

- Lower River Shannon SAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)

3.11 Screening Conclusion Statement

The proposed development is not directly connected with or necessary to the management of a European site.

This AA Screening report concludes that it cannot be excluded on the basis of objective evidence, and in view of best scientific knowledge, and in the absence of any measures intended to avoid or reduce harmful effects on European sites, that there will not be any likely significant effects from the Proposed Development alone, and in combination with other plans or projects, on the following European sites only:

The proposed development has been assessed as having the potential, both alone and in-combination with other projects, to adversely impact two Natura 200 sites, namely:

- Lower River Shannon SAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)

4 Stage 2 – Natura Impact Statement

This Natura Impact Statement (NIS) has been produced in support of the Appropriate Assessment of the Proposed Development to be undertaken by the competent authority. The NIS considers the likely or possible significant effects of the proposed development. Mitigation measures are identified to avoid adverse effects on the integrity of European sites.

4.1 Description of the Development

The development is described in detail in Section 3.3 of this report.

- Construction phase activities are outlined in Section 3.4.
- Operational phase activities are outlined in Section 3.5.
- Decommissioning phase activities are outlined in Section 3.6.

4.2 Receiving Environment

4.2.1 Habitats Within the Footprint of the Proposed Development

A habitat map of the proposed development and surrounding areas is provided in Appendix G.

No Annex 1 habitats were determined within the footprint of the proposed development.

GA1 – Improved Agricultural Grassland

This is a dominant habitat type within the proposed development area located at both ends of the proposed development near the substations and grid connection (Photo 4.1). This habitat type dominates along the proposed route of the development with the fields consisting of this habitat type intersected/separated by treelines/hedgerows (WL2/WL1), public roads such as the L-1010 (BL3) and the Ralappane stream (FW2). This habitat has been subject to agricultural maintenance practices for many years but certain areas experience variations in moisture levels with 'wetter' areas transitioning into or bordering wet grassland (GS4) or marsh (GM1) within the same field boundaries. The species composition of this habitat throughout the site consists of Yorkshire Fog (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), broad leaved dock (*Rumex obtusifolius*), soft rush (*Juncus effusus*), sorrel (*Rumex acetosa*), sharp flowered rush (*Juncus acutiflorus*), white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens*), ragwort (*Jacobaea vulgaris*) and common bent (*Agrostis capillaris*).

Photo 4.1: Improved Agricultural Grassland (GA1) Habitat



WL2 – Treelines

The proposed development area and cable route is intersected by treelines acting as field boundaries separating parcels of land within the proposed development area (Photo 4.2). This habitat type is important for local wildlife providing suitable habitat for potential roosts, nests, foraging and commuting routes throughout the wider area and development site. The species composition of this habitat varies along the proposed route depending on what species had previously been planted for form the treeline but primarily species consisted of willow (*Salix sp.*), hawthorn (*Crataegus monogyna*), elm (*Ulmus procera*), ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*) and sycamore (*Acer pseudoplatanus*).

Photo 4.2: Treeline (WL2) Habitat



WL1 Hedgerows

The proposed development area and cable route is intersected by hedgerows acting as field boundaries separating parcels of land within the proposed development area (Photo 4.3). Similarly, to treelines (WL2), this habitat type is important for local wildlife providing suitable habitat for potential roosts, nests, foraging and commuting routes throughout the wider area and development site. The species composition of this habitat varies along the proposed route depending on what species had previously been planted for form the hedgerow but primarily species consist of willow (*Salix sp.*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), dog rose (*rosa canina*), bramble (*Rubus fruticosus*), gorse (*Ulex europaeus*), elder (*Sambucus nigra*), ivy (*Helix hedera*), oak sapling (*Quercus robur*), honeysuckle (*Lonicera sp.*) and ash sapling (*Fraxinus excelsior*).

Photo 4.3: Hedgerow (WL1) Habitat



WS1 – Scrub

Scrub habitat is present throughout the site but appears to be 'patchy' and inconsistent in distribution along the proposed route and development area (Photo 4.4). Areas of scrub identified are largely associated with treeline/hedgerow habitats along the borders of individual fields. The species composition of this habitat varies along the proposed route depending on factors such as land management practices, grazing, soil type/fertility, exposure and moisture levels but primarily species consist of willow (*Salix sp.*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus*), gorse (*Ulex europaeus*) and hazel (*Corylus avellana*).

Photo 4.4: Scrub (WS1) Habitat



GS1 – Dry Calcareous and Neutral Grassland

This habitat type (Photo 4.5) is mainly present towards the western end of the proposed route near the GIS substation compound. Species composition of this habitat type consisted of Yorkshire Fog (*Holcus lanatus*), sorrel (*Rumex acetosa*), creeping buttercup (*Ranunculus repens*), dandelion (*Taraxacum sp.*), knapweed (*Centaurea nigra*), lesser celandine (*Ficaria verna*), white clover (*Trifolium repens*), pignut (*Conopodium majus*) and meadow buttercup (*Ranunculus acris*).

Photo 4.5: Dry Calcareous and Neutral Grassland (GS1) Habitat



GM1 – Marsh

This habitat type (Photo 4.6) is mainly present towards the western end of the proposed route near the GIS substation compound. It is present in areas of GA1 habitat fields where the ground has been subject to longer periods of water retention/increased moisture levels just north of the Ralappane stream. Species composition of this habitat type consisted of yellow flag (*Iris pseudacorus*), marsh forget-me-not (*Myosotis scorpioides*), marsh bedstraw (*Galium palustre*), soft rush (*Juncus effusus*), water cress (*Nasturtium officinale*) and marsh pennywort (*Hydrocotyle vulgaris*).

Photo 4.6: Marsh (GM1) Habitat



BL3 – Buildings and Artificial Surfaces

There are several agricultural and private residence properties along the proposed route within the development site consisting of residential, maintenance, service and abandoned structures as well as access roads, lanes and yards. The L-1010 road is also present which the main body of the proposed development travels along before turning north at the western end for the GIS substations and north at the eastern end for the Grid Connection.

WD1 – (Mixed) Broadleaved Woodland

There is a small pocket area of this habitat type (Photo 4.7) towards the western end of the route just north of the L-1010 and west of where the proposed route turns north. The area appears to be an old agricultural property which has become overgrown by the woodland habitat overtaking the area with abandoned/derelict structures present. Species composition of this habitat type consisted of ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), elm (*Ulmus procera*) and willow (*Salix sp.*). Undergrowth species present consisted of nettle (*Urtica dioica*), broad leaved dock (*Rumex obtusifolius*), ivy (*Helix hedera*), Yorkshire fog (*Holcus lanatus*) and creeping buttercup (*Ranunculus repens*) where the woodland borders GA1 habitat.

Photo 4.7: (Mixed) Broadleaved Woodland (WD1) Habitat



ED3 – Recolonising Bare Ground

This habitat type (Photo 4.8) is predominantly located towards the eastern end of the proposed development near the grid connection where the route turns north off of the L-1010. It appears to be an active storage yard connected to one of the neighbouring properties with access to some of the fields. Species composition of this habitat type consisted of gorse (*Ulex europaeus*), foxglove (*Digitalis purpurea*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), marsh ragwort (*Jacobaea aquatica*), marsh thistle (*Cirsium palustre*), bramble (*Rubus fruticosus*) and nettle (*Urtica dioica*).

Photo 4.8: Recolonising Bare Ground (ED3) Habitat



FW2 – Lowland Depositing Stream with Riparian Woodland (WN5) Habitat

There are two streams of this habitat type that intersect through the proposed development site, the Ralappane and Faranawana Streams. Examples of this habitat type are presented in Photo 4.9, and Photo 4.10. The Faranawana stream flows north towards the Shannon Estuary from Woodview Place under the L-1010 and is bordered by a woodland corridor forming a riparian habitat (WN5). The Ralappane stream also flows towards the Shannon Estuary initially west parallel to the L-1010 underground before emerging to run along treelines/hedgerows on field boundaries, towards the western end of the proposed route near the GIS substations it again forms a riparian habitat (WN5) as it flows out to the estuary. Species composition of this habitat type consisted of reed (*Phragmites australis*), canary grass (*Phalaris canariensis*), nettle (*Urtica dioica*), purple loosestrife (*Lythrum salicaria*), branched burreed (*Sparganium erectum*), willow (*Salix sp.*), elm (*Ulmus procera*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), hemlock water dropwort (*Oenanthe crocata*), yellow flag (*Iris pseudacorus*), wild angelica (*Angelica sylvestris*), herb Robert (*Geranium robertianum*) and broad buckler fern (*Dryopteris dilatata*).

Photo 4.9: FW2 and Riparian Woodland (WN5) Habitat



Photo 4.10: Lowland Depositing Stream (FW2) Habitat



FW4 – Drainage Ditch

Several drainage ditches were identified across the proposed development, these were observed to generally be flowing towards the Shannon Estuary similarly to the lowland depositing river (FW2) habitats. An example of this habitat type is presented in Photo 4.11. As such the drainage ditches on the western end of the proposed development route ultimately drain into the Ralappane Stream, due to the nature of drainage ditches and inconsistent periods and levels of moisture and water flow the drainage ditches are not considered to be suitable habitat to support aquatic species such as fish and are not suitable to provide significant foraging habitat for otter. The surrounding habitat species consisted of typical riparian, aquatic and field flora species such as soft rush (*Juncus effusus*), willow (*Salix sp.*), nettle (*Urtica dioica*), water crowfoot (*Ranunculus aquatilis*), yellow flag (*Iris pseudacorus*), marsh ragwort (*Jacobaea aquatica*), common bent (*Agrostis capillaris*), marsh foxtail (*Alopecurus geniculatus*), pondweeds such as *potamogeton sp.* and water starwort (*Callitriche stagnalis*).

Photo 4.11: Drainage Ditch (FW4) Habitat



GS2 – Dry Meadows and Grassy Verges

This habitat type (Photo 4.12) has been identified along various points of the proposed development area, most notably in the eastern end of the proposed route near the grid connection along the access road leading north from the L1010 to the Tullahennel Wind Farm Substation and on the western end of the route separating the Ralappane Stream from the wider environment. Species present consisted of Yorkshire fog (*Holcus lanatus*), ragwort (*Senecio jacobaea*), spear thistle (*Cirsium vulgare*), false oat grass (*Arrhenatherum elatius*), cleavers (*Galium aparine*), creeping buttercup (*Ranunculus repens*), lesser celandine (*Ficaria verna*), *persicaria sp.* and nettles (*Urtica dioica*). The habitat is present near the grid connection to the west appears to be present and transitional between recolonising bare ground (ED3) and an area of bramble scrub lining the access route.

Photo 4.12: Dry Meadows and Grassy Verges (GS2) Habitat



GS4 – Wet Grassland

This habitat type (Photo 4.13) is mainly present towards the western end of the proposed route near the GIS substation compound. It is present in areas of GA1 habitat fields where the ground has been subject to longer periods of water retention/increased moisture levels in the vicinity of FW4 and FW2 habitats. Species composition of this habitat type consisted of soft rush (*Juncus effusus*), great willowherb (*Epilobium hirsutum*), Yorkshire fog (*Holcus lanatus*), meadow buttercup (*Ranunculus acris*), marsh foxtail (*Alopecurus geniculatus*), nettles (*Urtica dioica*),

purple moor grass (*Molinia caerulea*), marsh willowherb (*Epilobium palustre*), celery leaved buttercup (*Ranunculus sceleratus*), yellow flag (*Iris pseudacorus*) and sharp flowered rush (*Juncus acutiflorus*).

Photo 4.13: Wet Grassland (GS4) Habitat



WD5 - Scattered Trees and Parkland

This habitat type (Photo 4.14) is located on the far eastern side of the proposed development site situated just on the corner of the proposed development area. The species present consisted of ash (*Fraxinus excelsior*), sitka spruce (*Picea sitchensis*) and scots pine (*Pinus sylvestris*) with an understory habitat consisting of hawthorn (*Crataegus monogyna*), and rye grass (*Lolium perenne*) with some sparse gorse (*Ulex europaeus*) growth.

Photo 4.14: Scattered Trees and Parkland (WD5) Habitat



4.2.2 Invasive Species

No schedule 3 listed invasive species were recorded during field surveys undertaken to inform the Proposed Development.

4.2.3 Mammals

Historic Surveys

Surveys carried out by DixonBrosnan from 2019 to 2024 recorded the following evidence of otter activity within and in close proximity to the Proposed Development:

- An otter sprainting site identified along the tidal section of the Ralappane Stream.
- Live otter was recorded foraging along the shoreline near Knockfinglas Point west of the site.
- Live otter recorded in a field above the upper shoreline west of the site.
- Live otter recorded foraging close to the lagoon west of the Proposed Development.
- Dead female otter was observed within the coastal waters east of the site.
- Two otters recorded via trail camera close to the confluence of the stream and the shoreline outside of the proposed development area to the west, indicating potential breeding behaviour. However, despite this no holts were identified or recorded within 150m of the proposed development site.
- The location of these sightings are presented below in Figure 4.1.

Figure 4.1: Otter Survey Results from DixonBrosnan from 2019-2024



Source: DixonBrosnan Mammal Survey Report – Otter Results 2019-2021 (March 2024)

Additional otter surveys were carried out by DixonBrosnan from 2022 – 2024, these surveys were to identify/confirm any changes to otter activity within the site and wider area. No significant changes in usage of the site by otter was identified. No couches or holts were recorded during these surveys. While no new evidence or significant changes in site usage were identified, the results from the 2022-2024 survey showed that there is consistent usage of the lower section of the Ralappane Stream with likely foraging ongoing within the intertidal and offshore habitats.

Current Surveys

Otter activity was recorded with a potential otter slide and couch with a mammal trail leading down to the Ralappane Stream via a drainage ditch. Evidence of recent activity was observed as bedding was present along the mammal trails, in the ditch and by the potential couch area, this trail was identified outside of the proposed development site, approximately 72m from the red line boundary.

The locations of these features relative to the Proposed Development are provided in Appendix G.

4.2.4 Aquatic Surveys

The Proposed Development site is currently utilised for agricultural purposes. As such, diffuse agricultural sources continue have historically caused deterioration to the water quality within the Ralappane stream. This is reflected in the findings of the aquatic surveys as outlined hereunder. Aquatic surveys of the watercourses intersecting with the Proposed Development were conducted on the 30th October 2023. Results relating to QI species at each of the three survey sites are presented hereunder.

Full details relating to this report are provided in Appendix C.

4.2.4.1 Site 1 – Farranawana Stream, Farranawana

Given the channel was very shallow and small, its value for salmonids was low near the proposed crossing. No brown trout (*Salmo trutta*) or Atlantic salmon (*Salmo salar*) were recorded in the eDNA sample collected at the site. The stream was of too high energy for lamprey, and none were recorded from the eDNA sample.

No Annex I aquatic habitats were recorded.

4.2.4.2 Site 2 – Ralappane Stream, Cockhill

Given the channel suffered from both heavy siltation and enrichment pressures (based on its physical condition), it was considered a poor salmonid habitat. As the coarse gravels were blocked with silt given historical hydromorphological pressures (i.e., drainage), and from soil erosion, the nursery and spawning value were also poor. Also, the low autumnal flows and its diminutive size would preclude salmonid presence as validated by the eDNA sampling results (i.e. no salmon recorded). While the stream supported some lower quality lamprey ammocoete habitat given widespread depositional areas, the poor flows, small size of the stream and absence of spawning habitat indicated conditions were unsuitable for the species. The eDNA results supported the absence of lamprey and salmonids.

No Annex I aquatic habitats were recorded.

4.2.4.3 Site 3 – Rallappane Stream, Ralappane

The Rallappane stream is the only stream where works will be required to facilitate the crossing.

Given the channel suffered from both heavy siltation and enrichment pressures it was considered a poor salmonid habitat. As the coarse gravels were blocked with silt given historical hydromorphological pressures (i.e., drainage) and from soil erosion, the nursery and spawning value were poor. The poor stream condition supported the absence of salmonids in the eDNA results. While the stream supported some low-quality lamprey ammocoete habitat, poor flows, small size, and the absence of spawning habitat precluded the presence of the species, as supported by the eDNA results.

No Annex I aquatic habitats were recorded.

4.2.5 Bird Surveys

4.2.5.1 Estuarine Bird Surveys

Surveys carried out focussed on the shoreline to the north of the proposed development, and identified foraging areas to the south of this. Vantage point B was the closest to the Proposed Development and was located approximately 400m to the west of the proposed development, while point C, E and F were all located along the shoreline to the north of the Proposed Development.

The surveys recorded highest numbers of birds in estuary areas to the west of the Proposed Development. The vantage points in proximity to the Proposed Development (Point B, Bay, Point C, Point E and Point F) recorded 13 SCI species (Table 4.1), generally in low numbers. The survey report notes that the shoreline adjacent to the Proposed Development lacks significant intertidal habitats, with some limited foraging habitat for wading birds along the stony shoreline. Far more significant intertidal habitat is located to the west of the Proposed Development (at Point A and Point D) which is reflected in the survey results. Of note, however, is that low numbers (max 10) of curlew were recorded foraging in wet grassland habitats

adjacent to Ralappane point. This area of wet grassland intersects with the Proposed Development boundary and is therefore within the ZOI.

A summary of peak counts at the vantage points relevant to the Proposed Development are summarised below in Table 4.1.

Table 4.1: Peak Counts of SCI Species (Low and High Tide Counts) Recorded 2018-2020

Species	Peak Count					Figure of National Significance ⁶
	Point B	The Bay	Point C	Point E	Point F	
Black headed gull	65	64	300	85	193	-
Cormorant	12	3	10	3	3	110
Curlew	10	10	10	40	6	350
Greenshank	1	1	1	1	1	20
Grey plover	-	-	1	-	-	30
Lapwing	-	-	4	-	-	850
Light bellied brent geese	40	-	1	-	-	350
Redshank	1	1	1	1	1	240
Ringed plover	4	-	0	1	2	120
Shelduck	2	-	9	3	-	100
Teal	2	-	-	-	70	360
Whimbrel	-	-	1	80	-	-
Wigeon	10	10	12	-	-	560

Full details relating to these surveys are provided in Appendix A.

4.2.5.2 Breeding Bird Surveys

Breeding bird surveys were carried out by DixonBrosnan during the 2023 breeding season. Just one SCI species, cormorant, associated with the River Shannon and River Fergus SPA is listed for both breeding and wintering in the Conservation Objectives. The report states in relation to cormorant “...*No signs of breeding Cormorant were recorded at the Proposed Development site and no trees suitable for use as Cormorant roosts or nesting sites were recorded...*”.

Full details relating to these surveys are provided in Appendix B.

No evidence of breeding cormorant or suitable breeding habitat were recorded during Mott MacDonald walkover surveys in 2024.

⁶ Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D. & Kelly, S. (2019) Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

4.2.6 European Sites

Viable Source Pathway receptor links were identified to the following European sites:

- Lower River Shannon SAC (002165)
- River Shannon and River Fergus Estuaries SPA (004077)

4.2.6.1 Lower River Shannon SAC

The site synopsis⁷ describes this SAC as follows:

'The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulmasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary. Both the Fergus and inner Shannon Estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. Saltmarsh vegetation frequently fringes the mudflats. The site supports an excellent example of a large shallow inlet and bay. Other coastal habitats that occur within the site include stony beaches and bedrock shores. Freshwater rivers have been included in the site.'

The Natura 2000 Standard Data Form for the River Shannon SAC⁸ identifies the following most important impacts and activities with high negative effect on the site:

- Grazing
- Fertilisation
- Forestry
- Removal of beach materials
- Hand cutting of peat
- Paths, tracks, cycling tracks
- Urbanised areas, human habitation
- Discharges
- Marine and freshwater aquaculture
- Hunting
- Nautical sports
- Air pollution, air borne pollutants
- Invasive non-native species
- Polderisation
- Estuarine and coastal dredging
- Management of aquatic and bank vegetation for drainage purposes
- Sea defence or coast protection works, tidal barrages
- Eutrophication (natural)
- The impacts and activities as outlined above are not linked to the Proposed Development.

⁷ NPWS (2013) Site Synopsis. Lower River Shannon SAC. Site Code 002165.

⁸ [N2K IE0002165 dataforms \(europa.eu\)](#)

The QIs for which the SAC is designated, the conservation objectives identified for the QIs, and their current national conservation status and trend are outlined in Table 4.2.

Table 4.2: Qualifying Interests for River Shannon SAC

Qualifying Interest (* indicates priority habitat)	Conservation Objective ⁹	National Conservation Status and Trend ^{10 11}
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	The overall conservation status for the habitat is favourable and the conservation status trend is stable
Estuaries [1130]	To maintain the favourable conservation condition of Estuaries in the Lower River Shannon SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating
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	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating
Coastal lagoons* [1150]	To restore the favourable conservation condition of Coastal lagoons in the Lower River Shannon SAC	The overall conservation status for the habitat is bad and the conservation status trend is deteriorating
Large shallow inlets and bays [1160]	To maintain the favourable conservation condition of Large shallow inlets and bays in the Lower River Shannon SAC	The overall conservation status for the habitat is bad and the conservation status trend is deteriorating
Reefs [1170]	To maintain the favourable conservation condition of Reefs in the Lower River Shannon SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is stable
Perennial vegetation of stony banks [1220]	To maintain the favourable conservation condition of Perennial vegetation of stony banks in the Lower River Shannon SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is stable
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	The overall conservation status for the habitat is inadequate and the conservation status trend is stable
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	The overall conservation status for the habitat is favourable and the conservation status trend is stable
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]	To restore the favourable conservation condition of Atlantic salt meadows (<i>Glauco - Puccinellietalia maritima</i>) in the Lower River Shannon SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	To restore the favourable conservation condition of Mediterranean salt meadows	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating

⁹ NPWS (2012) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

¹⁰ NPWS (2019) Article 17 Habitats Conservation Assessments 2019 Volume 2

¹¹ NPWS (2019) Article 17 Species Conservation Assessments 2019 Volume 3

Qualifying Interest (* indicates priority habitat)	Conservation Objective ⁹	National Conservation Status and Trend ^{10 11}
	(<i>Juncetalia maritimi</i>) in the Lower River Shannon SAC	
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche - Batrachion</i> vegetation in the Lower River Shannon SAC	The overall conservation status for the habitat is inadequate and the conservation status trend is deteriorating
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]	To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey silt laden soils (<i>Molinia caerulea</i>) in the Lower River Shannon SAC	The overall conservation status for the species is bad and the conservation status trend is deteriorating
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnus incana</i> , <i>Salix alba</i>) *[91E0]	To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno - Padion, <i>Alnus incana</i> , <i>Salix alba</i>) in the Lower River Shannon SAC	The overall conservation status for the habitat is bad and the Conservation Status trend is deteriorating .
<i>Margaritifera margaritifera</i> (freshwater pearl mussel) [1029]	To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC	The overall conservation status for the species is bad and the conservation status trend is deteriorating
<i>Petromyzon marinus</i> (sea lamprey) [1095]	To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC	The overall conservation status for the species is Bad and the conservation status trend is deteriorating .
<i>Lampetra planeri</i> (brook lamprey) [1096]	To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC	The overall conservation status for the species is favourable and the conservation status trend is stable .
<i>Lampetra fluviatilis</i> (river lamprey) [1099]	To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC	The overall conservation status for the species is unknown and the conservation status trend is not available .
<i>Salmo salar</i> (salmon) [1106]	To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC	The overall conservation status for the species is inadequate and the conservation status trend is stable
<i>Tursiops truncatus</i> (common bottlenose dolphin) [1349]	To maintain the favourable conservation condition of Bottlenose Dolphin in the Lower River Shannon SAC	The overall conservation status for the species is favourable and the conservation status trend is stable
Otter (<i>Lutra lutra</i>) [1355]	To restore the favourable conservation condition of Otter in the Lower River Shannon SAC	The overall conservation status for the species is favourable and the conservation status trend is improving

In summary, Table 4.3 outlines that five QI have a favourable conservation status listed

- For nine of the QIs the conservation status is listed as inadequate. The conservation trend for five of these QI is deteriorating while the conservation trend for the remaining four is stable.
- Only six QIs have a bad conservation status listed

The known extents of a number of the QIs of the River Shannon Estuary SAC, have been mapped in the Site-Specific Conservation objectives or referenced in the site synopsis. It is of

note that some habitats and species may extend beyond and occur outside the European site boundary. **No QI habitat occurs within the proposed Red Line Boundary.** The closest extents of these QIs inside of the SAC as mapped in the conservation objectives are outlined in Table 4.3 hereunder.

Table 4.3: Qualifying Interests for River Shannon SAC

Qualifying Interest (* indicates priority habitat)	Known Location in Relation to the Proposed development
Sandbanks which are slightly covered by sea water all the time [1110]	Sandbank habitat within the SAC is located at the mouth of the Estuary, a significant distance from the Proposed Development (approximately 18km to the west). Given the distance, this habitat is not located within the Zol of the works.
Estuaries [1130]	Estuary habitat includes the coastal waters north of the Proposed Development. A hydrological connection is present via the Ralappane and the Farranawan streams. This habitat is therefore within the Zol of the proposed development.
Mudflats and sandflats not covered by seawater at low tide [1140]	Mudflat habitat has been mapped approximately 900m to the east of the Proposed Development at its closest point. Given the location of this habitat in relation to the Proposed Development, and the dilution which would occur within the wider Shannon Estuary waters, it is not within the Zol of the works.
Coastal lagoons* [1150]	This habitat is located approximately 6km to the north east of the Proposed Development. Given the location of this habitat in relation to the Proposed Development it is not within the Zol of the works.
Large shallow inlets and bays [1160]	This habitat is located within the mouth of the Estuary, approximately 3.4 km to the west at its closest point. Given the distance, this habitat is not within the Zol of the works.
Reefs [1170]	Reef habitat has been 80m to the north of the Red Line Boundary at its closest point. A hydrological connection is present via the Ralappane and the Farranawan streams. This habitat is therefore within the Zol of the proposed development.
Perennial vegetation of stony banks [1220]	This habitat is located approximately 3.7km to the north of the Proposed Development. Given the location relative to the Proposed Development, this habitat is not within the Zol of the works.
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	This habitat is located a significant distance from the Proposed Development, with its closest extent located approximately 4km to the north of the Proposed Development. Given the location and nature of this habitat, it is not within the Zol of the works.
Salicornia and other annuals colonising mud and sand [1310]	The closest extent is mapped approximately 1.1km to the west of the proposed development and outside of the Zol of the works.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	This habitat was not recorded during the site walkover. The closest mapped extent of this habitat is located approximately 1km to the east of the Proposed Development and is outside of the Zol of the works.
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	This habitat was not recorded during the site walkover. The closest mapped extent of this habitat is located approximately 1km to the east of the Proposed Development and is outside of the Zol of the works.

Qualifying Interest (* indicates priority habitat)	Known Location in Relation to the Proposed development
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	This habitat was not recorded during the site walkover. The closest mapped extent of this habitat is located approximately 40km to the east of the Proposed Development and is outside of the Zol of the works.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]	This habitat has not been mapped as part of site specific conservation objective mapping, and the conservation objectives note that the extent of the habitat is unknown. However, this habitat was not recorded during the site walkover and is not identified as being within the Zol of the works.
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) *[91E0]	This habitat was not recorded during the site walkover. The closest mapped extent of this habitat is located 60km to the east and is outside of the Zol of the works.
<i>Margaritifera margaritifera</i> (freshwater pearl mussel) [1029]	The Proposed Development is not located within any freshwater pearl mussel sensitive areas. The closest pearl mussel catchment to the Proposed Development is located 10km north of the Proposed Development. Given that it is within a separate catchment, and that there is no connectivity identified to the sensitive area, or to suitable habitat for the species, it is outside the Zol of the works.
<i>Petromyzon marinus</i> (sea lamprey) [1095]	No lamprey were recorded within the footprint of the proposed development. The Shannon estuary is both an important habitat and transit area for lamprey. As such, sea lamprey are considered to be within the Zol of the proposed development .
<i>Lampetra planeri</i> (brook lamprey) [1096]	No lamprey were recorded within the footprint of the proposed development. Brook lamprey are associated with the freshwater extent of the River Shannon SAC. As such they are located outside of the Zol of the proposed development.
<i>Lampetra fluviatilis</i> (river lamprey) [1099]	No lamprey were recorded within the footprint of the proposed development. The Shannon estuary is both an important habitat and transit area for lamprey. As such, river lamprey are considered to be within the Zol of the proposed development .
<i>Salmo salar</i> (salmon) [1106]	No salmon were recorded within the footprint of the proposed development. The Shannon estuary is both an important habitat and transit area for salmonids. As such, salmon are considered to be within the Zol of the proposed development .
<i>Tursiops truncatus</i> (common bottlenose dolphin) [1349]	The waters to the north of the Proposed Development are mapped as critical habitat for bottlenose dolphin. Given the proximity of these works to the critical habitat, bottlenose dolphin are within the Zol of the proposed development .
Otter (<i>Lutra lutra</i>) [1355]	No otter holts were recorded within the Zol of the proposed development. A single couch was recorded approximately 80m from the Proposed Development. In addition, otter activity was recorded in coastal waters to the north of the Proposed Development, as well as along watercourses within the Zol of the proposed development. As such, otter are considered to be within the Zol of the proposed development .

4.2.6.2 River Shannon and River Fergus Esuaries SPA

The site synopsis¹² describes the SPA as follows:

'The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, e.g. Macoma-Scrobicularia-Nereis, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches. The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds'.

The Natura 2000 Standard Data Form for the River Shannon and River Fergus SPA¹³ identifies the following most important impacts and activities with high negative effect on the site:

- Discharges
- Fertilisation
- Shipping lanes
- Urbanised areas, human habitation
- Industrial or commercial areas
- Marine and Freshwater Aquaculture
- Nautical sports
- The impacts and activities as outlined above are not linked to the Proposed Development.

The SCIs for which the SPA is designated, the conservation objectives identified for them, and their current conservation status trends are outlined in Table 4.4.

Table 4.4: Special Conservation Interests for River Shannon and River Fergus SPA

Special Conservation Interests	Conservation Objectives ¹⁴	Population Change ¹⁵
Cormorant (<i>Phalacrocorax carbo</i>) [A017]	To maintain the favourable conservation condition of cormorant in the River Shannon and River Fergus Estuaries SPA	Increase of 6.9% on the 22-year population change timeframe
Whooper swan (<i>Cygnus cygnus</i>) [A038]	To maintain the favourable conservation condition of whooper swan in the River Shannon and River Fergus Estuaries SPA	Increase of 39.6% on the 24-year population change timeframe
Light-bellied Brent goose (<i>Branta bernicla hrota</i>) [A046]	To maintain the favourable conservation condition of light - bellied Brent goose in the River Shannon and River Fergus Estuaries SPA	Increase of 96.16% on the 20-year population change timeframe
Shelduck (<i>Tadorna tadorna</i>) [A048]	To maintain the favourable conservation condition of shelduck in	Decrease of 23% on the 22-year population change timeframe

¹² NPWS (2015) Site Synopsis River Shannon and River Fergus Estuaries SPA

¹³ Site (europa.eu)

¹⁴ NPWS (2012) 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

¹⁵ Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D. & Kelly, S. (2019) Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Special Conservation Interests	Conservation Objectives ¹⁴	Population Change ¹⁵
	the River Shannon and River Fergus Estuaries SPA	
Wigeon (<i>Anas penelope</i>) [A050]	To maintain the favourable conservation condition of wigeon in the River Shannon and River Fergus Estuaries SPA	Decrease of 39% on the 22-year population change timeframe
Teal (<i>Anas crecca</i>) [A052]	To maintain the favourable conservation condition of teal in the River Shannon and River Fergus Estuaries SPA	Increase of 4% on the 22-year population change timeframe
Pintail (<i>Anas acuta</i>) [A054]	To maintain the favourable conservation condition of pintail in the River Shannon and River Fergus Estuaries SPA	Decrease of 43% on the 22-year population change timeframe
Shoveler (<i>Anas clypeata</i>) [A056]	To maintain the favourable conservation condition of shoveler in the River Shannon and River Fergus Estuaries SPA	Decrease of 35% on the 22-year population change timeframe
Scaup (<i>Aythya marila</i>) [A062]	To maintain the favourable conservation condition of scaup in the River Shannon and River Fergus Estuaries SPA	Decrease of 98% on the 22-year population change timeframe
Ringed plover (<i>Charadrius hiaticula</i>) [A137]	To maintain the favourable conservation condition of ringed plover in the River Shannon and River Fergus Estuaries SPA	Decrease of 7% on the 22-year population change timeframe
Golden plover (<i>Pluvialis apricaria</i>) [A140]	To maintain the favourable conservation condition of golden plover in the River Shannon and River Fergus Estuaries SPA	Decrease of 43% on the 22-year population change timeframe
Grey plover (<i>Pluvialis squatarola</i>) [A141]	To maintain the favourable conservation condition of grey plover in the River Shannon and River Fergus Estuaries SPA	Decrease of 62% on the 22-year population change timeframe
Lapwing (<i>Vanellus vanellus</i>) [A142]	To maintain the favourable conservation condition of lapwing in the River Shannon and River Fergus Estuaries SPA	Decrease of 68% on the 22-year population change timeframe
Knot (<i>Calidris canutus</i>) [A143]	To maintain the favourable conservation condition of knot in the River Shannon and River Fergus Estuaries SPA	Decrease of 40% on the 22-year population change timeframe
Dunlin (<i>Calidris alpina</i>) [A149]	To maintain the favourable conservation condition of dunlin in the River Shannon and River Fergus Estuaries SPA	Decrease of 63% on the 22-year population change timeframe
Black-tailed godwit (<i>Limosa limosa</i>) [A156]	To maintain the favourable conservation condition of black - tailed godwit in the River Shannon and River Fergus Estuaries SPA	Increase of 38% on the 22-year population change timeframe
Bar-tailed godwit (<i>Limosa lapponica</i>) [A157]	To maintain the favourable conservation condition of bar - tailed godwit in the River Shannon and River Fergus Estuaries SPA	Increase of 31% on the 22-year population change timeframe
Curlew (<i>Numenius arquata</i>) [A160]	To maintain the favourable conservation condition of curlew in	Decrease of 41% on the 22-year population change timeframe

Special Conservation Interests	Conservation Objectives ¹⁴	Population Change ¹⁵
	the River Shannon and River Fergus Estuaries SPA	
Redshank (<i>Tringa totanus</i>) [A162]	To maintain the favourable conservation condition of redshank in the River Shannon and River Fergus Estuaries SPA	Increase of 11% on the 22-year population change timeframe
Greenshank (<i>Tringa nebularia</i>) [A164]	To maintain the favourable conservation condition of greenshank in the River Shannon and River Fergus Estuaries SPA	Increase of 84% on the 22-year population change timeframe
Black-headed gull (<i>Chroicocephalus ridibundus</i>) [A179]	To maintain the favourable conservation condition of black-headed gull in the River Shannon and River Fergus Estuaries SPA,	No trend available
Wetland and waterbirds [A999]	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	Not applicable

In summary Table 4.4 outlines that just eight SCI species have shown percentage increases in population, while twelve SCI species have shown percentage decreases. Site Specific Conservation Objective (SSCO) mapping for the site has identified a number of roosting areas for birds associated with the SPA. The closest of these identified roosts (noted as containing six ringed plover) is located approximately 500m to the west of the Proposed Development.

SCI species recorded during wintering bird surveys were typically found outside of the ZOI of the proposed development within the estuarine habitat to the west, or the coastal waters to the north. Surveys identified low numbers of curlew, an SCI species of the River Shannon and River Fergus Estuary as foraging within the ZOI of the proposed development. In addition, hydrological connectivity was identified to supporting habitat for SCI species. As such the SCI wetlands and waterbirds is also within the ZOI of the proposed development.

4.3 Impact Prediction

The layout of the section is such that the overarching potential for impact types is outlined first and initially in greater detail in Section 4.3.1. Site impacts to specific European sites are then outlined in Section 4.4.

4.3.1 Construction phase Impact Types

The potential for impacts to each European site is outlined in the relevant section hereunder. In-combination effects are provided in Section 4.3.8. Where the potential for impact is identified this is assessed against the conservation objectives in Section 4.4.

4.3.1.1 Direct Impact to Qualifying Interests/Special Conservation Interests

No works are proposed within the boundary of the SAC. No QI habitats or supporting habitat for QI species was recorded within the ZOI for Direct Impact.

As outlined previously, low numbers of *ex situ* curlew were recorded foraging within the red line boundary for the Proposed Development. The potential for direct impact to *ex situ* curlew and potentially other *ex situ* waterfowl (e.g. snipe and redshank) as a result of the proposed development is discussed below in the context of the European site.

4.3.1.2 Noise Disturbance

Construction phase of the works will result in elevated noise levels associated with the Proposed Development. A number of QIs/SCIs associated with European sites in the vicinity of the works have the potential, as outlined in section 4.2, to occur within the zone of impact of the works.

High noise effects (70dB and higher) are restricted to within 50m of the Proposed Development. Cutts *et al.* (2013) note that noise levels of below 55dB is often below background noise levels in estuaries. Noise modelling carried out indicates that the noise levels drop to below 55dB within approximately 230m of the proposed development (worst case scenario based on noise levels at construction compounds). As such 230m is taken as a worst case scenario noise effect Zol.

The potential for impacts to specific QIs/SCIs caused by noise and vibration is discussed below in the context of each European site.

4.3.1.3 Dust Effects

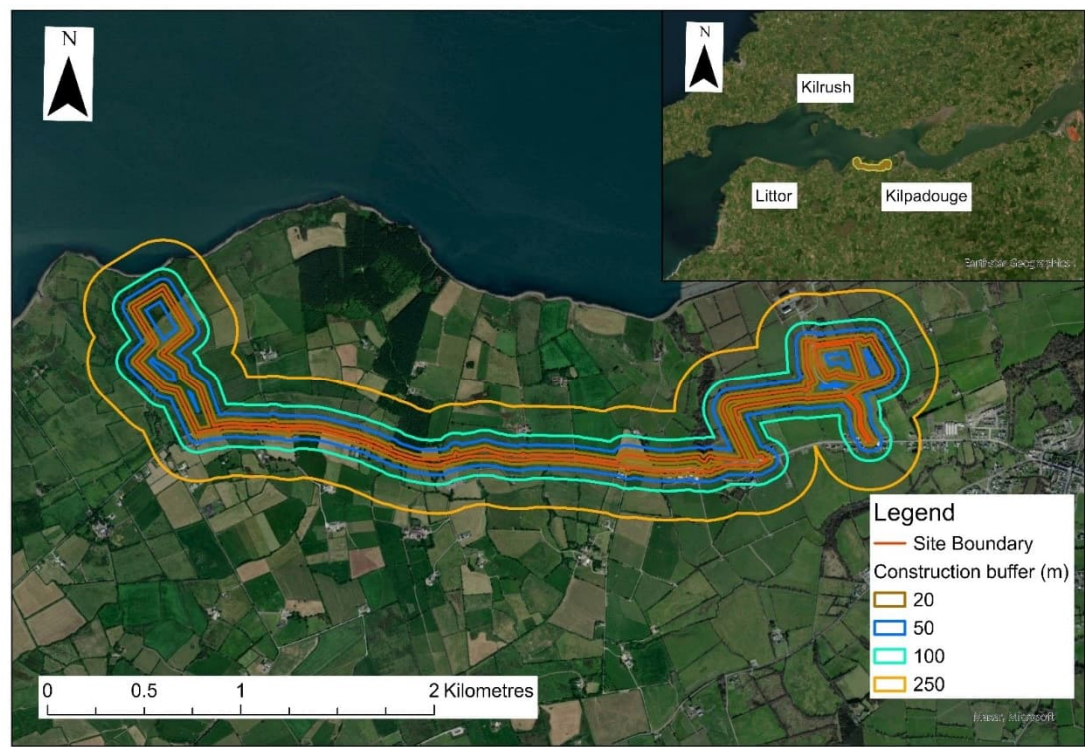
The proposed construction works will include excavation activities, drilling, stripping of soil and the storing of spoil material. All activities have the potential to result in the generation of dust over the duration of the construction works. The Institute of Air Quality Management (IAQM) 'Guidance on the Assessment of dust from demolition and construction' ¹⁶ prescribes potential dust emission risk classes to ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m from the source.

Dust may also be generated from track-out due to heavy duty vehicle (HDV) movements from the site itself. Trackout is measured from the side of the roads used by construction traffic. It is anticipated that a peak of approximately 50 HDV vehicle movements will travel to and from the Proposed Development each day. The IAQM guidance states that risk to sensitive ecological receptors is "negligible" if they are located more than 50m from the boundary of the site, and 50m of the proposed construction routes, up to 250m from the site entrance. Figures 4.3 and 4.4 outline the risk areas for dust related impacts.

Given the location of the Proposed Development relative to European sites, and associated sensitive QI/SCIs no potential for impact associated with dust effects is identified.

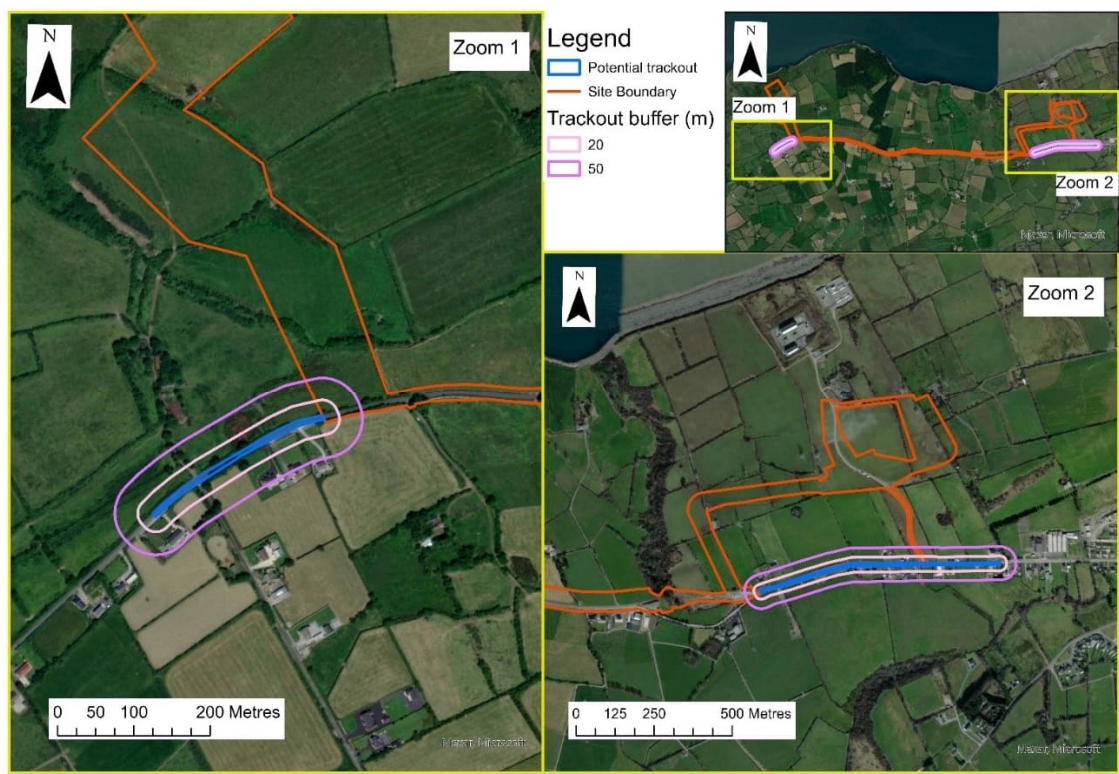
¹⁶ Institute of Air Quality Management (IAQM) (2024) IAQM Guidance on the Assessment of Dust from Demolition and Construction.

Figure 4.2: Construction Dust Assessment Buffers (Earthworks and Construction)



Source: Mott MacDonald

Figure 4.3: Construction Dust Assessment Buffers (Trackout)



Source: Mott MacDonald

4.3.1.4 Pollution/Sedimentation Associated with Construction

The proposed works will require excavation along the cable route, and at the GIS substation locations. Works will require the general use of concrete. There is potential for the accidental release of concrete due to these works into adjacent coastal waters, and into the watercourses previously identified along the cable route. Additionally, there is potential for accidental release of sediment and hydrocarbons into watercourses.

The potential for impacts to specific QIs/SCIs caused by pollution and sedimentation caused by the works is discussed below in the context of each European site.

4.3.1.5 Dewatering Associated with Construction

There is potential for dewatering associated with construction to cause a localised draw down in groundwater. The Scottish Environmental Protection Agency (2014) specifies the zone of influence for Ground Water Dependant Terrestrial Ecosystems (GWDTE) from excavations deeper than 1m to be a 250m buffer around the works area. There are no GWDTEs associated with European sites located within 250m of the proposed development.

4.3.2 Effect Pathways During Construction

4.3.2.1 Lower River Shannon SAC

Direct Impacts to Qualifying Interests

The proposed development is located outside of any European Sites. As such, there is no potential for direct effect to any QI or SCI species/habitats within the site boundaries. Otter may occur terrestrially outside of the SAC boundary within the ZoI of the Proposed Development. There is potential therefore for direct impact to *ex situ* otter associated with the River Shannon SAC.

Potential for Noise and Vibration Effects

Guidance on managing the risk to marine mammals from manmade sounds in Irish waters notes that sound exposure levels from operations such as drilling, blasting and piling have the potential to cause disturbance effects to marine mammal species¹⁷.

Critical habitat for bottlenose dolphin has been mapped 150m north of the Proposed Development at its closest location. However, the works do not require the impulsive operations within coastal waters likely to cause disturbance or injury to marine mammals. There is no potential for impact to bottlenose dolphin associated with the Proposed Development.

No otter holts were identified within 150m of the works areas. An otter couch was recorded approximately 80m from the proposed development boundary. In addition, holts and additional couches may potentially be become established between survey completion and construction. In addition, otter activity was recorded along the shoreline to the north of the red line boundary, and along watercourses identified within the boundary of the Proposed Development.

There is potential therefore for disturbance of otter associated with the Lower River Shannon SAC.

¹⁷ DAHG (2014) Guidance to Manage the Risk to Marine Mammals From Man-Made Sound Sources in Irish Waters.

Pollution Associated with Construction

As previously noted, there is potential for the release of concrete, hydrocarbons, and sediment laden water into the adjacent SAC.

There is potential for impact to QIs such as:

- Estuaries
- Reefs

This is due to the nature and location of such habitats in relation to the proposed works. Degradation in water quality has the potential to cause impacts to the following QIs and/or their supporting habitat:

- Sea lamprey
- River lamprey
- Salmon
- Otter

4.3.2.2 River Shannon and River Fergus Estuaries SPA

Direct Impacts to SCI Species

The works are located entirely outside of the European Site boundary. However, low numbers of curlew associated with the River Shannon and River Fergus Estuaries SPA have been recorded in proximity to the Proposed Development. In addition, there is potential for unstable slopes at construction phase to cause direct damage to foraging habitat within the SPA itself.

There is potential for direct damage to a foraging area recorded for these.

Potential for Visual Disturbance, Noise and Vibration Effects

The following SCIs associated with the River Shannon and River Fergus SPA have been recorded in proximity to the Proposed Development:

- Black headed gull (peak count 123)
- Cormorant (peak count 3)
- Curlew (peak count 10)
- Greenshank (peak count 1)
- Redshank (peak count 1)
- Shelduck (peak count 2)
- Teal (peak count 2)
- Whimbrel (peak count 1)
- Wigeon (peak count 12)

High noise effects (70dB and higher) are restricted to within 50m of the Proposed Development. Cutts *et al.* (2013) note that noise levels of below 55dB is often below background noise levels in estuaries. Noise modelling carried out indicates that the noise levels drop to below 55dB within approximately 230m of the proposed development (worst case scenario based on noise levels at construction compounds). As such 230m is taken as a worst case scenario noise effect Zol. The majority of SCI species recorded were located outside of this Zol within the SPA itself. Low numbers of curlew are the exception to this, being recorded foraging on the western end of the Proposed Development within the Zol for noise effects.

There is potential for visual disturbance to bird species caused by presence of machinery and humans. The disturbance caused by the noise impulses, and presence of humans and

machinery, has the potential to displace wintering birds away from foraging areas which are in proximity to the Proposed Development. This displacement if it is from a key foraging area in the absence of other suitable habitat has the potential to cause a loss in fitness of the species and reduce their capacity for migration at the end of the wintering season if noise impulses are ongoing throughout the winter.

The Proposed Development is set back from the coastline and buffered by agricultural land and hedgerows. As such no potential for impact is identified to the core foraging areas for SCI species within the SPA. As outlined previously, a foraging area for *ex situ* curlew was identified within the ZOI for visual effects. Given the findings of the wintering bird surveys identifying SCI species within these areas, there is potential for disturbance effects to the Lower River Shannon SPA associated with the Proposed Development.

There is potential, therefore, for impacts to curlew caused by noise and disturbance associated with the proposed development.

4.3.3 Operation Phase Impact Types

There is potential for disturbance related effects associated with maintenance crews during the operational phase.

4.3.4 Effect Pathways During Operation

As outlined previously in Section 3.5.1.3, stormwater drainage will be discharged via a petrol interceptor and conveyed to the fire water retention tank before discharging to the Shannon Estuary. As such there is no potential for surface water impacts associated with the operational phase.

Maintenance for the works will be largely restricted to works at the substations. Given the location of these works' areas, the nature of the works and the nature of the European sites, there is no potential for impacts caused by the operational phase of the development.

4.3.5 Decommissioning Phase Impact Types

The impacts associated with decommissioning are assumed to be similar to those identified in the construction phase. Effect pathways, impact prediction, and mitigation measures required are therefore considered to mirror those of the construction phase.

4.3.6 Effect Pathways During Decommissioning

The effect pathways during the decommissioning of the proposed development would be similar to those identified in the construction phase.

4.3.7 Summary

A summary of potential impacts identified in Section 4.3 is provided hereunder in Table 4.5.

Table 4.5: Potential for Impact in the Absence of Mitigation

European Site	Impact to QIs/SCIs Identified
Lower River Shannon SAC	Potential for noise disturbance to otter
	Potential for surface water emissions to cause degradation to: Estuaries [1130] Reefs [1170]
	Potential for surface-water emissions to cause impact to: Sea lamprey

European Site	Impact to QIs/SCIs Identified
	River lamprey Salmon Otter
River Shannon and Fergus Estuaries SPA	Potential for noise disturbance to <i>ex situ</i> curlew
	Potential for direct impact to <i>ex situ</i> curlew foraging area
	Potential for degradation to wetland habitat caused by surface water emissions

4.4 Plans and Projects Which Might Act In-Combination

Article 6(3) of the Habitats Directive requires 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.”

It is therefore required that the potential impacts of the Proposed Development are considered in combination with any other relevant plans or projects. A search of plans and projects in the vicinity of the proposed development was undertaken in May 2024 to examine projects with potential for in combination effects.

4.4.1 Overall STEP Facility

The Proposed Development will form part of the wider STEP Facility. Additional projects in relation to this facility are detailed hereunder:

- Strategic Gas Reserve Facility – this is the subject of a SID pre-application (ABP-319245-24) comprising of a floating storage and regasification unit, jetty and access trestle, onshore receiving facilities and ancillary works.
- Combined Cycle Gas Turbines (CCGT) Power Plant, Battery Energy Storage System (BESS), Above Ground Installation and associated ancillary works - a planning application was lodged with An Bord Pleanála on 19th April 2024 (ABP-PA08.319566).
- Gas Pipeline - planning permission exists for the development of a 26km natural gas pipeline which will facilitate connection from the STEP facility to the GNI transmission network at Leahy’s, west of Foynes, Co. Limerick.
- Data Centre Campus as part of the Masterplan, a data centre campus is proposed to the west of the STEP site. In the case of the Strategic Gas Reserve Facility, and the Data Centre Campus, these projects have not been submitted for planning at the time of writing. These projects will be subject to the provisions of Article 6(3), i.e., requiring screening for Appropriate Assessment as a minimum, and AA, if necessary. These projects will be assessed for the potential for in-combination effects in their own rights as part of this process.
- The gas pipeline referenced above was subject to environmental assessment in 2008 but it has yet to be constructed. A NIS was produced in support of the application for the Combined Cycle Gas Turbine Power Plant application. This report identified the potential for effects on the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA through noise effects and surface water degradation associated with the development.

Mitigation measures were prescribed to ameliorate these effects. Given the location of these projects and the nature of potential impacts from same, there is potential for in-combination effects should the construction phase of the projects run concurrently to that of the Proposed Development. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.

4.4.2 Plans

Kerry County Development Plan 2022-2028

The Proposed Development is located within the County Kerry administrative area. The Kerry County Development Plan includes objectives and policies which are associated within the protection of the natural environment. These are informed in part by an Appropriate Assessment which was undertaken to ensure that any likely effects of the plans' policies were considered in order to avoid any such adverse impacts.

The document includes objectives and policies which are associated within the protection of the natural environment. These are informed in part by an Appropriate Assessment which was undertaken to ensure that the plans' policies avoided any adverse effects.

The Natura Impact Report outlines European sites which were noted as being Environmental Sensitivities, and for which impacts were identified. A summary of this assessment is provided in Table 4.6 in relation to European sites previously identified as within the ZOI for the Proposed Development.

Table 4.6: Potential Impacts Identified Within the County Development Plan

Location	Impacts Identified
Tarbert Ballylongford Landbank	<p>The NIS notes that proposals for the Tarbert Ballylongford landbank were previously assessed by the Shannon Integrated Framework Plan¹⁸. Potential impacts identified therein are outlined hereunder:</p> <p>Lower River Shannon SAC</p> <p>Marine related industry</p> <ul style="list-style-type: none"> ● Impacts to Estuaries Habitat <ul style="list-style-type: none"> – Habitat loss – to land – Habitat change – to another marine habitat – Physical disturbance – Siltation rate changes – Introduction of non synthetic and synthetic compounds – Removal of target and non-target species – Scouring – Smothering – Temporary increases in the level of suspended sediments in the water column – Changes in hydrodynamics and geomorphology at dredge and disposal sites ● Impacts to reefs habitats <ul style="list-style-type: none"> – Potential for direct habitat loss and degradation ● Impacts to brook lamprey <ul style="list-style-type: none"> – Loss of migration route – Artificial barriers which may block upstream migration and limit species to lower stretches and restricting access to spawning areas

¹⁸

Location	Impacts Identified
	<ul style="list-style-type: none"> ● Impacts to sea lamprey <ul style="list-style-type: none"> – Loss of migration route – Artificial barriers which may block upstream migration and limit species to lower stretches and restricting access to spawning areas ● Atlantic salmon <ul style="list-style-type: none"> – Risk of impact during migration period when they may use the adjacent river channel for passage – Dredging works, infilling, reclamation or coastal protection works would increase risk to the species. ● Bottle-nosed dolphin <ul style="list-style-type: none"> – Disturbance through construction, operational, and decommissioning works – Disturbance through dumping of dredge spoil at sea – Impacts to water quality as a result of increased discharges – Collision with infrastructure associated with development, increased shipping ● Otter <ul style="list-style-type: none"> – Indirect disturbance – Loss of commuting habitat – Loss of access to feeding areas ● River Shannon and River Fergus Estuaries SPA ● Direct physical damage to mobile SCI species ● Indirect disturbance or loss of species
Listowel Town Plan	<ul style="list-style-type: none"> ● Potential for impacts to environmental receptors including ● Potential for water quality changes due to urban pressures ● Potential for increased abstraction resulting in changes and pressures to the existing hydrological and hydrogeological regimes

Mitigation was prescribed in order to ameliorate these effects. As such there is no-potential for significant in-combination effects associated with the Kerry County Development Plan.

4.4.3 Planned and Permitted Development

A search of planning applications in the vicinity of the proposed development was undertaken in May 2024 to examine projects with potential for in combination effects. These are detailed in Table 4.7.

Table 4.7: Planned and Permitted Development

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	18878	Kilpaddoge, Tarbert, Co. Kerry	23.09.2019	<p>This project comprises a 10-year permission for a proposal that would entail the construction of a 30 MW Battery Energy Storage System (BESS) Facility to provide grid balancing services to the Irish Electrical Grid.</p> <p>The BESS would include the following elements:</p> <p>Up to 26 self-contained battery container units with associated Heating Ventilation and Air Conditioning (HVAC) Systems, Power Conversion Systems (PCS), Step-up transformers, Control systems and ancillary electrical components, A single storey electricity control building (104.8 sqm), A 110kV ESB sub-station, A single storey sub-station control building (178.3 sqm) and associated electrical infrastructure, A 110kV Generator Transformer, All necessary ground and foundation works, Associated compound cabling and ducting, Palisade security fencing and lighting, CCTV cameras, New site access from existing private road, Temporary construction compound, and All associated ancillary infrastructure and site development works</p> <p>The proposal would also entail earthworks to the site, whereby it would be dug-out to provide a lower and a higher level. The former level would be over the northern and central portions of this site, and it would be laid out to accommodate the control buildings and accompanying equipment. The on-site access road would pass on N/S axis through these portions of the site. The latter level would be over the southern portion, and it would accommodate the battery containers. A retaining wall would be constructed between these levels and a further one adjacent to the southern boundary of the site.</p>	<p>Yes - A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon SAC and the River Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water degradation. Mitigation measures were proposed within the report to ameliorate this risk.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of</p>

¹⁹ Guidance of the nature of a plan or project is provided in Section 2.1 of the document Department of Environment, Heritage and Local Government (2009), Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. Given the location of the development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	19115	Kilpaddoge, Tarbert Co. Kerry	07.02.2020	The development will consist of a grid stabilisation facility comprising of: the construction up to 4 no. Rotating stabilisers, 5 no. Battery storage containers, 1 no. Control room, 2 transformers and ancillary equipment within a site area of approx. 1.46 hectares. It is proposed to connect the proposed development to the adjacent EirGrid substation by underground cable which will traverse the permitted and under construction peaking plant. The rotating stabilisers will be supported by 10 no. Electrical equipment rooms which will contain ancillary power supply products including a static frequency convert (sfc), mv switchgear, exciters and lv distribution, and step-up / down transformers. A heating ventilation	No – A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon SAC and the River

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
				and air conditioning system (hvac) will be attached to each rotating stabiliser, 4 no. Auxiliary transformers are also proposed. The battery containers will house individual battery components with 2 no. Fitted external hvac system for each. 13 no. Inverter stations and 14 auxiliary transformers are proposed for the battery containers. The entire site will consist of various underground cables and ducts, boundary securing fence, compound lighting and palisade gates and fencing, new internal access track, security lighting, cctv, hardstanding areas and all necessary foundation works. Permission is also sought for 2 electrical transformers (up to 220kv), associated hv equipment and underground electrical grid connection cabling and ducting connecting the development to the national grid at the adjacent ESB/EirGrid substation. Planning permission is sought for a period of 10 years. A natura impact statement (nis) accompanies this application	Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water degradation. Mitigation measures were proposed within the report to ameliorate this risk. At the time of writing, this project has been constructed and has entered the operational phase of the development. As such, no potential for in-combination effects associated with this development have been identified. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	ABP 304807-19	Townlands of Aghanagran Middle, Aghanagran Lower, Ballyline West, Tullahennell South Ballylongford Co. Kerry	06.01.2020	Construction of a windfarm of six turbines, with a blade tip height of 126.5m, battery units, upgrading of the existing access track and the provision of new internal roads, the development and improvement of existing entrances onto the public road, an 80m wind anemometry mast, a peat deposition area, underground electricity cables, an electricity substation with control room, a temporary construction compound, all on a site of 21.45ha. The applicant is seeking a 10-year planning permission and an operational period of 25 years. The application was accompanied by an EIAR and appendices which includes a Landscape and Visual Assessment Photomontages and Zone of Theoretical Visibility Maps and a Natura Impact Statement.	Yes – A Natura Impact Statement was produced in relation to this development. The report identified potential for surface water emissions into the River Shannon SAC and the River Shannon and Fergus Estuaries SPA causing impacts to QI and SCI species due to water

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>degradation. Mitigation measures were proposed within the report to ameliorate this risk.</p> <p>Given the location of the development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.</p>
Project	VA03.30779 8	Townland of Carrowdotia South Co.Clare and Kilpaddoge Co. Kerry.	04.06.2021	Installation of 400kV electricity transmission cables, extension to the existing Kilpaddoge Electrical Substation and associated works, between the existing Moneypoint 400kV Electrical Substation in the townland of Carrowdoita South County Clare and existing Kilpaddoge 220/110kV Electrical Substation in the townland of Kilpaddoge County Kerry. The development includes work in the foreshore.	<p>Yes – A Natura Impact Statement was produced in relation to this development. The report identified the potential for impact to the Lower River Shannon SAC, and the River Shannon and River Fergus Estuary SPA. These are through impacts to water quality, and through disturbance to QI/SCI species during the construction phase.</p> <p>Given the location of this development relative to the Proposed</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					Development, should works be carried out concurrently there is potential for in-combination effects due to degradation in water quality, and through disturbance. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	20850	Kilpaddoge, Tarbert, Co. Kerry	12.11.2020	For changes to the previously permitted peaker power plant development (planning ref. 13/138). It is proposed to change the energy source for the charging of the battery energy storage system (BESS) containers from diesel to charging off the national grid and to change the permitted layout for electrical equipment based on the consequence of the proposed change in energy source at an area located within the permitted development. It is also proposed to include a small metering enclosure adjacent to the constructed substation building within the permitted development. A five year planning permission is being sought for the proposed development	<p>No - The planning application report for the project notes that as the application is for change of use to an existing facility the compound had already been constructed.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant</p> <p>As such, given the nature and scale of the development no potential for in-combination effects is identified.</p>
Project	21549	Kilpaddoge, Tarbert, Co. Kerry	20.08.2021	<p>(A) A high inertia synchronous compensator (HISC) compound containing 1 no. HISC unit enclosed within a steel clad framed style structure (12.1m max height) and supported by 8 no. Electrical equipment containers (containing ancillary power supply products including a static frequency converts, mv switchgear, exciters, lv distribution, control room, welfare and office), main auxiliary and start-up electrical transformers, generator circuit breaker, switchgear equipment, external cooler units and 1 no. Back up diesel generator and associated diesel storage tank; (b) a 220kv high voltage gas insulated switchgear (GIS) substation compound containing a GIS substation building with all control and hv equipment within a single storey building (13.2m max height). The building will be surrounded by a compound road and contained within a 2.6m high galvanised steel palisade fence; (c) a battery storage compound containing 5 no. Battery storage containers, enclosed in steel containers of dimensions approximately 13m by 2.5m by 3m, housing individual battery components with 2 no fitted external HVAC systems for each unit and supported by 13 no. Inverter stations, 14 no. Auxiliary transformers and control container; (d) 220kv underground cable to the existing adjoining EirGrid substation; (e) associated elements comprising various underground cables and ducts, equipment plinths, boundary security fence, compound lighting and palisade gates</p>	<p>Yes – A Natura Impact Statement was produced in support of the planning application. The application noted the potential for impacts associated with water quality and habitat alteration, as well as noise and disturbance/displacement of key species.</p> <p>There is a potential risk for in-combination effects to air quality from increased traffic</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
				and fencing, security lighting, CCTV, internal access roads, hardstanding areas and all necessary foundations works for the above compounds. The planning application is on lands where grid stabilisation facility was previously permitted under planning register no 19/115. Planning permission to construct the development is sought for a period of 10 years. A natura impact statement (NIS) has been prepared in respect of the proposed development and accompanies the application	movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. Mitigation has been proposed to ameliorate these impacts, however, given the location of this development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects. As

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	21305 and ABP 310521	Kilpaddoge, Tarbert, Co. Kerry	29.11.2021	Retain an existing telecommunications support structure (previously granted under Reg. Ref. 11/969 and ABP Ref. PL08.240232) together with associated ground equipment, security fencing and access track at Kilpaddoge, Tarbert, Co. Kerry.	No – given the nature, scale and location of this development no potential for in-combination impacts is identified.
Project	20438 and ABP appeal Ref. 308643	Meelcon, Carhoona, Farranawan a, Tarbert, Doonard upper and lower, Kilpaddoge, Ballyline west, Ballymacasy, Lislaughtin, Glamcullare south, Gurteenavall ig Co Kerry	21.06.2021	Amendment to previous granted permission which related to change in connection grid route for wind farm. A NIS was submitted with this application. The revised route will entail the construction of approximately 12.1km of 38kV underground electric cable connecting the existing permitted windfarm (19/381) to the 38Kva/110Kva substation at Kilpaddoge, Tarbert, County Kerry. The underground cables will be located along the public roads R-551, R552 and L-1010 and along 2 sections of private property. The development will also consist of the connection of the permitted windfarm (19/381), via existing permitted underground electricity cable.	Yes – A Natura Impact Statement was produced in support of the planning application. The application noted the potential for impacts associated with water quality and disturbance/displacement of species. Mitigation has been proposed to ameliorate these impacts, however, given the location of this development relative to the Proposed Development, should works be carried out concurrently there is potential for in-combination effects through impacts to <i>ex-situ</i> SPA SCI bird species in the surrounding lands. As the potential for in-

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.
Project	302681-18	Tullamore, Drombeg and Coolkeragh Listowel Co. Kerry	22.05.2019	<p>The proposed development comprises a ten-year planning application for:</p> <p>A solar pv farm with an operational lifespan of 35 years to export up to 50mw of electricity to the national grid.</p> <p>The development will comprise 94pprox.. 357,500 sq. m. of solar panels together with all ancillary cabling and electrical infrastructure including 94pprox.. 25 no. Combined inverter / transformer stations (with option to provide these as separate inverter transformer units);</p> <p>Provision of new access tracks and upgrading of existing agricultural access tracks; (94pprox.. 5,936 m of internal access tracks)</p> <p>Landscaping;</p> <p>Temporary construction compound;</p> <p>Battery storage and control units;</p> <p>Boundary and security fencing; cctv security system on poles;</p> <p>New vehicular access point to the L-1009 (at site of existing agricultural gate to be used for construction and operational traffic);</p> <p>Approx. 4m telecommunications mast and</p> <p>All ancillary site development works all on a site of approximately 99.2ha.</p> <p>A Natura Impact Statement (NIS) was submitted to the planning authority with the application.</p>	No – This development is located a significant distance from the Proposed Development. Given the nature of the project and its location relative to the Proposed Development no potential for in-combination effects is identified.
Project	1825	Beal East, Ballybunion Co. Kerry	19.01.2019	<p>For the development of a solar pv farm on a site. The development will consist of a solar PV array consisting of approximately 12.5 ha of solar panels within a total red line boundary of 14.16 ha on ground mounted steel frames, 1 no. Single story delivery substation, 2 no. Single story inverter / transformer units, 2 no. Single story battery storage containers, underground cable ducts on site, temporary construction compound (including site offices, portable toilets and parking area), boundary security fence, site entrance, access tracks, CCTV and all associated site works. This planning application is accompanied by an environmental report stage 1, screening for appropriate assessment, ecology report, archaeological impact assessment and photomontages</p>	No – A screening for Appropriate Assessment was carried out in relation to this project which concluded that “...the proposed Beale Hill Solar Project will not cause adverse direct impacts on the conservation objectives and qualifying interests of any SACs or SPAs...”

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant.</p> <p>Given the nature, scale and location of this development no potential for in-combination effects is identified.</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	309156-21	Townlands of Ballyline West, Coolkeragh, Dromalivaun and Tullamore Co. Kerry	27.09.2022	<p>A detailed description of the proposed development is provided in the public notices and the EIAR submitted with the application. It includes the following:</p> <p>12 no. turbines (maximum tip height of 150m) with associated foundations and hard stand areas.</p> <p>Permanent meteorological mast (90m) and associated foundation and hardstand area.</p> <p>New (6.85km) and upgraded (4.43km) internal site service and access tracks.</p> <p>Underground 33 kV electric cabling between turbines within the wind farm and wind farm substation.</p> <p>6 no. peat deposition areas located across the windfarm site.</p> <p>2 no. site entrances, one permanent and one temporary.</p> <p>225m underground cable connection from the 110kV wind farm substation to the existing 110 kV transmission line due east of the windfarm.</p> <p>110 kV substation.</p> <p>New junction off the L6021 at the north-east of the site to facilitate construction and access.</p> <p>New junction off the L1009 on the west side of the site to facilitate construction and access.</p> <p>2 no. temporary construction compounds.</p> <p>Associated surface water management systems.</p> <p>Tree felling of c 3.15 ha of conifer trees to facilitate site development.</p> <p>Temporary works on sections of the public road along the turbine delivery route (including hedge/tree cutting, relocation of power lines/poles, lampposts, signage and local road widening).</p>	No – outside RLB and no pathway for in-combination impacts 6.7km south
Project	318540	At Tarbert Island, Tarbert Co. Kerry	Case is due to be decided by 05.06.2024	10-year planning permission for the proposed Open Cycle Gas Turbine (OCGT) power plant fuelled by Hydrotreated Vegetable Oil (HVO) and associated site works	<p>Yes –Works are likely to take place concurrently. Given the locations relative to the River Shannon SAC, there is potential for in-combination impacts via pollution to watercourses and/or by disturbance impacts to ex-situ SPA SCI bird species in the surrounding lands 1.96</p> <p>There is a potential risk for in-combination effects</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					<p>to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant</p> <p>. As the potential for in-combination effects has been identified, there is therefore the potential for adverse effects on the integrity of European sites.</p>

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
Project	23284	Ballymacasy , Coolnagraigue, Ballyline East, Ballyline West, Leanamore and Dromalivaun Co Kerry	17.10.2023	Apply for a 10 year permission and 40 year operation for a solar farm of 146.6 hectares, on 3 no. Land parcels consisting as described herein: west parcel(Ballymacasy, Ballyline east and Ballyline west townlands) c 58.48 hectares, central parcel (Coolnagraigue townland) c. 53.8 hectares and east parcel (Leanamore and Dromalivaun townlands) c 34.32 hectares, a route corridor for an underground internal electrical cable connecting the west and central parcels to the east parcel consisting of c 3772 meters in length.	No – There is a potential risk for in-combination effects to air quality from increased traffic movements, during the construction phase of the Proposed Development in associated with the gas pipeline, and the combined cycle gas turbine. There is potential for this to cause air emission deposits of nitrogen oxides and ammonia on ecological receptors which could impact the integrity of nearby European sites. However, given the short time frame during which the increase in which traffic movements would occur and the dilution ratios and tidal influences within the Shannon Estuary on sensitive habitats, it is not considered that the in-combination effects associated with air emissions will be significant. Given the location of this project relative to the Proposed Development (located 4.5km to the south east) and the nature of the development, no

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
					potential for in-combination effects is identified.
Project	318912	Tullamore Listowel Co. Kerry	Case is due to be decided by 27.05.2024	Substation and associated works to reduce quantum of solar panels required for solar farm. An NIS accompanies this application.	No – Given the location of this project relative to the Proposed Development (located 10km away) and the nature of the development, no potential for in-combination effects is identified.
Project	2360050	Townlands Of Aghanagran Lower, Ballyline West, Kilgarvan, Coolkeragh and Tullamore Co. Kerry	Decision Date: 23.01.2024	A new grid connection route connecting the permitted Ballylongford windfarm (Kerry County Council planning ref 19/381) (An Bord Pleanala ref- PL08.304807) at Aghanagran Middle And Lower, Ballyline West And Tullahennel South, Ballylongford, to the proposed 38kVsubstation (Kerry County Council planning ref 23/431) at Tullamore, Listowel, Co Kerry. The route will entail the installation of approximately 7.3km of 38kv underground electric cable passing through townlands of Aghanagran Lower, Ballyline West, Kilgarvan, Coolkeragh, and Tullamore in County, Kerry The proposed grid route is proposed to be via underground cables located along the public roads: L10028, R552, and L-1009, and private property. The new grid route is a change a previously granted permission for a 12.1km grid connection route (Kerry County Council planning ref 20/438) (An Bord Pleanala ref- PL08308643) from the permitted wind farm to the 38kva /110kva substation at Kilpaddoge, Tarbert. The proposal includes alterations to the permitted windfarm (Kerry County Council planning ref 19/381) (An Bord Pleanala ref- PL08.304807), the permitted 38 kV substation at the wind farm is to be relocated and redesigned. The altered substation proposal will be located in a new substation compound that includes a control building, and all associated electrical plant and apparatus, fencing, and an access track within the townland of Aghanagran Lower. The proposed substation at the windfarm will be connected to the windfarm via underground cabling from Turbine T4. The project includes all ancillary and associated works necessary to facilitate the development, including three temporary construction compounds. A Natura Impact Statement has been prepared in respect of the proposed development and accompanies this application.	No – Given the location of this project relative to the Proposed Development (located 5km away) and the nature of the development, no potential for in-combination effects is identified.
Project	315838	Tarbert Power Station Tarbert	Recommendation/ Conclusion that AA is	Application received under Section 4 of the Development (Emergency Electricity Generation) Act 2022 (the Act) for a designated development (construction of a temporary, 5 year, 150MW emergency generation plant – limited to a maximum of 500 operational hours per annum) located at Tarbert Power Station, Tarbert, in the townland of Tarbert Island, Co. Kerry	No – This development is currently under construction and will be completed prior to the construction phase of the

Plan or project ¹⁹	Planning Reference	Location	Date Granted	Description	Potential for in-combination effects
		in the townland of Tarbert Island Co. Kerry	required 29.03.23		proposed development. No operational phase effects have been identified concerning the installation of emergency plant equipment which are likely to give rise to in-combination effects with the proposed Shannon LNG project.
Foreshore Licences					
Project	319080	Moneypoint Generating Station, Co. Clare	Lodged Nov 2023	ESB intends to undertake a survey campaign at the Moneypoint Generating Station site to inform the engineering design of the proposed Moneypoint Hub Project. The marine surveys will include geophysical, geotechnical, environmental, and met ocean surveys.	No – Given the nature of these works, and their location relative to the Proposed Development (3km away) no potential for in-combination effects is identified.

4.4.3.1 Other In-Combination Effects

Lower River Shannon SAC

The conservation objectives supporting documents for the Lower River Shannon SAC²⁰²¹²²²³ notes the following activities which have affected and continue to impact the site:

- Land reclamation and infilling
- Erosion
- Spread of common cordgrass
- Arterial drainage schemes

The Proposed Development does not require any land reclamation or infilling within the SAC. Likewise, no potential for erosion effects, or spread of common cordgrass associated with the Proposed Development has been identified. Further, the Proposed Development does not require any works similar to those carried out under arterial drainage schemes. As such, there is no potential for in-combination impacts associated with these activities.

River Shannon and River Fergus Estuaries SPA

The conservation objectives supporting documents for the River Shannon and River Fergus Estuaries SPA²⁴ note the following historic activities which affect the site:

- Loss of wetland habitat for example through reclamation of intertidal habitat, and construction of features like piers, and slipways.
- Trampling and compaction of wetland habitat through trampling and compaction through activities such as horse riding, walking, and motor vehicles.
- Overgrazing of wetland habitat.
- Fisheries and aquaculture.
- Localised issues relating to water quality causing lowered oxygen levels, and nutrient enrichment.
- Disturbance events.

The Proposed Development is located entirely outside of the SPA boundary. However, in the absence of mitigation, the degradation of habitats which act as supporting habitat for *ex situ* SCI species associated with the construction phase of the works has the potential to result in in-combination effects on the River Shannon and River Fergus Estuaries SPA.

Likewise, the potential for disturbance to SCI species associated with the construction phase of the works has the potential, in the absence of mitigation, to result in in-combination effects on the River Shannon and River Fergus Estuaries SPA.

²⁰ NPWS (2012) Lower River Shannon SAC (site code 2165) Conservation objectives supporting document - coastal habitats

²¹ NPWS (2012) Lower River Shannon SAC (Site code 2165) Conservation objectives supporting document - marine habitats and species

²² NPWS (2012) Lower River Shannon SAC (Site code 2165) Conservation objectives supporting document - lagoons

²³ NPWS (2012) Lower River Shannon SAC (Site code 2165) Conservation objectives supporting document - Conservation objectives supporting document - Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation (habitat code 3260)

²⁴ NPWS (2012) River Shannon and River Fergus Estuaries Special Protection Area (Site Code 4077). Conservation Objectives Supporting Document. Version 1.

4.5 Potential for Adverse Effects on European Site Integrity

4.5.1 Conservation Objectives

European and national legislation places a collective obligation on Ireland and its citizens to maintain or restore habitats and species in the Natura 2000 Network to favourable conservation condition. Ireland has determined conservation objectives for European Sites which define favourable conservation condition for habitats and species protected under the Habitats Directive and Birds Directive.

The conservation objectives for a site act as a reference point from which an assessment may be made of whether a project could adversely affect the integrity of a site.

4.5.2 Potential for Adverse Effects on the Lower Shannon SAC

Pathways for adverse effects on the Lower River Shannon SAC have been identified. The potential for these pathways to result in adverse effects to the SAC is now assessed.

These potential effects are identified as follows:

- Potential for noise disturbance to otter
- Potential for surface water emissions to cause degradation to:
 - Estuaries [1130]
 - Reefs [1170]
- Potential for surface-water to cause impact to:
 - Sea lamprey [1095]
 - River lamprey [1099]
 - Salmon [1106]
 - Otter [1355]

SSCOs have been developed for the Lower River Shannon SAC. These have been listed in section 3.2. An assessment of the potential for adverse effects on the integrity of the Lower River Shannon SAC is presented hereunder in Tables 4.8 to 4.12.

Table 4.8: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Lower River Shannon SAC – Estuaries

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.	<p>The Proposed Development does not require works within the boundary of the Lower River Shannon SAC, or the estuaries habitat.</p> <p>The proposed works have the potential to result in the degradation of estuarine habitat, through degradation of surface water, however this will not result in a loss of the permanent habitat area.</p>	Loss of habitat area would constitute an adverse effect on the site's integrity
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 <i>Nucula nucleus</i> community complex; Subtidal sand to mixed sediment with <i>Nephtys</i> spp. community complex; Furoid-dominated intertidal reef community complex; Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community.	As outlined previously, there is potential for surface water emissions to be released into the habitat during the construction phase of the Proposed Development. Release of pollutants, in particular the release of cement fines into estuaries habitat has potential to result in impacts to the invertebrate communities within the sediments.	Impacts due on the invertebrate community distribution would constitute an adverse effect on the site's integrity .

Table 4.9: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Lower River Shannon SAC – Reefs

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat distribution	Occurrence	The distribution of Reefs is stable, subject to natural processes.	The Proposed Development does not require works within Reef habitat. There will be no reef habitat distribution associated with the Proposed Development.	No potential for adverse effects on site integrity have been identified.
Habitat area	Hectares	The permanent habitat area is stable, subject to natural processes.	The Proposed Development does not require works within Reef habitat. There will be no reduction in reef habitat area associated with the Proposed Development.	No potential for adverse effects on site integrity have been identified.

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
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.	As outlined previously, there is potential for surface water emissions to be released into the habitat during the construction phase of the Proposed Development. Release of pollutants, in particular the release of cement fines into reef habitat has potential to result in impacts to the invertebrate communities within the sediments.	Impacts on the invertebrate community distribution would constitute an adverse effect on the site's integrity .

Table 4.10: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Lower River Shannon SAC – Sea Lamprey and River Lamprey²⁵

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Distribution: extent of anadromy	% of river accessible	Sea lamprey: Greater than 75% of main stem length of rivers accessible from estuary River lamprey: Access to all water courses down to first order streams	The construction phase of the Proposed Development will require temporary isolation of watercourses due to the open cut crossing method. This restriction in watercourse access is temporary and does not have potential to result in an overall loss of accessibility of watercourses for lamprey species.	No potential for adverse effects on site integrity have been identified.
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	No works are required in areas identified as suitable habitat for juvenile lamprey. However, there is potential for impact to and loss of lamprey who utilise the adjacent coastal waters as a transit area. However, this loss does not have potential to result in the loss of entire age/size groups present within the SAC.	No potential for adverse effects on site integrity have been identified.
Juvenile density in fine sediment	Juveniles/m ²	Sea lamprey: Juvenile density at least 1/m ² River lamprey: Mean catchment juvenile density of river/brook lamprey at least 2/m ²	No works are required in areas identified as suitable habitat for juvenile lamprey. As such, there is no potential for an overall reduction in juvenile density within fine sediments.	No potential for adverse effects on site integrity have been identified.
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	The watercourses within the Zol of the proposed development have not been identified as spawning habitat for lamprey. As such, there is no potential for decline in extent and distribution of spawning beds for the species.	No potential for adverse effects on site integrity have been identified.

²⁵ Sea lamprey and river lamprey are assessed here together as their conservation objectives overlap.

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
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	No works are required in areas identified as suitable habitat for juvenile lamprey. As such, there is no potential for a loss in availability of juvenile habitat.	No potential for adverse effects on site integrity have been identified.

Table 4.11: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Lower River Shannon SAC – Salmon

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	The Proposed Development will not create any permanent barriers to access to any watercourses for salmon.	No potential for adverse effects on site integrity have been identified.
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	The conservation objectives note that salmon within the River Shannon SAC are protected only in freshwater. No salmon, or suitable habitat for same was recorded during aquatic surveys for the species. However, there is potential for migrating salmon associated with the freshwater reaches of the SAC to occur within the Zol of the Proposed Development. As outlined previously, there is potential for release of surface-water emissions into the River Shannon waters. The release of surface-water emissions, in particular cementitious products, has potential to cause mortality to adult fish.	The loss of adult spawning fish would constitute an adverse effect on the site's integrity .
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	The Proposed Development does not require works in freshwater reaches identified as supporting salmon fry. As such, there is no potential for impacts to salmon fry abundance.	No potential for adverse effects on site integrity have been identified.
Out-migrating smolt abundance	Number	No significant decline	As noted previously, the conservation objectives note that salmon within the River Shannon SAC are protected only in freshwater. No salmon, or suitable habitat for same was recorded during aquatic surveys for the species. However, the	The loss of out migrating smolt would constitute an adverse effect on the site's integrity .

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
			River Shannon Estuary acts as an important transit area for salmon. As such there is potential for out migrating smolt to occur within the Zol of the Proposed Development. As in the case of adult spawning fish there is potential for impacts to smolt which may be passing through the Zol of the Proposed development.	
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Watercourse impacted by the Proposed Development do not constitute suitable spawning habitat for salmon. As such, there is no potential for impacts to redds associated with the Proposed Development.	No potential for adverse effects on site integrity have been identified.
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	The watercourse within the Zol for the proposed development are not designated as part of the Lower River Shannon SAC. The River Shannon downstream of this watercourse is a transitional watercourse. There is no potential for impacts to Q values taken in freshwater extents of the SAC.	No potential for adverse effects on site integrity have been identified.

Table 4.12: Assessment of Potential for Adverse Effects on the site Integrity (before mitigation) of Lower River Shannon SAC – Otter

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Distribution	Percentage positive survey sites	No significant decline	No otter holts were recorded during field walkovers within the potential Zol of the development. A couch was recorded, albeit outside of the Proposed Development boundary. There is potential for holts and couches to become established prior to construction of the Proposed Development. Signs of otter presence were noted along the shores of the River Shannon, and along watercourses within the Proposed Development boundary. As such, there is potential for the works to cause disturbance resulting in the avoidance of the Proposed Development by otter. This may, in a worst-case scenario, result in a reduction in the percentage of positive survey sites for otters associated with the Lower River Shannon SAC. However, given the scale of the works, this will not result in a significant decline in the percentage of positive survey sites within the SAC.	No potential for adverse effects on site integrity have been identified.

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along riverbanks/ around ponds	No works will take place within the SAC as a result of the proposed development and there will be no change in the extent of terrestrial habitat available for otter as a result of the proposed development.	No potential for adverse effects on site integrity have been identified.
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	No direct works will take place within the SAC as a result of the proposed development and there will be no change in the extent of marine habitat available for otter as a result of the proposed development.	No potential for adverse effects on site integrity have been identified.
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 500.1km	No works are required within the SAC boundary. The cable where it crosses freshwater habitat will be below ground. There may be a short term restriction from these areas during construction. These will not, however be permanent and will not result in a significant decline of freshwater habitat for otter.	No potential for adverse effects on site integrity have been identified.
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	No works will take place within lake or lagoon. There will be no change in the length (km) of freshwater (lake/lagoon) habitat available for otter as a result of the proposed development.	No potential for adverse effects on site integrity have been identified.
Couching sites and holts	Number	No significant decline	There is a potential, due to possible visual and noise disturbance, that the couching sites of otter in the vicinity (up to 150m) of the works would be adversely impacted. In addition, there is potential for holts and couches to become established prior to construction of the Proposed Development. As such there is potential for the works to result in a decline in the number of couching sites and holts for otter associated with the SAC.	Impacts on the number of couching sites and holts would constitute an adverse effect on site's integrity .
Fish biomass available	Kilograms	No significant decline	There is a potential, due to possible release of pollutants, that the biomass of fish species in the local water course might decline	Impacts on the fish biomass available to otter would constitute a negative effect on the site's integrity .
Barriers to connectivity	Number	No significant increase.	The proposed development does not comprise works which would constitute a permanent barrier to connectivity for otter. There may be a short-term restriction of the where crossings are required due to temporary works within the channel during construction. These will not, however, be permanent and will not result in a significant decline of freshwater habitat for otter.	No potential for adverse effects on site integrity have been identified.

4.5.3 Potential for Adverse Effects on the River Shannon and River Fergus Estuaries SPA

As set out in Section 4.3 it has been determined through desk-based assessment and ecological field assessment that the construction of the Development, in the absence of mitigation, has the potential to result in adverse effects to:

- Curlew (peak count 10)
- Wetland and Waterbirds [A999] – small numbers of snipe and redshank may use the site.

Adverse direct effects to curlew were determined due to potential for localised temporary disturbance (via noise and/or visual disturbance impacts) in *ex-situ* feeding grounds resulting from construction works.

The potential for impacts on these species are considered in greater detail, by reference to their Conservation Objectives, in Tables 4.13 and 4.14.

Table 4.13: Assessment of Potential for Adverse Effects on the site Integrity of the River Shannon and Fergus Estuaries SPA – Curlew, Redshank and Snipe (wintering ex situ wader species that use farmland)

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Population trend	Percentage change	Long term population trend stable or increasing	<p>The disturbance associated with the Proposed Development will be short term in nature. The habitat within the ZoI does not comprise principal supporting habitat for the species. In addition, surveys found that this habitat within the footprint of the Proposed Development is degraded and reverting to scrub, an unsuitable foraging habitat for the species.</p> <p>As such, disturbance of a low number of curlew from the ZoI of the Proposed Development will not result in a lack of key foraging options for the species. Likewise, the loss of this habitat will not cause a loss of key foraging habitat for the species. There is, therefore, no potential for a long-term decrease in the population trend for the species caused by the works.</p>	No potential for adverse effects on site integrity have been identified.
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by black-headed gull other than that occurring from natural patterns of variation	<p>The proposed development has the potential to result in permanent loss of a small area of habitat utilised by low numbers of curlew. Given localised effects on a very small number of Curlew, which can use abundant alternative forage habitat, no significant effects to the overall range are identified.</p> <p>A small-scale localised pollution event would not likely affect wintering waders. Impacts due to a short term oil spillage or other pollution incident would not likely affect wintering wader species outlined</p>	No potential for adverse effects on site integrity have been identified.

Table 4.14: Assessment of Potential for Adverse Effects on the site Integrity of River Shannon and Fergus Estuaries SPA –Wetlands

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
Habitat Area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha other than that occurring from natural patterns of variation	<p>The Proposed Development has the potential to result in a deterioration in water quality caused by surface water emissions. This has the potential to result in a degradation of wetland habitats associated with the SPA. These habitats are key foraging habitat for a large number of birds associated with the SPA.</p> <p>The associated reduction in wetland quality has the potential to result in a lowering of the carrying capacity for wetland birds.</p>	No potential for adverse effects on site integrity have been identified.

Attribute	Measures	Targets	Potential Impact	Potential for Adverse Effects on Site Integrity
			However, this will not constitute a reduction in the permanent area occupied by wetland habitats.	

4.6 Mitigation

Mitigation is prescribed in accordance with the EPA guidance on EIAR (EPA, 2022) which requires mitigation by avoidance as a first approach. Where this is not feasible, measures to prevent impacts from giving rise to adverse effects will be adopted (e.g. design of bunded storage for chemicals). Where impacts cannot be avoided, e.g., generation of noise, mitigation by reduction of impact is required to limit the exposure of the receptor to an acceptable level (often achieved by interrupting the pathway between the source and receptor).

Mitigation is prescribed hereunder to address the impacts such that adverse effects on site integrity of the European sites does not occur.

Mitigation measures are set out in accordance with the European Commission guidance on the ‘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’ (2021). Mitigation is described with respect to:

- how the measures will avoid/prevent/reduce the adverse impacts on the site to an acceptable level;
- the degree of confidence in their likely success;
- the timescale, relative to the project, when they will be implemented;
- how and when the measures will be monitored.

All mitigation prescribed in this NIS must be implemented by the appointed Contractor for the works, in consultation with an appropriately qualified Ecologist, and the relevant statutory bodies identified hereunder. The Contractor will incorporate the mitigation measures being outlined below into a Construction Environmental Management Plan (CEMP) for the proposed development and agree the CEMP with the Developer and the local authority in advance of mobilisation.

Mitigation is needed for the proposed development to ameliorate or remove the adverse impacts identified and that may impact:

A CEMP has been produced for this project which includes mitigation details outlined in Section 4.6 of this NIS.

A summary of mitigation measures outlined in this section and its application to each of the European Sites identified with potential for effects is outlined in Table 4.15 below.

Table 4.15: Mitigation Measure Summary

Measure	River Shannon and River Fergus Estuaries SPA	Lower River Shannon SAC
Mitigation for protection of water quality	Yes	Yes
Mitigation for prevention of disturbance to wintering birds	Yes	-

Measure	River Shannon and River Fergus Estuaries SPA	Lower River Shannon SAC
Mitigation for prevention of disturbance to otter couches/holts (if present)	-	Yes

4.6.1 Pre-Construction Confirmatory Surveys

Given the dynamic distribution of species and habitats over time, changes may arise between baseline surveys informing this AA Screening and NIS and construction. For example, otters may establish new holts, or occupy previously inactive holes excavated by other animals.

In advance of enabling works, the Contractor's ECoW will conduct confirmatory otter surveys in advance of the commencement of any works within 150m of the works areas (where access is available) as per Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. This will allow for the identification of any holts have been established prior to commencement of works. The confirmatory otter survey will be conducted no more than 10-12 months prior to construction commencing. Otter surveys will be carried out having regard to guidance of NRA (2006, 2009).

The results of pre-construction confirmatory surveys will inform the refinement of mitigation measures (if required) in Contractor method statements, and all results will be incorporated into Contractor's constraint mapping.

Survey reporting and mapping will also be provided to the Employer's Representative team, and to local authority or other parties where required by conditions.

4.6.2 Ecological Supervision and Monitoring

An ECoW will be employed by the Contractor to oversee implementation of mitigation. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.

The ECoW will have demonstrable experience in ecological supervision.

The Contractor's ECoW will also ensure any disturbance licenses are arranged based on relevant details outlined in this NIS and any significant findings of confirmatory pre-construction surveys outlined above. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated, and effects are minimised.

All monitoring reports and licensing documentation will be provided to the Employer's Representative team, and to local authority or other parties where required by condition.

4.6.3 Mitigation Against Water Quality Impacts to Surface Water

The principle likely pollution sources are contaminated site run-off, including silty water arising from exposed ground / stockpiles / and from accidental leaks / spills of oil / fuels from machinery or storage areas, and run off from areas where concrete pours are taking place.

General mitigation measures to avoid / prevent contaminated runoff and pollution from site are prescribed in Table 4.16. Measures proposed to avoid/prevent contaminated runoff and pollution during water crossings are provided in Table 3.27.

Table 4.16: Mitigation Against Surface Water Pollution - General

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>At a minimum, all pollution control measures will be designed, installed, and maintained in accordance with measures outlined below and under the supervision of the Contractor's Environmental Clerk of Works (EnCoW).</p> <p>Concrete</p> <p>The pouring of concrete will be required during the construction phase. To prevent the runoff of concrete into nearby watercourses and drains, the following will be implemented.</p> <ul style="list-style-type: none"> • No on-site batching will be permitted at the proposed works areas. Concrete will instead be transported to the site within a concrete truck. • Quick setting concrete mixes will be used to reduce the risk of contaminated run-off to the nearby watercourses. • Concrete trucks will be washed down in a sealed mortar bin / skip which has been examined in advance for any defects. This requirement will be communicated to each concrete truck driver prior to entering into the works area. • Where concrete pours are to take place instream they will only take place within an isolated, dry, works area. • Where the isolated working area requires constant pumping to maintain a dry works area, pumps shall be turned off during the pour, and remain off until concrete has hardening negating a run-off risk. • The Contractor's EnCoW will ensure that covers are available for freshly poured concrete to avoid wash off in the event of rain. • Waste concrete slurry will be allowed to dry and taken to a licensed waste depot for disposal. 	<p>Measures will prevent the uncontrolled releases of pollutants into the environment.</p>	<p>Measures prescribed as standard best practice and are aligned with CIRIA Guidelines C532</p>	<p>Pollution prevention measures will need to be in place before the enabling and construction works commence at each location.</p>	<p>The Contractor's EnCoW will carry out ongoing monitoring of all pollution control measures.</p> <p>The Contractor EnCoW will report monitoring findings, and adaptive management actions taken in writing to the independent EnCoW within the Employer's Representative Team and any statutory bodies in compliance with planning conditions.</p>	<p>Measures will prevent and/or remedy the uncontrolled releases of pollutants into the environment.</p>

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<ul style="list-style-type: none">● The Contractor will schedule concrete works during relatively dry weather conditions (i.e. when there are no active Met Eireann yellow, orange or red warnings) to reduce the elevated risk of runoff.● The Contractor's EnCoW will notify the Employer's Representative Team, the NPWS and IFI immediately of any concrete spills into watercourses. <p>Hydrocarbons</p> <p>Where mobile equipment is required e.g. generators, these will be housed in a suitably sized bund / plant nappy such that any leaks / spills are intercepted. All mobile equipment used will be stored within a plant nappy. Operators will regularly inspect the plant nappy, at a minimum on a daily basis, and replace it where it has become contaminated.</p> <p>Fuelling and lubrication of plant and equipment will be restricted to the construction compound sites, or laydown areas.</p> <p>All waste fuels, oils, and other hazardous wastes will be disposed of in accordance with the requirements of waste legislation.</p> <p>Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained during induction to site by the Contractor's EnCoW in the use of this equipment.</p> <p>Should use of a spill-kit be required it shall be immediately re-stocked by the Contractor.</p> <p>All spill-kits shall be inspected on a weekly basis by the SHEQ officer to ensure they are maintained as fit for purpose. Records relating to these inspections shall be kept.</p> <p>Welfare / hygiene facilities will be located within the construction compounds.</p>					

Measure	How the measures will avoid / prevent / reduce impacts	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
Should one be required, any water from any wheel washes will be removed from site and disposed of in line with Waste Legislation. No wheel wash water will be discharged into any watercourses or drainage ditches.					

Table 4.17: Mitigation Proposed for Watercourse Crossings

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>Prior to the works commencing, the measures prescribed in this section shall be installed to prevent the downstream transportation of surface water run off associated with vegetation clearance. This may be through the use of features like hay bales. Monitoring of these measures to ensure their continued effectiveness will take place on an on-going basis while the works are proceeding.</p> <p>The clearance of any riparian vegetation will be avoided / or kept to the minimum required for the facilitation of the works such that no unnecessary exposure of riverbanks occurs.</p> <p>The Contractor's EnCoW shall direct the Contractor to take any corrective actions required. The Contractor will record all works authorisations, report these to the independent EnCoW within the Employers Representative Team, and maintain on file for inspection as required.</p> <p>Where the implementation of these measures fail, or are inadequate, the Contractor will implement adapted</p>	Measures prescribed as best practice and are proven technologies / methods.	Pollution prevention measures will need to be in place before the construction works commence	<p>The Contractor's EnCoW will carry out daily monitoring of all pollution control measures including monitoring of pollution control measures such as silt fencing and compliance with restricted areas.</p> <p>The Contractor EnCoW will report monitoring findings, and adaptive management actions taken in writing to the Employer's Representative Team and any statutory bodies in compliance with planning conditions.</p>	Measures will ensure all adverse effects associated watercourse crossings are avoided

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>measures (for example replacement sediment treatment system) in agreement with the Contractor's EnCoW and the Employers Representative Team.</p> <p>The Inland Fisheries Ireland (IFI) Biosecurity Protocol for Field Survey Works will be complied with.</p> <p>Unless otherwise agreed with IFI, any element of the works requiring instream works will be restricted to the fisheries open season (i.e. restricted to July to September inclusive).</p> <p>Where trenching (instream) works are proposed, electrofishing may be required to remove fish under licence from IFI. Method statements will be developed in agreement with the Employer's Representative and with IFI for the works.</p> <p>Open Cut Water Crossing</p> <p>Open cut works will be carried out within a dry works area.</p> <p>The dry works area will be isolated by installing an impermeable barrier between the watercourse and the works area. The impermeable barrier will be tailored to the watercourse in question. Techniques include the use of inflatable dams, frame dams or, in smaller watercourses, sandbags (double-bagged and underfilled, containing only clean washed sand).</p> <p>Water pumped from the dry works area will be treated using settlement tanks to remove sediment prior to discharge back to the watercourse. In consultation with Inland Fisheries Ireland (IFI), greater filtration of silt may be achieved prior to discharge, through proposed use of silt de-watering bags which trap silt and expel only clean water and can be left to biodegrade on riverbanks as a habitat enhancement measure.</p> <p>Water will be conveyed over the isolated section of channel by pumping or the use of a temporary diversion. Where sufficient capacity is available, and there is no risk of excessive scour, the diversion will be within the footprint of the existing channel.</p>				

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<p>Following open trenching site restoration works will be carried out following completion of the crossing, in agreement with IFI. These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation.</p> <p>Open cut trenching works will not be carried out during extreme rainfall or high flow events. Met Éireann provides a 5-day weather forecast via its website (www.met.ie) and works will not take place at least during yellow, orange and red weather warnings. The Contractor's Environmental Clerk of Works (EnCOW) will monitor this daily and will provide reports for audit.</p> <p>A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to commencement of works.</p> <p>Silt fences will be installed downslope of the area where silt is being generated on disturbed ground as follows:</p> <ul style="list-style-type: none">● To be effective the silt curtain must contain the area where silt is generated and must terminate on high ground (i.e. an elevated area not in the watercourse).● Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh.● The base of the silt fence will be bedded at least 15-30 cm into the ground at 2 metre intervals.● Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains.● The integrity of the silt fencing will be checked daily by the EnCoW and after poor weather conditions (rain or wind) and any failures rectified immediately.				

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<ul style="list-style-type: none">● Two lines of silt curtain / fence will be installed, where considered necessary, by the EnCoW.● Any build-up of sediment along the fence boundary will be removed daily.● Silt fences will be maintained until vegetation on the disturbed ground has re-established. Re-instatement method statements will be subject to approval by the EnCoW.● The silt fencing must be left in place until the works are completed (which includes removal of any temporary ground treatment).● Silt fences will not be removed during heavy rainfall.● The silt fence will not be pulled from the ground but cutaway at ground level and posts removed.				

4.6.4 Mitigation Against Disturbance to Wintering Birds

The principle likely disturbance from construction activities are temporary disturbance to very low numbers of SCI from works at the western end of the Proposed Development. This disturbance will not be significant, however precautionary mitigation measures to minimise noise disturbance from works associated with the development are prescribed in Table 4.18 below.

Table 4.18: Mitigation Against Disturbance to Wintering Waterfowl

Measure	Confidence in the likely success of the measure	Timescale for Implementation	Monitoring requirements	How the measures will avoid / prevent / reduce impacts
<ul style="list-style-type: none"> All plant used during the construction phase shall be the quietest of its type practical for achieving the works, as demonstrated in writing by the Contractor to the local authority, with reference to other noisier models. All plant shall be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of the specific noise reduction measures in the next bullet. The following will be incorporated to reduce the impact further: <ul style="list-style-type: none"> The use of mufflers on pneumatic tools Effective exhaust silencers Sound reducing enclosures Machines in intermittent use shall be shut down during periods where they are not required 	Measures prescribed as standard best practice and are proven technologies / methods (sound hoarding and noise reduction measures are used generally to reduce noise impacts on projects).	Sound reduction hoarding will need to be in place before the construction works commence. Implementation of plant specific noise reduction to take place on an ongoing basis.	The Contractor's EnCoW will carry out daily monitoring of noise reduction measures (i.e. visual checks of hoarding), The Contractor's EnCoW will report monitoring findings, and adaptive management actions taken in writing to the Employer's Representative Team, and any statutory bodies in compliance with planning conditions.	Measures will ensure any adverse effects associated with noise disturbance are avoided.

4.7 Conclusion

The mitigation measures detailed in Section 4.6 of this NIS will ensure no adverse effects on the integrity of any European sites in light of the site's conservation objectives.

Based on the assessment of the Proposed Development alone and in-combination with other projects and plans, including the implementation of mitigation measures, it can be concluded that no adverse effects on the integrity of any European sites will arise, in view of the site's conservation objectives. The authors have no reasonable scientific doubt as to the conclusion reached.

As such, An Bord Pleanála is enabled to conclude that the Proposed Development shall not adversely affect the integrity of a European site, alone and in combination with other projects and plans (including the other elements of the Project).

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A. Winter Bird Surveys

APPENDIX A7B-3

Winter Bird Surveys

Shannon LNG Limited
August 2021

Shannon Technology and Energy Park
Environmental Impact Assessment Report

DixonBrosnan
environmental consultants

Shannon Technology and Energy Park
(STEP) Estuarine Bird Report

August 2021

www.dixonbrosnan.com



Project	Shannon Technology and Energy Park (STEP) Winter Bird Report	
Client	New Fortress Energy	
Project Ref.	2116	
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Date	Revision	Prepared By
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1. Introduction

1.1 Project Background

DixonBrosnan Environmental Consultants were commissioned by New Fortress Energy to assess the potential impacts for the Proposed Development at the Shannon Technology and Energy Park (STEP) to impact on waterbirds using the lands in the vicinity of the site. The Proposed Development consists of a Liquefied Natural Gas (LNG) Terminal and Power Plant together with associated infrastructure on an approximately 52 ha area in the northeast of the overall 243 ha landbank which comprises grassland on the southern shores of the Shannon Estuary and is surrounded by a mixture of agricultural land, rural housing, public roads and the Shannon Estuary.

The information in this report was used to help determine the impacts on bird populations and also informed the conclusions of the Environmental Impact Assessment Report (EIAR) for the Proposed Development.

Survey results are discussed in the context of the study area as a whole and in the context of available Irish Wetland Bird Survey (I-WeBS) data, previous waterbird surveys and in relation Special Protection Area (SPA) i.e., River Shannon and River Fergus Estuaries SPA, located to the north of the study area.

This report has been written in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) *Guidelines for Ecological Report Writing* (CIEEM 2017).

1.2 Site Background

The Proposed Development is located on the southern shores of the Shannon Estuary, 4.5 km west of Tarbert and 3.5 km west of Ballylongford in Co. Kerry (**Figure 1**). The site occupies part of two townlands, Kilcolgan Lower and Ralappane. The Proposed Development site is within a rural/agricultural setting.

The River Shannon and River Fergus Estuaries form the largest estuarine complex in Ireland. The complex spans three counties, Clare (north shore), Limerick and Kerry (southern shoreline). The large intertidal mudflats exposed at low tide and the diversity of other wetland habitats results in an estuarine complex with high value for birds. The value of the site has been recognised at an international level, with some 32,000 ha designated as the River Shannon and River Fergus Estuaries SPA (Site Code 4077) under the EU Bird's Directive.

The estuary has been the focus of systematic waterbird monitoring since the early 1980s (Sheppard 1993) and more regularly since the mid 1990's (Crowe 2005). However, regular counts of the estuary are limited because of the extensive efforts required to undertake coordinated counts of such a large site, and one with many areas of limited access. Nonetheless, counts have shown that the Shannon Estuary has held the largest numbers of waterbirds in Ireland (e.g. Colhoun, 2001). However, surveys in more recent years show that, for many species, there have been substantial declines in usage by waterbirds (NPWS, 2012b).

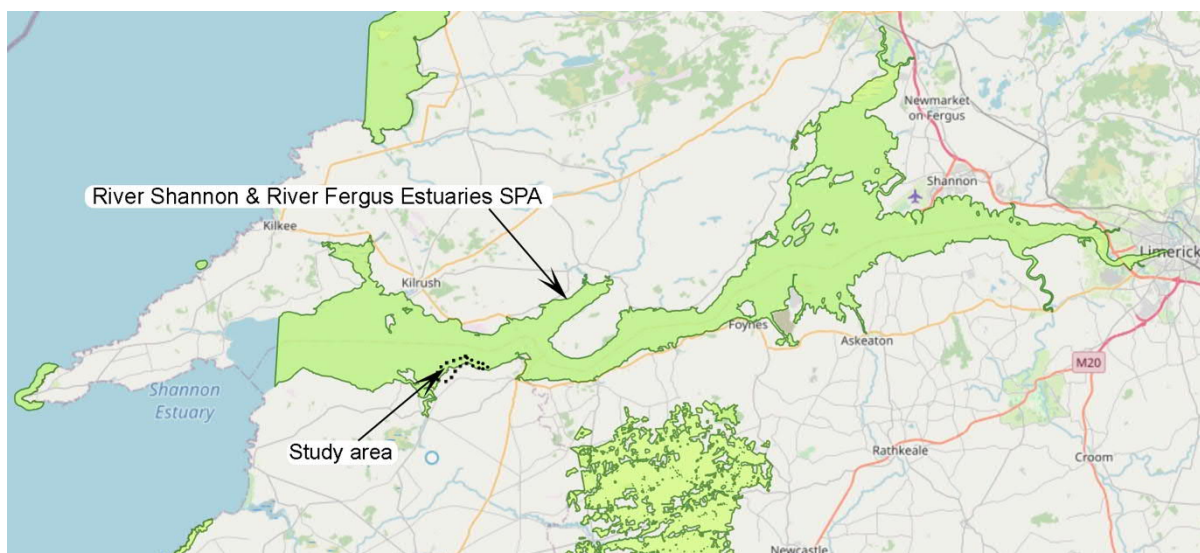


Figure 1. Approximate location of study area within River Shannon & River Fergus Estuaries SPA | Source EPA envision mapping | Not to scale

2. Conservation Legislation and Policy

2.1 European Union Directives

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of endangered species of wild birds. Sites that meet any of the following criteria may be selected as SPAs:

- A site regularly supporting 20,000 waterbirds or 10,000 pairs of seabirds;
- A site regularly supporting 1% or more of the all-Ireland population of an Annex I species;
- A site regularly supporting 1% or more of the biogeographical population of a migratory species;
- A site that is one of the most suitable sites in Ireland for an Annex I species or a migratory species.

In Ireland a programme to identify and designate these SPA sites has been in place since 1985. It is Ireland's typical mild and wet winters that make the wetlands of Ireland such an important resource for over three-quarters of a million of these waterbirds each year. Over 50 species of waterbird migrate here either on passage to more southerly resorts or to spend the entire winter here. They seek out the relatively undisturbed wetland areas for ice-free feeding conditions and for safe roosting opportunities. In some cases, significant proportions of the biogeographic populations of waterbird overwinter here (e.g. Light-bellied Brent Goose, Black-tailed Godwit, Whooper Swan, Greenland White-fronted Goose and Ringed Plover).

Ireland's SPA Network encompasses over 570,000 hectares of marine and terrestrial habitats. The marine areas include some of the productive intertidal zones of our bays and estuaries that provide vital food resources for several wintering wader species including Dunlin a, Knot

and Bar-tailed Godwit. Marine waters adjacent to the breeding seabird colonies and other important areas for sea ducks, divers and grebes are also included in the network.

The majority of the breeding seabirds and wintering waterbirds are considered to be regularly occurring migratory birds; over 60% of 25 Annex I listed species that now occur in Ireland on a regular basis belong to the breeding seabird and wintering waterbird groups. This has in part led to the situation that the majority (> 80%) of Ireland's SPAs are designated for these two bird groups.

2.1.1 Conservation Objectives for the River Shannon and River Fergus Estuaries SPA

The River Shannon and River Fergus Estuaries SPA was selected as a SPA because of the presence of internationally important numbers and/or numbers of all-Ireland importance for a total of 21 species. In addition to the selection and additional conservation interest species, the site was selected as a SPA because it regularly supports over 20,000 waterbirds during the non-breeding season making this a site of international importance. The species listed as SCIs for the River Shannon and River Fergus Estuaries SPA are included in **Table 1**.

The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland. The conservation objectives for the River Shannon and River Fergus Estuaries SPA are detailed in:

NPWS (2012a) *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.

Table 1. Features of Interest - River Shannon & River Fergus Estuaries SPA

Species code	Species	Scientific name	Conservation objective
A017	Cormorant	<i>Phalacrocorax carbo</i>	Maintain
A038	Whooper Swan	<i>Cygnus cygnus</i>	Maintain
A046	Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	Maintain
A048	Shelduck	<i>Tadorna tadorna</i>	Maintain
A050	Wigeon	<i>Anas penelope</i>	Maintain
A052	Teal	<i>Anas crecca</i>	Maintain
A054	Pintail	<i>Anas acuta</i>	Maintain
A056	Shoveler	<i>Anas clypeata</i>	Maintain
A062	Scaup	<i>Aythya marila</i>	Maintain
A137	Ringed Plover	<i>Charadrius hiaticula</i>	Maintain
A140	Golden Plover	<i>Pluvialis apricaria</i>	Maintain
A141	Grey Plover	<i>Pluvialis squatarola</i>	Maintain

Species code	Species	Scientific name	Conservation objective
A142	Lapwing	<i>Vanellus vanellus</i>	Maintain
A143	Knot	<i>Calidris canutus</i>	Maintain
A149	Dunlin	<i>Calidris alpina</i>	Maintain
A156	Black-tailed Godwit	<i>Limosa limosa</i>	Maintain
A157	Bar-tailed Godwit	<i>Limosa lapponica</i>	Maintain
A160	Curlew	<i>Numenius arquata</i>	Maintain
A162	Redshank	<i>Tringa totanus</i>	Maintain
A164	Greenshank	<i>Tringa nebularia</i>	Maintain
A179	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Maintain
A999	Wetlands		Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a SCI for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the SCI species. Thus, a further objective is to maintain or restore the favourable conservation condition of the wetland habitat within the River Shannon & River Fergus Estuaries SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

The favourable conservation conditions of these SCIs in the River Shannon and Fergus Estuaries SPA are defined by various attributes and targets, which are shown in **Table 2**. The conservation objectives for the breeding and wintering population of Cormorant is defined and measured by eight attributes and targets. The conservation objectives for each of the remaining 20 wintering populations of qualifying interest species are defined and measured by the same two attributes and targets. The conservation objective for wetland habitat is to maintain its favourable conservation condition in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, defined and measured by 1 no. attribute and target (NPWS 2012a).

Table 2. Attributes and targets for the conservation objectives for the wintering populations of in the River Shannon and Fergus Estuaries SPA

Species	Attribute	Measure	Target
Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon,	Population trend	Percentage change	Long term population trend stable or increasing

Species	Attribute	Measure	Target
Teal, Pintail, Shoveler, Scaup, Cormorant, Golden Plover, Grey Plover, Lapwing, Ringed Plover, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Knot, Dunlin, Greenshank, Redshank and Black-headed Gull	Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing and intensity of use of areas used by the each of the SCI species, other than that occurring from natural patterns of variation.
Cormorant	Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
	Productivity rate	Number	No significant decline
	Distribution; breeding colonies	Number; location; area (hectares)	No significant decline
	Prey biomass available	Kilograms	No significant decline
	Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase

Species	Attribute	Measure	Target
	Disturbance at the breeding site	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 cormorant other than that occurring from natural patterns of variation

Source: NPWS (2012a).

The selection of species listed as SCIs for the River Shannon & River Fergus Estuaries SPA was based on the following (NPWS 2012a):

- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Whooper Swan. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 118 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Light-bellied Brent Goose. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 494 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Shelduck. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,025 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Wigeon. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,761 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Teal. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,260 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Cormorant . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 245 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 223 individuals.

- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Golden Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 5,664 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 558 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Lapwing. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,126 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Knot . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,015 individuals.
- During winter the site regularly supports 1% or more of the biogeographic population of Dunlin. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,131 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Black-tailed Godwit. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,035 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Bar-tailed Godwit. The mean peak number within the SPA during the baseline period (1995/96 – 1999/00) was 460 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Curlew. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,396 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Greenshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 61 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Redshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,645 individuals.

The following species are identified as additional SCIs for the River Shannon and River Fergus Estuaries SPA as they were recorded in numbers of all-Ireland importance during the baseline period (1995/96 – 1999/00):

- Pintail
- Shoveler
- Scaup
- Cormorant (breeding population)

- Black-headed Gull .

The wetland habitats contained within the River Shannon and River Fergus Estuaries SPA are identified to be of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional SCI.

2.2. Species of Conservation Concern

In addition to species listed in the EU Birds Directive (refer to **Section 2.1**), species of conservation concern in the Irish and European context are also classified under Birds of Conservation Concern Ireland (BoCCI) and Species of European Conservation Concern (SPEC). Both of these assessment processes are used to identify priority species in order that conservation action can be taken to improve species status (Gilbert *et al.* 2021).

BirdWatch Ireland and the Royal Society for the Protection of Birds (RSPB) have listed priority bird species suffering decline in the Irish/European and global context. The Birds of Conservation Concern in Ireland (BoCCI) list classifies birds as Red (high conservation concern) or Amber (medium conservation concern) based on their conservation status and hence conservation priority. All other regularly occurring species are classified as Green List and are not considered threatened. Listed species must meet one or more of the following criteria:

Red List: Their breeding population or range has declined dramatically in recent years, or their breeding population has undergone a significant decline since 1800, or they are of global conservation concern.

Amber List: Their population or range has declined moderately in recent years, or they are rare or sporadically breeding species, or their breeding or wintering population is internationally important and/or localised, or they have an unfavourable conservation status in Europe.

Green List: Do not meet Red or Amber-listing criteria.

Species of European Conservation Concern are assessed by BirdLife International and recognised by the SPEC process:

SPEC 1: Species are those which are of global conservation concern. SPEC 1 species are automatically BoCCI Red-listed and both SPEC 2 and 3 species are Amber-listed except for those that do not breed in Ireland.

SPEC 2: Species are those which have an unfavourable conservation status in Europe (if the population is threatened, declining, depleted from historical levels or is found only in a few locations) and is concentrated in Europe (i.e. more than 50% of the global population occurs in Europe).

SPEC 3: Species are which have an unfavourable conservation status in Europe (as above), but which are not concentrated in Europe.

Species which do not fulfil these criteria are regarded as **non-SPEC** species and of least conservation concern.

3. Baseline Winter Birds Data

3.1 I-WeBS Monitoring of the River Shannon and River Fergus Estuaries SPA

The Selection Species and additional SCI species for the River Shannon and River Fergus Estuaries SPA are listed in **Table 3**, together with population data during the baseline period (1995/96 – 1999/00), the current level of conservation concern of each species in Ireland and the most recent national (all-Ireland) and international (biogeographic) population trends (Lewis *et al.* 2016).

In addition to the SCI species, the River Shannon and River Fergus estuaries supports an additional 19 regularly-occurring waterbird species during the non-breeding season. "Regularly-occurring" has been defined here as recorded presence in 18 or more of the 21 years since I-WeBS surveying began in 1994/95. **Table 4** lists these species and provides baseline data, the current level of conservation concern of each in Ireland and the most recent national (all-Ireland) and international (biogeographic) population trends. The latin names of species listed in the tables below are included in **Appendix 1**.

Table 3. Special Conservation Interests (SCI) Species and Additional Special Conservation Interests for the River Shannon and River Fergus Estuaries SPA

	Species	Annex I	Baseline Population ^a	BOCCI Category ^b	Current All-Ireland Trend ^c	Flyaway Trend ^d
Special Conservation Interest (SCI)	Bar-tailed Godwit	Yes	460 (n)	Red	3.9	Stable
	Black-tailed Godwit		2,035 (i)	Red	4.2	Increase
	Cormorant		245 (n)	Amber	-21.1	Stable
	Curlew		2,396 (n)	Red	- 13.4	Decline
	Dunlin		15,131 (i)	Red	-23.2	Decline
	Golden Plover	Yes	5,664 (n)	Red	- 23.5	Decline
	Greenshank		61 (n)	Green	16.8	Increase
	Grey Plover		558 (n)	Red	- 5.8	Decline
	Knot		2,015 (n)	Red	-42.2	Stable
	Lapwing		15,126 (n)	Red	- 16.4	Decline
	Light-bellied brent goose		494 (i)	Amber	-15.5	Increase
	Redshank		2,645 (n)	Red	- 23.6	Stable
	Ringed Plover		223 (n)	Amber	- 16.5	Stable
	Shelduck		1,025 (n)	Amber	- 14.2	Decline
	Teal		2,260 (n)	Amber	6.2	Stable
	Whooper Swan	Yes	118 (n)	Amber	13.4	Increase
	Wigeon		3,761 (n)	Amber	-12.0	Decline
Additional	Black-headed Gull		2,681 (n)	Amber		
	Cormorant (breeding)		93 pairs (n)	Amber		
	Pintail		62 (n)	Red	-12.8	Stable
	Scaup		102 (n)	Red	-57.9	Decline
	Shoveler		107 (n)	Red	-30.6	Stable

Source: Lewis *et al.* (2016). ^a. All baseline data are from the River Shannon and River Fergus Estuaries conservation objectives supporting document (NPWS 2012b), and relate to the average peak numbers for the period 1995/96 – 1999/2000 with the exception of Whooper Swan (Robinson *et al.* 2004a) and Light-bellied Brent Goose (Robinson *et al.* 2004b). (i) and (n) denote numbers of international and all-Ireland importance at the time of calculation i.e. from Wetlands International (2002) and Crowe *et al.* (2008) respectively. ^b. BOCCI category for the period 2020-2026 (Gilbert *et al.* 2021). ^c Current All-Ireland Trend based on % change estimates between the periods 2010/11 and 2015/2016 (Burke *et al.* 2018). ^d Current International Trend based on most recent available data from Wetlands International waterbird population estimates (2012-2021) <https://birdwatchireland.ie>.

Table 4. Summary data for other regularly occurring species non-SCI species for the River Shannon and River Fergus Estuaries SPA

	Species	Annex I	Baseline Population ^a	BOCCI Category ^b	Current All-Ireland Trend ^c	Current International Trend ^d
Regularly occurring non-SCI Species	Common Gull		525 ±	Amber		
	Coot		277	Amber	- 16.8	Decline
	Goldeneye		12 ±	Red	- 36.8	Decline
	Great Black-backed Gull		148	Amber		
	Great Crested Grebe		50	Amber	- 28.2	Stable
	Grey Heron		46	Green		Stable
	Greylag Goose		82	Amber	- 20.8	No data
	Herring Gull		128	Amber		
	Lesser Black-backed Gull		290	Amber		
	Little Egret	Yes	3	Green	-2.8	Increase
	Little Grebe		34	Green	- 1.3	Increase
	Mallard		589	Amber	-4.6	Decline
	Moorhen		47	Green		
	Mute Swan		156	Amber	-0.9	Stable
	Oystercatcher		551	Red	-21.1	Stable
	Pochard		27	Red	- 30.4	Decline
	Snipe		339	Red		
	Tufted Duck		189	Amber	- 11.1	Stable
	Turnstone		125	Amber	- 20.6	Stable

Source: Lewis *et al.* (2016). "Regularly occurring" is defined as having been recorded in 18 of the 21 years from 1994/95–2014/15. ± indicates where both ground and aerial counts were used. ^a. All baseline data are from the River Shannon and River Fergus Estuaries conservation objectives supporting document (NPWS 2012b), and relate to the average peak numbers for the period 1995/96 – 1999/2000 with the exception of Whooper Swan (Robinson *et al.* 2004a) and Light-bellied Brent Goose (Robinson *et al.* 2004b). (i) and (n) denote numbers of international and all-Ireland importance at the time of calculation i.e. from Wetlands International (2002) and Crowe *et al.* (2008) respectively. ^b. BOCCI category for the period 2020-2026 (Gilbert *et al.* 2021). ^c Current All-Ireland Trend based on % change estimates between the periods 2010/11 and 2015/2016 (Burke *et al.* 2018). ^d Current International Trend based on most recent available data from Wetlands International waterbird population estimates (2012-2021) <https://birdwatchireland.ie>.

3.2 I-WeBS Monitoring in the Vicinity of Study Area

A review of I-WeBS data shows that the study area and Proposed Development site are located within the I-WeBS subsite 0K492 (Ballylongford Bay (Carrig Isd-Ardmore Pt)). 0K492 is a subsite assessed by aerial surveys only (**Figure 2**). The vantage point locations for winter bird surveys carried out by DixonBrosnan are also indicated below in **Figure 2**.



Figure 2. Location of I-WeBS subsite 0K492 and the location of DixonBrosnan vantage points for Proposed Development site | Source Birdwatch Ireland

Aerial surveys of the Shannon and Fergus Estuaries commenced in 1994/95 with at least a single full count for the next two seasons, before a four-year break (1997/98 – 2000/01). Aerial surveys re-commenced in 2001/02 and were carried out each season until 2012/13. A technical error led to no data being collected in 2013/14 (Lewis *et al.* 2016).

The aim of aerial surveys is to complete two full surveys per season. Some 29 aerial subsites have been used overall, and these cover different areas and are coded differently to the ground-based subsites. However, the quality of the counts undertaken during aerial census is limited by many factors, especially at this site which supports large numbers (tens of thousands) of birds of many species. These limitations are discussed elsewhere (Boland & Crowe 2012) and are summarised below:

1. Aerial census only allows a limited timeframe and the counts provided of large flocks are estimates;
2. It is often difficult to discern/identify birds that remain on the ground and that are not flushed by the aircraft;
3. Species occurring in low densities (such as Pintail, Teal, Grey Plover) are overlooked. Aerial counts are more suitable for dispersed and distinguishable species

such as Lapwing, Golden Plover and Shelduck whereas small, scarce or skulking species are likely underestimated (e.g. Dunlin, Turnstone, Redshank, Greenshank) (Crowe 2005) and are better covered by ground observations.

A review of the Irish Wetland Bird Survey (I-WeBS) data for the period 2011-2012 season (only data available) for the subsite 0K492 is detailed in **Table 5** below. It is noted that the table only presents data from a single month i.e. February 2012. Correspondence with Birdwatch Ireland (December 2020), confirmed that this is the most recent data available for this subsite.

Table 5. Irish Wetland Bird Survey (I-WeBS) data for the period 2011-2012 season (only data available is for February 2012) for the subsite (aerial) 0K492

Species	Annual peak of each species	1% National	1% International
Wigeon	200	630	15000
Teal	20	340	5000
Golden Plover	50	1200	9300
Lapwing	120	1100	20000
Dunlin	70	570	13300
Black-headed Gull	15		20000

Source: Birdwatch Ireland 16/12/2019

Of the species recorded, Golden Plover are listed on Annex I of the Birds Directive. Wigeon and Black-headed Gull are classified as Red Listed species (high conservation concern) by BirdWatch Ireland and the Royal Society for the Protection of Birds (Gilbert *et al.* 2021).

However, it is noted that none of the species recorded during the 2011-2012 survey period were recorded in high numbers and numbers were low in-comparison to the figures which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical population of a migratory species).

3.3 Other Surveys in the Vicinity of the Study Area

The 2010/11 waterbird survey programme was designed to investigate how waterbirds are distributed across coastal wetland sites during the low tide period. The surveys ran alongside and are complementary to I-WeBS. Following a reconnaissance visit by fieldworkers in September 2010, it was decided to divide the site into two halves, and to count the site over two days on each survey occasion. A programme of four low tide counts (October 20th/21st and November 22nd-24th 2010, plus January 6th/7th and February 18th/19th 2011) and a high tide count (26th/27th January 2011) were completed across the site. A total of up to 66 count sections (subsites) were used, comprising of up to 35 subsites on day one and up to 30 subsites on day two on each survey occasion. It should be noted that the count subsite boundaries and SPA boundaries are not coincident.

The NPWS subsite most relevant to the Proposed Development site is the Carrig Island (0K509) subsite. Six vantage point locations were utilised for estuarine bird surveys carried out by DixonBrosnan. Point A and Point F are located the Carrig Island subsite. It is noted that Point B, Point C, Point E and Point F occur within an area not covered by the 2010/11 I-WeBS survey programme.

Species richness at subsite level varied considerably with a greater proportion of subsites supporting in the range of six to ten species. Ten subsites supported 15 or more species. With regards to the distribution of species throughout the Shannon and Fergus Estuaries, Carrig Island (OK509) had very high numbers of Whooper Swan, Light-bellied Brent Geese, Wigeon, Teal, Golden Plover, Pintail and Lapwing, and high numbers of Shelduck, Cormorant, Ringed Plover, Dunlin, Bar-tailed Godwit, Curlew, Redshank and Black-headed Gull. The subsite received intensive coverage over the survey period. It had the highest waterbird diversity of any subsite, averaging 26 species at low tide (20-30 per day) and 17 at high tide. Peak numbers of Dunlin and Teal exceeded the threshold of all-Ireland importance.

Overall, Carrig Island (OK509) is one of the most important subsites in the Shannon and Fergus Estuary complex, in terms of diversity and numbers of waterbirds present. Both the subtidal and intertidal habitats are of significant importance for waterbirds.

The most detailed survey of the Shannon Estuary was carried out by MKO in 2017/2018 (MKO 2019). This surveyed 87 subsites within the Shannon Estuary, including the Proposed Development site. This survey found the total number of SCI species recorded across all subsites ranged from 20 species in October to 10 species in June. Most of the 21 SCI species were present in all the winter months (October-March) with Pintail and Scaup being the only missing SCI species during these months, while over half of the SCI species remained present during the summer. The mean species richness per subsite varied from 1.7-18.3, and species richness in the area covering the Proposed Development site was in the lowest category for species richness i.e. Point B, Point C, Point E and Point F (**Figure 4**). One of the highest species richness occurred in the Ballylongford area to the west of the project site, in which Point A and Point D are located. The narrow section of the Lower Shannon between Foynes and Tarbert had generally low species richness, although the small size of the subsites in these areas will have affected the analyses. The subsite species richness was generally correlated with the subsite intertidal area although this was mainly due to low species richness in subsites with less than 50 ha of intertidal habitat (**Figure 3**). The subsite distribution of SCI species richness was strongly correlated with the subsite distribution of total species richness (Spearman's $r = 0.942$, one-side $p < 0.001$, $n = 89$).

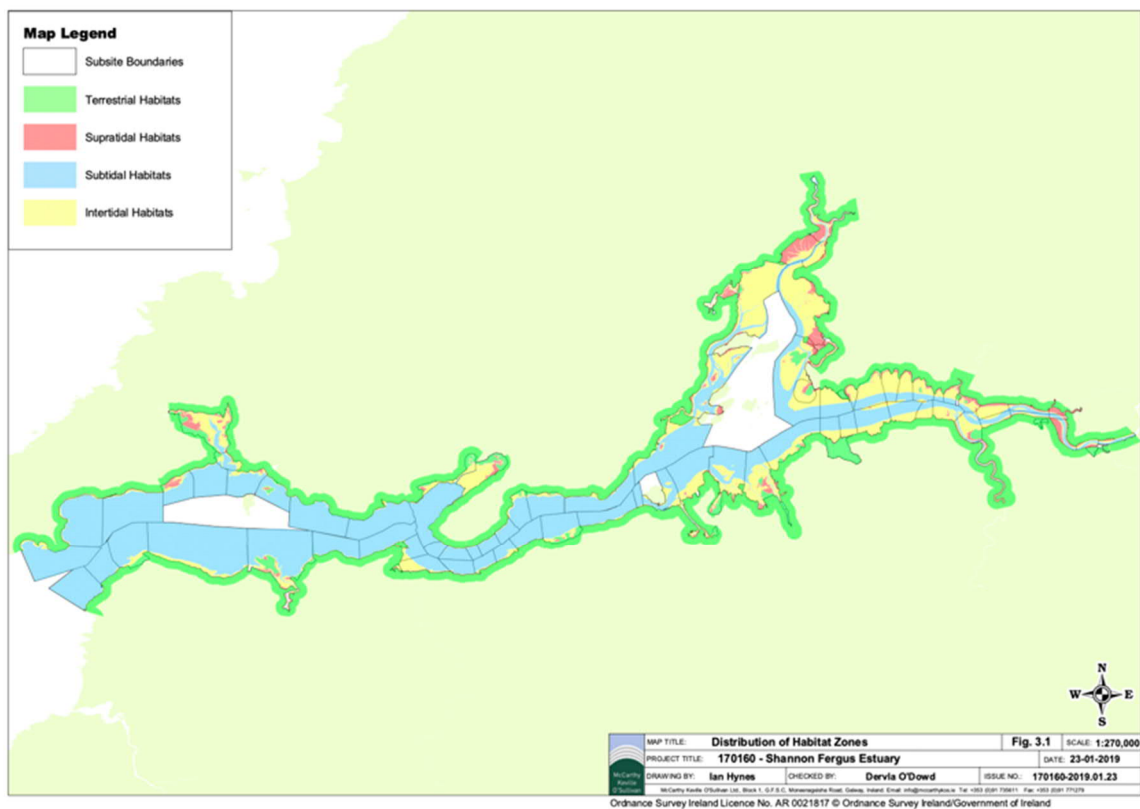


Figure 3. Distribution of habitat zones within the Shannon Estuary (MKO 2019)

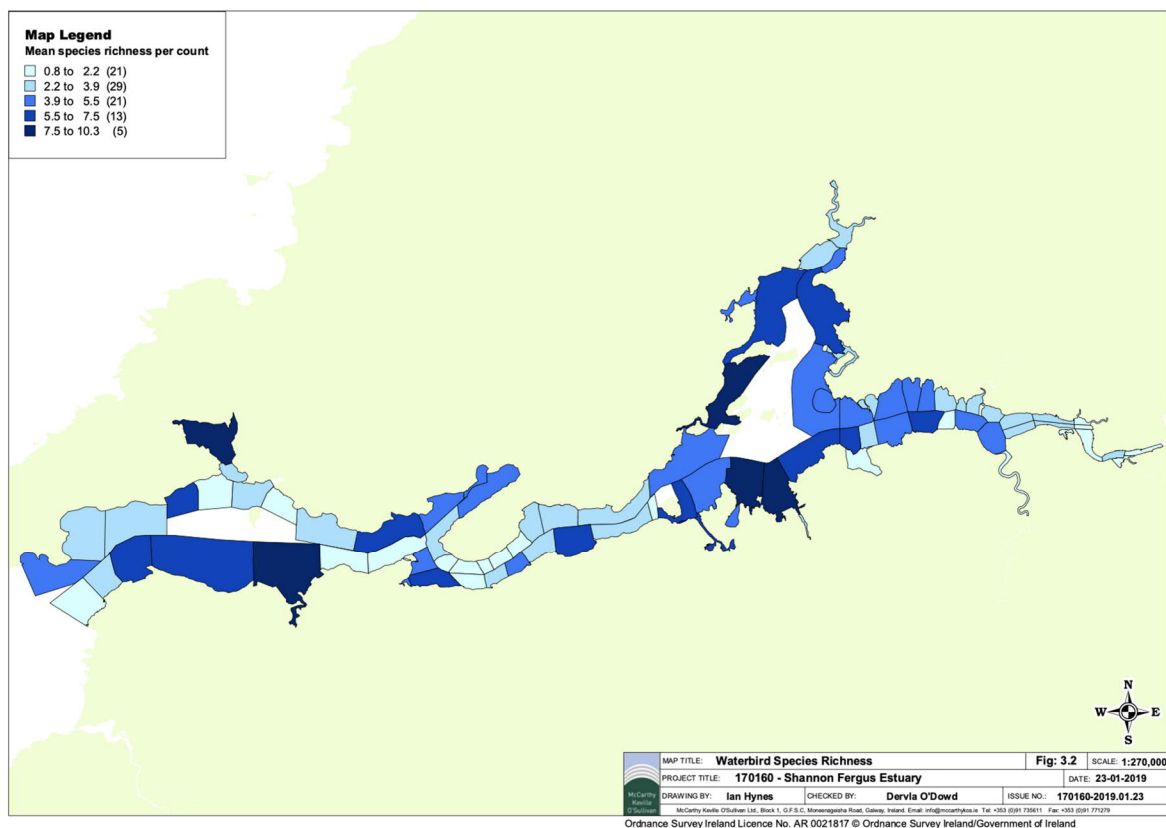


Figure 4. Mean species richness per count (MKO 2019)

3.4 Baseline Winter Bird Surveys – Cork Ecology 2006/2007

Cork Ecology conducted a baseline winter bird assessment of the coastal areas between Knockfinglas Point and Ardmore Point and adjacent land, near Ballylongford, Co. Kerry at the request of DixonBrosnan Environmental Consultants. Full details of this report are included in **Appendix 2**.

Six monthly surveys were conducted between October 2006 and March 2007. On each visit, three counts were made of the coastal waters between Knockfinglas Point and Ardmore Point; a) at the western end of the site, b) from Knockfinglas Point and c) at the eastern end of the site, near Ardmore Point (**Figure 5**). At each point, a 180° scan using a 20x telescope and 8x binoculars was made of the inshore waters and all species of wildfowl, waders and gulls were recorded. All wildfowl, waders and gulls encountered on the beach between Point A and Point B, and in the bay between Point B and Point C were also recorded. Bird identification followed Mullarney *et al* (1999).

It is noted that the Vantage Points used during the 2006/2007 winter bird survey correspond to those used during later 2018/2019 surveys carried out by DixonBrosnan. However an additional survey point at Richard's Rock (west of the Proposed Development area) (Point D) was added during the 2018/2019 surveys and two additional sites east of the Proposed Development site (Point E, Point F) during summer 2021.

A total of 29 of waterbirds were recorded during the counts over the coastal waters in 2006/2007 (**Table 6**).

Table 6. Peak numbers of wildfowl, waders and gulls recorded during the 2006/2007 winter bird survey (Cork Ecology)

Species*	9/10/2006	9/11/2006	20/12/2006	24/1/2007	22/2/2007	14/3/2007
Black Guillemot	0	3	1	0	1	0
Black-headed Gull	26	6	2	22	0	0
Common Gull	0	1	5	5	0	0
Cormorant	2	0	1	0	0	0
Curlew	6	22	3	78	51	1
Dunlin	1	0	0	250	70	0
Great black-backed Gull	0	0	0	1	0	0
Great Crested Grebe	6	9	13	1	9	1
Great Northern Diver	0	0	2	2	3	2
Grey Heron	1	1	1	0	1	1
Guillemot	0	0	0	0	1	0
Herring Gull	1	0	1	0	0	0
Lapwing	0	0	2	60	2	0
Lesser black-backed Gull	2	0	0	0	0	0
Mallard	0	1	1	0	2	2
Moorhen	0	1	0	0	1	1
Mute Swan	0	0	0	2	0	2
Oystercatcher	1	17	4	11	1	8
Razorbill	0	3	1	0	0	0
Red-breasted Merganser	0	0	1	0	0	0
Red-throated Diver	0	8	5	2	8	1
Redshank	0	0	4	1	1	0
Ringed Plover	5	0	0	20	9	0
Scaup	0	0	0	30	0	0

Species*	9/10/2006	9/11/2006	20/12/2006	24/1/2007	22/2/2007	14/3/2007
Shag	0	0	1	0	0	0
Snipe	4	0	3	3	17	0
Teal	0	4	13	8	14	2
Turnstone	4	30	3	5	10	0
Wigeon	0	5	3	6	12	0

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

The highest species diversity of wildfowl, waders and gulls was recorded during the December visit, when 21 species were recorded, compared to 18 species in January and February, 14 in November, 12 in October and 10 in March. No species were recorded in nationally important numbers during the 2006/2007 winter bird surveys (Burke *et al.* 2018).

The majority of sightings of Red-throated Diver, Great Northern Diver and Great Crested Grebe occurred from Point A, and this area usually held low numbers of ducks and waders on the beach.

Grey Heron, Mute Swan, Moorhen and Snipe were regularly recorded on the small lagoon in low numbers and it was noted that Mute Swan and Moorhen are likely to breed there.

In October, the majority of birds were recorded off Point A (66.7 %), at the western end of the site, with small numbers of waders recorded on the beach between Point A and Point B (15.0 %). Few birds were seen offshore in October, with six Great Crested Grebes and one Cormorant recorded up to 800 m from the shore at Point A, with another Cormorant seen flying west from Point B. In November, more than half of all birds recorded were around Point A (36.2 %) and on the beach and lagoon between Point A and B (28.4 %). Numbers of Red-throated Divers increased in November, with five recorded within 1 km of the shore from Point A, and three within 800 m of shore from Point B. Numbers of Great Crested Grebes within 1 km of the shore from Point A also increased. Low numbers of ducks were recorded, mostly from Point A.

A flock of 30 Turnstones was recorded on the Beach between Point A and Point B, and a small flock of Curlews and Oystercatchers were on the shore between Point B and Point C.

Greatest species diversity was recorded on the December survey. Again, the majority of birds were recorded from Point A (73.9 %), with fewer birds recorded on the beach between Points A and B, and from Point B.

Red-throated Divers, Great Northern Divers and Great Crested Grebes were only recorded from Point A, with all birds seen up to 1 km from shore. The December total of 13 Great Crested Grebes was the peak count over the six surveys. Small numbers of ducks and waders were also recorded from Point A, with fewer birds seen elsewhere.

Total numbers of wildfowl, waders and gulls were highest in January. The majority of birds were recorded in a high tide roost of primarily Dunlin, Lapwing and Ringed Plover on the beach between Point A and Point B (78.9 %).

Low numbers of Red-throated Divers, Great Northern Divers and Great Crested Grebes and a flock of 30 Scaup was recorded within 500 m of the shore from Point A. A survey in February

2005 also recorded 25 Scaup from Point A. Numbers of birds recorded between Point B and Point C were very low.

In February, the majority of wildfowl, waders and gulls were again recorded from Point A (76.5%), with eight Red-throated Divers, three Great Northern Divers and nine Great Crested Grebes all seen offshore. Up to 14 Teal and 12 Wigeon were recorded moving between Point A and Point B, and a flock of 70 Dunlin was seen flying past Point A. Numbers of birds recorded between Point B and Point C were very low.

Lowest numbers of wildfowl, waders and gulls were recorded in March, with no concentrations of birds noted. Half of all birds recorded were found at Point A (29.2 %) and on the beach and lagoon between Point A and B (20.8 %), with the remainder seen at Point B and Point C.

Overall, two Annex I listed species, Red-throated Diver and Great Northern Diver, were recorded in the inshore waters bordering the proposed site, and one BWI Red-listed species, Curlew, was recorded feeding in fields within the proposed site regularly throughout the winter months.

Although the Shannon estuary supports internationally important concentrations of wildfowl and waders, no significant concentrations of divers, grebes or ducks were recorded in the inshore waters bordering the proposed site. The majority of divers and grebes were found offshore from Point A, where no development is planned.

Similarly, no significant high tide roost was found within the site, and the area did not support large numbers of feeding wildfowl or waders. A high tide roost of primarily Dunlin, Lapwing and Ringed Plover was noted on the beach east of Point A in January, but no species were recorded in nationally important numbers.

3.5 Baseline Winter Bird Surveys – DixonBrosnan 2011/2012

Bird surveys were carried out by DixonBrosnan Environmental Consultants on three occasions, 26th November 2011, 5th January 2012 and 28th January 2012 (See **Table 7**) from three points on the northern boundary of the Proposed Development (Points A, B and C). Full details of this survey are included in **Appendix 3** of this report. Surveys were carried out using an 8X40 Luger field binoculars and a 20X60 Sahara spotting scope. The first two surveys were carried out from mid tide to high tide and the third survey was carried out from mid tide to low tide.

The Annex I bird species Great Northern Diver and Whooper Swan were recorded from the site. Several Amber and Red listed species were recorded i.e. Cormorant (Amber), Black-headed Gull (Red), Lesser Black Backed Gull (Amber), Lapwing (Red), Curlew (Red), Oystercatcher (Amber) and Redshank (Red). Great Northern Diver was recorded in the area around Knockfinglas point and Whooper Swan was recorded from the lagoon. Notwithstanding the presence of Annex 1 species and red listed species, the numbers recorded were not nationally significant. Of the species recorded, Whooper Swan, Cormorant, Teal, Ringed Plover, Lapwing, Curlew, Redshank and Black-headed Gull are listed as a qualifying interest for the River Shannon and River Fergus estuaries SPA.

Table 7. Peak numbers of wildfowl, waders and gulls recorded during the 2011/2012 winter bird survey

Species*	26/11/2011	05/01/2012	28/01/2012
Black-headed Gull		6	
Common Gull	4	1	5
Common Scoter			2
Cormorant	2	4	1
Curlew	6	24	25
Glaucous Gull	3	4	
Great Black-backed Gull		5	
Great Northern Diver	1		4
Grey Heron	1		
Lapwing	35		
Lesser Black-backed Gull	4	8	
Mallard	5		
Mute swan	2		
Oystercatcher	20	11	45
Redshank	45		31
Ringed Plover			5
Snipe	1		
Teal	1		
Turnstone	9	4	35
Whooper Swan	2	2	

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

4. Estuarine Bird Survey 2018-2021 Location and Study Area

4.1 Location of Study Area

The study area for the 2018-2020 winter bird surveys (October to March) was located approximately 3.1 km northeast of Ballylongford Village, Co. Kerry (**Figure 5**). Surveys were carried out from four vantage points on the southern shores of the Shannon Estuary between Richard's Rock and east of Ardmore Point. Initially the survey focused on three points (**Figure 5** Points A, B and C). A fourth survey site, Point D, was added in February of 2019. In 2021 surveys were extended in the summer months (May to July 2021) and two additional survey sites were added to the east of the Proposed Development site. All wildfowl, waders and gulls encountered on the beach between Points A and B (Beach and Lagoon), and in the bay between Points B and C (Bay) were recorded as separate subsites. The survey locations were chosen based on previous winter bird surveys, information gathered during the original site walkover and the location of the Proposed Development site. Boundaries of the count areas were selected primarily to delineate patches of relatively homogenous habitat within the study area in order to compare bird usage of these habitats and spatial areas; but were also selected to be easily perceived by the observer. This was done by use of sight-lines to prominent landmarks such as permanent marker buoys, coastal features and features on the horizon.

The location of these sites, which were chosen due to their location near potentially valuable bird habitat relative to the Proposed Development site, are as follows:

1. Point A - Beach to west of Proposed Development site, approximately 1.5 km west of jetty location;
2. Point B - Knockinglas Point within the Proposed Development site boundary, approximately 950 m west of proposed jetty location;

3. Point C- Near Ardmore Point to east of Proposed Development site, approximately 300 m east of proposed jetty location
4. Point D - At Richard's Rock to west of the Proposed Development site, approximately 2.2 km west of proposed jetty location
5. Beach and Lagoon – Area between Point A and Point B
6. Bay Area between Point B and Point C
7. Point E. Located approximately 1.2 km east of Proposed Development site
8. Point F. Located approximately 1.8 km east of the Proposed Development site



Figure 5. Vantage point locations and subsites for the winter bird counts

4.2 Landscape Overview

The landscape to the south of the study area is rural in nature, with marginal farmland and coniferous forestry adjoining the estuary. The study area overlooks the coastal/intertidal waters of the Shannon Estuary. There are no significant areas of exposed mudflat habitat within the study area. The shoreline bounding the estuary is largely rock, gravel and shingle shore, with no significant areas of mudflat. A small brackish lagoon is located on the western boundary of the study area.

5. Survey Methodology

Winter bird surveys were undertaken by DixonBrosnan at each survey point between October 2018 and March 2020. Survey details, including time, date and tidal conditions are included in

Table 8. As detailed in **Section 4.1**, Point D was added in February 2019 and Points E and F in May 2021. Summer bird surveys were carried out from May to July 2021.

The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998) and the low tide waterbird surveys (Lewis & Tierney 2014). The estuarine bird survey was undertaken using 8.5x45 binoculars and a Swarovski ATX30-70x95 spotting scope. Sixty-minute counts were undertaken at each survey location at either high tide, mid tide and low tide. The vantage point locations for the estuarine bird counts are shown in **Figures 5**.

All waterbirds present within the count areas other than passerines, doves and pigeons were identified to species and their behaviour was also noted. Waterbirds are defined as “birds that are ecologically dependent on wetlands” (Ramsar Convention, 1971) which are a diverse group that includes divers, grebes, swans, geese and ducks, gulls, terns and wading birds. Birds flying over the count area but not utilising the resources within it, were not included in the counts, however notes were made on any substantial movements of birds that were observed. Birds re-locating within a site were not counted twice, however there may be some overlap between the subsites due to their close proximity.

Conditions experienced during the survey along with survey notes are recorded in **Appendix 4**. It is important to note that waterbird counts represent a ‘snapshot’ of bird numbers during a count session, so in general and taking into account all potential sources of error, resulting data are regarded to be underestimates of population size.

Table 8. Count times and conditions

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)				POINT E	POINT F
			POINT A	POINT B	POINT C	POINT D		
18/10/2018	12:00	Low 07.15 (2.11m) & High 13.57 (3.71m)	H	H	H	N/A	N/A	N/A
22/11/2018	11:00	Low 10.50 (0.64m) & High 17.02 (4.89m)	L	L	L			
29/11/2018	10:00	Low 16.20 (1.05m) & High 09.58 (4.29m)	H	H	H			
12/12/2018	08:30	Low 14.29 (1.2m) & High 08.27 (4.5m)	H	H	H			
18/12/2018	11:00	Low 07.49 (1.60m) & High 14.11 (4.17m)	H	H	H			
21/01/2019	10:00	Low 11.46 (0.32m) & High 17.59 (5.05m)	L	L	L			
24/01/2019	11:30	Low 14.00 (0.19m) & High 07.45 (5.21m)	L	L	L			
18/02/2019	09:15	Low 10.45 (0.54m) & High 16.59 (4.93m)	L	L	L	L		
20/02/2019	09:30	Low 12.17 (0.00m) & High 06.01 (5.35m)	L	L	L	L		

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)				POINT E	POINT F
			POINT A	POINT B	POINT C	POINT D		
15/03/2019	10:00	Low 18.12 (1.87m) & High 12.12 (3.92m)	H	H	H	H		
21/03/2019	10:00	Low 11.57 (0.09m) & High 18.13 (5.36m)	L	L	L	L		
21/10/2019	09:30	Low 05.58 (1.6m) & High 12.24 (4.2m)	H	H	H	H		
25/10/2019	09:20	Low 10.22 (1.7m) & High 16.42 (4.2m)	L	L	H	L		
15/11/2019	09:00	Low 13.39 (0.6m) & High 07.40 (5.2m)	L	L	H	L		
19/11/2019	09:15	Low 16.50 (1.5m) & High 10.36 (4.2m)	H	H	H	H		
03/12/2019	09:30	Low 15.40 (1.1m) & High 09.22 (4.7m)	H	H	H	H		
09/12/2019	10:15	Low 09.55 (1.1m) & High 16.11 (4.8m)	L	L	H	L		
22/01/2020	10:00	Low 05:00 (1.7m) & High 11:30 (4.6m)	H	H	H	H		
30/01/2020	10:30	Low 09:11 am (1.42m) & High 3:50pm (4.41 m)	L	L	L	L		
23/02/2020	12:25	Low 11.46 (0.73m) & High 5.55pm (4.69m)	L	L	L	L		
24/02/2020	09:00	Low 11.46 am (0.73m) & High 5.55pm	L	L	L	L		
31/03/2020	10:00	Low 5.02pm (0.73m) & High 11.10am	H	H	H	H		
28/05/2021	13:30	Low 01:25 0.1m, High 07:44 5.0m, Low 13:46 0.4m, High 20:07 5.1m	L	L	H	H	L	L
30/06/21		Low 04:17 0.8m, High 10:49 4.2m, Low 16:41 1.2m, High 22:59 4.3m	L	L	L	L	L	L
19/07/21	15:30	High 19 01:19 4.2m, Low 07:28 1.2m, High 14:13 4.2m, Low 20:14 1.3m	H	H	-	L	-	-
20/07/21	17:00	High 02:32 4.2m, Low 08:40 1.2m,	-	-	L	-	L	L

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)				POINT E	POINT F
			POINT A	POINT B	POINT C	POINT D		
		High 15:20 4.4m, Low 21:28 1.1m						

Table 9. Low Tide - Peak numbers of wildfowl, waders and gulls recorded during the 20018/2019 and 2021 bird surveys.

Species*	22/11/ 18	21/01/ 2019	24/01/ 2019	18/02/ 2019	20/02/ 2019	21/03/ 2019	25/10/ 2019	15/11/ 2019	09/12/ 2019	30/01/ 2020**	23/02/ 2020	24/02/ 2020	28/05/ 2021	30/06/ 2021	19&20 /07/20 21
Black Guillemot		1			8	7		1				1	2	1	
Black-headed Gull	2	3	2				94	6				11			
Common Guillemot												2			
Common Gull	1	2			1	1	3	3		40	8	8			3
Cormorant	3	1			1	1	2				4	12	5		2
Curlew	1	12	3	1	5		3	8	1	26	45	29		2	
Dunlin						4	1	1			260				
Golden Plover															
Great Black-backed Gull							2						3	1	2
Great Crested Grebe	1	2	11	1	2		4	1			2	5			
Great Northern Diver	1	2	1	1	3	4		1				11			
Greenshank					1		1	1				2			
Grey Heron	1	1			1		1								1
Grey Plover															
Herring Gull			9		1	5	1			1					1
Lapwing		11													
Lesser Black-backed Gull											1		7	2	2
Light-bellied Brent Geese		11		49	67	11					100				
Little Egret	1			1			2	1		1	1		1	1	2

Species*	22/11/ 18	21/01/ 2019	24/01/ 2019	18/02/ 2019	20/02/ 2019	21/03/ 2019	25/10/ 2019	15/11/ 2019	09/12/ 2019	30/01/ 2020**	23/02/ 2020	24/02/ 2020	28/05/ 2021	30/06/ 2021	19&20 /07/20 21
Mallard				2								4		2	
Moorhen						2								1	
Mute Swan				2											
Oystercatcher	5	4	6	4	3	3	6	9	8	7	8	4			1
Razorbill												1			
Red-throated Diver	1			1		1	1	1			2	8			
Redshank						3	4	2			2	2			
Ringed Plover				7	22	12		5			2				
Sandwich Tern														2	3
Shag	5				1	2								1	
Shelduck															
Snipe	5		4			1	1	2		4	1			2	
Teal	1				10										
Turnstone							6	1		3		14	1	1	
Water rail														3	
Whimbrel														6	1
Wigeon	25	12			2					28	12	26			

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

Table 10. High Tide - Peak numbers of wildfowl, waders and gulls recorded during the 2019/2020 and 2021 bird survey.

Species*	18/10/2018	29/11/2018	12/12/2018	18/12/2018	15/03/2019	21/10/2019	19/11/2019	03/12/2019	22/01/2020	31/03/2020	19&20/07/2021
Black Guillemot		2	1				5	1			
Black-headed Gull	1		123			14	30	46	16		
Common Guillemot		2	1	3		1					
Common Gull	8	2	14	2		6	1		2		4
Cormorant	1	2	3	3	1	2			2	1	2
Curlew	10	2	45		7	19	30	2	1		
Dunlin							1				
Golden Plover										24	
Great Black-backed Gull	3	4		1				1			2
Great Crested Grebe	11	2	1	1		5	4		2		1
Great Northern Diver		2	3	2	2		3	2	1	1	
Greenshank	1	1	1					4			
Grey Heron					1	1					
Grey Plover			6				15	12			
Herring Gull					10	1			3	5	1
Lapwing			3								
Lesser Black-backed Gull					14					1	2
Light-bellied Brent Geese											
Little Egret		1				2	1			5	2
Mallard			2								
Moorhen	1					2				1	
Mute Swan											

Species*	18/10/201 8	29/11/201 8	12/12/201 8	18/12/201 8	15/03/201 9	21/10/201 9	19/11/201 9	03/12/201 9	22/01/202 0	31/03/202 0	19&20/07/ 2021
Oystercatcher	7	7	5	6		7	12		4	2	3
Razorbill			1	1							
Red-throated Diver		1	1	2		2	1			1	
Redshank			1		4	5	3				
Ringed Plover								24		3	
Sandwich Tern											3
Shag		2	1	1							
Shelduck					4						
Snipe	3	17	3	8						8	
Teal			1			2					
Turnstone		18	9	7		27	27	11		9	
Water Rail											
Whimbrel											1
Wigeon		6					20				

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font ** Only one survey carried out in March 2020 due to Covid-19 restrictions

Table 11. Peak numbers within study area at high and low tide

Species*	Peak High Tide Count	Peak Low Tide Count	1% National ^a	1% International ^a
Black Guillemot	5	8	-	-
Black-headed Gull	123	94	-	31,000
Common Guillemot	3	2	-	-
Common Gull	14	40	-	16,400
Cormorant	3	12	110	1200
Curlew	45	45	350	7600
Dunlin	1	260	450	13,300
Golden Plover	24	0	920	9300
Great Black-backed Gull	4	3	-	3,600
Great Crested Grebe	11	11	30	6300
Great Northern Diver	3	4	20	50
Greenshank	4	2	20	3300
Grey Heron	1	1	25	5000
Grey Plover	15	0	30	2000
Herring Gull	10	9	-	14,400
Lapwing	3	11	850	72,300

Species*	Peak High Tide Count	Peak Low Tide Count	1% National ^a	1% International ^a
Lesser Black-backed Gull	14	7	-	5,500
Light-bellied Brent Geese	0	100	350	400
Little Egret	5	2	20	1,100
Mallard	2	4	280	53,000
Moorhen	2	2	-	37,100
Mute Swan	0	2	90	100
Oystercatcher	12	9	610	8,200
Razorbill	1	1	-	-
Red-throated Diver	2	2	20	3,000
Redshank	5	4	240	2,400
Ringed Plover	24	22	120	540
Sandwich Tern	3	3	-	-
Shag	2	5	-	2,000
Shelduck	4	0	100	2,500
Snipe	17	5	-	100,000
Teal	2	10	360	5000
Turnstone	27	14	95	1,400

Species*	Peak High Tide Count	Peak Low Tide Count	1% National ^a	1% International ^a
Water rail	0	3	-	-
Whimbrel	0	6	-	-
Wigeon	20	28	560	1400

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font; a. Burke *et al* (2018)

Table 12. Summary of peak low tide counts by area

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Black Guillemot	8	0	1	0	0	3	1	0	-	-
Black-headed Gull	2	2	6	2	0	94	1	0	-	31,000
Common Guillemot	0	0	1	0	0	0	0	0	-	-
Common Gull	8	1	8	2	2	3	0	2	-	16,400
Cormorant	2	1	3	0	4	1	0	0	110	1200
Curlew	12	12	5	5	0	45	0	0	350	7600
Dunlin	0	0	0	0	0	260	0	0	450	13,300
Great Black-backed Gull	0	0	0	0	0	2	0	1	-	3,600
Great Crested Grebe	11	0	1	0	1	4	0	0	30	6300
Great Northern Diver	4	0	2	0	1	2	0	0	20	50
Greenshank	0	0	0	0	0	1	0	0	20	3300
Grey Heron	1	1	1	1	0	1	0	1	25	5000
Grey Plover	0	0	0	0	0	0	0	0	30	2000
Herring Gull	0	0	9	9	0	5	0	0	-	14,400

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Lapwing	11	11	0	0	0	0	0	0	850	72,300
Lesser Black-backed Gull	1	0	1	0	0	0	1	7	-	5,500
Light-bellied Brent Geese	11	11	0	0	0	100	0	0	350	400
Little Egret	1	0	0	0	0	2	1	0	20	1,100
Mallard	2	2	2	2	0	0	0	0	280	53,000
Moorhen	2	2	0	0	0	0	0	0	-	37,100
Mute Swan	0	0	0	0	0	2	0	0	90	100
Oystercatcher	8	8	9	9	3	8	0	1	610	8,200
Razorbill	0	0	0	0	0	0	0	0	-	-
Red-throated Diver	1	0	2	2	1	2	0	0	20	3,000
Redshank	1	1	0	0	0	4	0	0	240	2,400
Ringed Plover	0	0	0	0	0	22	0	0	120	540
Sandwich Tern	2	0	0	0	0	3	0	0	-	-
Shag	5	0	0	0	0	0	0	0	-	2,000
Shelduck	0	0	0	0	0	0	2	0	100	2,500
Snipe	5	5	1	0	0	2	0	0	-	100,000

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Teal	10	10	0	0	0	0	0	0	360	5000
Turnstone	0	0	6	6	0	2	2	0	95	1,400
Water Rail	0	0	0	0	0	0	0	0	-	-
Whimbrel	0	0	0	0	1	0	0	1	-	-
Wigeon	25	25	10	0	12	0	0	0	560	1400

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font; a. Burke *et al* (2018)

Table 13. Summary of peak high tide counts by area

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Black Guillemot	2	0	1	2	1	5	1	-	-	-
Black-headed Gull	46	4	64	64	123	30	1	-	-	31,000
Common Guillemot	3	0	1	2	1	0	0	-	-	-
Common Gull	8	2	14	14	7	1	0	-	-	16,400
Cormorant	3	0	3	3	2	1	0	-	110	1200
Curlew	45	45	10	10	2	30	0	-	350	7600
Dunlin	0	0	0	0	0	1	0	-	450	13,300
Golden Plover	0	0	0	0	0	24	0	-	920	9,300
Great Black-backed Gull	3	0	3	3	4	0	0	-	-	3,600
Great Crested Grebe	11	0	2	2	1	4	0	-	30	6300
Great Northern Diver	3	0	3	3	2	1	0	-	20	50
Greenshank	4	4	1	1	1	0	0	-	20	3300
Grey Heron	1	1	1	1	0	0	0	-	25	5000
Grey Plover	12	12	0	0	0	15	0	-	30	2000
Herring Gull	0	0	1	9	0	10	1	-	-	14,400

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Lapwing	3	3	0	0	0	0	0	-	850	72,300
Lesser Black-backed Gull	0	0	1	1	0	14	0	-	-	5,500
Light-bellied Brent Geese	0	0	0	0	0	20	0	-	350	400
Little Egret	1	1	1	1	0	2	1	-	20	1,100
Mallard	0	0	0	2	2	0	0	-	280	53,000
Moorhen	2	2	0	0	0	0	0	-	-	37,100
Mute Swan	0	0	0	0	0	0	0	-	90	100
Oystercatcher	7	7	4	9	5	12	0	-	610	8,200
Razorbill	1	0	0	0	1	0	0	-	-	-
Red-throated Diver	2	0	1	1	2	0	0	-	20	3,000
Redshank	1	1	1	1	1	5	0	-	240	2,400
Ringed Plover	24	24	0	0	0	0	0	-	120	540
Sandwich Tern	2	0	0	0	0	0	0	-	-	-
Shag	2	0	0	0	0	0	0	-	-	2,000
Shelduck	0	0	0	0	0	4	2	-	100	2,500
Snipe	17	17	8	8	0	1	0	-	-	100,000

Species*	POINT A	Beach & Lagoon	POINT B	Bay	POINT C	POINT D	POINT E	POINT F	1% National ^a	1% International ^a
Teal	1	0	2	2	0	0	0	-	360	5000
Turnstone	27	27	23	23	7	0	2	-	95	1,400
Whimbrel	0	0	0	0	0	0	0	-	0	0
Water Rail	0	0	0	0	0	0	0	-	-	-
Wigeon	8	8	4	10	0	20	0	-	560	1400

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font; a. Burke *et al* (2018)

Table 14. Conservation Status of Species Recorded during 2018-2020 site surveys

Species*	Conservation Status**
Black Guillemot	Amber List
Black-headed Gull	Amber List
Common Guillemot	Amber List
Common Gull	Amber List
Cormorant	Amber List
Curlew	Red List
Dunlin	Red List
Golden Plover	Annex I; Red List
Great Black-backed Gull	Green List
Great Crested Grebe	Amber List
Great Northern Diver	Annex I; Amber List
Greenshank	Green List
Grey Heron	Green List
Grey Plover	Red List
Herring Gull	Amber List
Lapwing	Red List
Lesser Black-backed Gull	Amber List
Light-bellied Brent Geese	Amber List
Little Egret	Annex I; Green List
Mallard	Amber List
Moorhen	Green List
Mute Swan	Amber List
Oystercatcher	Red List
Razorbill	Red List
Red-throated Diver	Annex I; Amber List
Redshank	Red List
Ringed Plover	Amber List
Sandwich Tern	Annex I; Amber List
Shag	Amber List
Shelduck	Amber List
Snipe	Red List
Teal	Amber List
Turnstone	Amber List
Water Rail	Green List
Whimbrel	Green List
Wigeon	Amber List

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font; **Gilbert *et al* (2021)

6. Results

6.1 Results Overview

The results of DixonBrosnan winter bird surveys 2018-2020 and summer bird surveys 2021 are summarized in **Tables 9-13**. A total of 36 bird species were recorded during the 2018/2019 and 2019/2020 winter bird counts. No species were recorded in nationally important numbers (Burke *et al.* 2018). Four Annex I species were recorded Great Northern Diver, Red-throated Diver, Golden Plover and Little Egret. Eight other Red List species were recorded; Curlew, Dunlin, Grey Plover, Lapwing, Oystercatcher, Razorbill, Redshank and Snipe (**Table 14**). Golden Plover is also a Red List species. The Red List species Curlew and Snipe were recorded foraging on both intertidal and terrestrial habitats within the study area. During the winter survey 14 of the 21 SCI species for the River Shannon and River Fergus Estuaries SPA were recorded i.e. Cormorant, Wigeon, Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Light-bellied Brent Goose, Dunlin, Curlew, Redshank, Greenshank, Shelduck and Black-headed Gull.

During the summer 2021 surveys a total of 20 species were recorded. This included three species which had not been recorded during winter surveys i.e. Sandwich Tern, Whimbrel and Water Rail. During the summer surveys, one Annex I species was recorded i.e. Sandwich Tern. During the summer 2021 surveys four SCI species were recorded i.e. Cormorant, Curlew, Shelduck and Black-headed Gull.

During site surveys, peak numbers were recorded in December (03/12/2018). This was during high tide, when a large flock of Black-headed Gull (123) were recorded foraging and loafing on the water. A flock of Curlew (45) were also recorded foraging on the landward site of the study area at Point A. During the 2019/2020 survey, peak numbers were recorded in February (22/02/20). This was mainly influenced by a large flock of Dublin (260) and Light-bellied Brent Goose (100) recorded at Point D, loafing on the shoreline within a large mixed flock of waders. It is noted that Point D was not added to the study area until February 2019.

The largest diversity of species was recorded in October and February during both the 2018/2019 and 2019/2020 surveys. Sixteen species recorded during October 2019 and 2020 and 15 and 16 respectively in February 2019 and 2020. While the peak numbers by month varied between the two survey seasons, the species diversity by month was consistent between both survey seasons. Small numbers of birds were recorded during the summer 2021 surveys (May to July 2021). However, as with winter surveys the majority of records were at the west of the study area near Point A and Point D.

Peak bird numbers were recorded during low tides, with 260 Dunlin and 100 Light-bellied Brent Goose recorded at Point D during low tide. In general, the largest density of birds was recorded at the Robert's Rock (Point D), which was added to the study area in 2019.

Adjacent to the Proposed Development site and along the southern shoreline of the Shannon Estuary, intertidal habitats are largely absent (See **Figure 3**). There is some limited foraging for wading birds along the stony shoreline near the site. The deeper waters of the estuary provide foraging grounds for seabirds and divers including Black Guillemot, Common

Guillemot, Great Crested Grebe, Great-northern Diver and Razorbill. These birds generally occurred in small numbers at both high and low tides.

6.2 Survey Results by Section

Point A is located on the beach to the west of the Proposed Development site boundary. Several divers were recorded foraging in the deeper waters here including Great Crested Grebe (peak number 11), Great Northern Diver (peak number 4) and Red-throated Diver (peak number 2) as well as occasional small numbers of Black Guillemot (peak number 8) and Common Guillemot (peak number 3). The deeper waters bordering this site meant that diving birds were recorded during low and high tide counts. Wading birds were occasionally recorded here foraging along the shoreline or roosting on the upper shore i.e., Ringed Plover (peak number 24), Grey Plover (peak number 15), Turnstone (Peak number 27), Greenshank (peak number 4), Lapwing (peak number 11), Curlew (peak number 45) and Oystercatcher (peak number 12). Duck species were also recorded here i.e., Wigeon (peak number 28) and Mallard (peak number 4), often roosting near the small stream on the southern boundary of the shoreline. The agricultural fields to the south and west of Point A, (also near Point D), appear to be used regularly by terrestrial foraging Curlew. Three species not recorded during winter surveys were recorded here during summer 2021 i.e., Sandwich Tern, Water Rail and Whimbrel. Small numbers of Sandwich Tern were recorded foraging off Point A (peak number 2) during the June 2021. Six Whimbrel and three Water Rail were recorded foraging along the shoreline in July 2021.

Point B is located at Knockfinglas Point to the west of the proposed jetty. Low numbers of gulls, diving birds, and waders were recorded here during both low and high tide surveys. A flock of 64 Black-headed Gull and 23 Turnstone were recorded loafing on the water at high tide. Similarly, low numbers of birds were recorded in the Bay area adjacent to Point B. Only three wader species were recorded here and in small numbers i.e. Curlew (peak number 10) and Turnstone (peak number 23), Oystercatcher (peak number 9). Small numbers of Sandwich Tern (peak number 4) were recorded foraging near Point B during June 2021.

Point C is located at Ardmore Point to the east of the Proposed Development site boundary and the proposed jetty site. This overlooks slightly deeper waters than the other survey points with limited intertidal habitats. Gull and divers were regularly recorded at this site, albeit in small numbers. A mixed flock of gulls including 123 Black-headed Gull was recorded in December (12/12/2018). Few waders were recorded here, likely due to the limited foraging habitat present; Oystercatcher (peak number 5), Curlew (peak number 2) and Redshank (peak number 1), Greenshank (peak number 1) and Turnstone (peak number 7). Small numbers of duck species i.e. Mallard (peak number 2) and Wigeon (peak number 12), were recorded here at low tide.

Point D is located at Robert's Rock, approximately 1 km southwest of the Proposed Development site boundary. The largest numbers and diversity of birds were recorded at Point D, reflecting the diversity of habitats visible from this site, which overlooks the boundary between Ballylongford Creek and the Shannon Estuary. Here there is a larger area of intertidal foraging habitat, including an area of mudflat exposed at low tide and saltmarsh habitat. Wading birds, gulls, ducks and diving birds were recorded at this site. Little Egret was recorded on the saltmarsh habitat. There was a notable difference in bird numbers and diversity

recorded here between low and high tide. Small numbers of Sandwich Tern (peak number 3) were recorded foraging near Point D during July 2021.

During low tide a range of wading bird species were recorded from Point D including Curlew (peak number 45), Dunlin (peak number 260), Greenshank (peak number 1), Oystercatcher (peak number 8), Light-bellied Brent Goose (peak number 100), Redshank (peak number 4), Ringed Plover (peak number 22) and Turnstone (peak number 2) were recorded here. A number of gulls species, the largest numbers being Black-headed Gull (peak number 94), were also recorded here. Diving birds recorded included Great Northern Diver, Great Crested Grebe, and Red-throated Diver. While smaller numbers of birds were recorded here during high tide, bird diversity was still relatively high at Point D during high tide counts.

7. Discussion

The habitats in close proximity to the jetty and offshore elements of the Proposed Development site have the potential to support a range of waterbird species including those listed as SCIs for the River Shannon and River Fergus Estuaries SPA. The I-WeBS subsite, within which the Proposed Development site is located, is an important subsite for waterbirds, with peak numbers for several species, including Dunlin and Teal, exceeding the threshold of all-Ireland importance. It is noted that the I-WeBS subsite within which the Proposed Development site is located, covers a large area and includes a large area of intertidal mudflats along Ballylongford Creek and the margins of Carrig Island. MKO (2017) separated this area to the east and west of Knockfinglas Point into separate subsites. While the subsite to the west of Knockfinglas Point has one of the highest species richness and bird densities within the Shannon Estuary, the lands to the east of Knockfinglas Point, which include the Proposed Development site has one of the lowest species richness of any subsite within the estuary.

While the winter birds surveys carried out near the Proposed Development site recorded comparable species diversity to the I-WeBS, NPWS and MKO studies of this area, no nationally important numbers of birds were recorded during 2006/2007, 2011/2012, 2018/2019, 2019/2020 or 2021. Numbers and diversity of birds recorded during the summer were low at all study areas, but in particular in areas at (Point B and Point C) and to the east of the jetty location (Point E and Point F). In general, due to the lack of suitable mudflat habitat, the numbers of wintering birds were relatively low.

The study area is dominated by shingle and gravel shores, shingle beach and a gravel-boulder mix shore with limited exposed mudflat at low tide. The stretch of the shore east of Point A to Point E has low value for wading birds and this is reflected in the low numbers and diversity of birds recorded here. Point D, approximately 1 km west of the Proposed Development site, is closer to an area of intertidal mudflats north of Ballylongford Creek. Bird numbers and diversity were notably higher at Point D compared to Points A, B or C (E and F). This would suggest that the habitats to the west of the Proposed Development site are likely to provide the valuable intertidal habitats which are lacking within the study area.

A number of benthic foraging divers were recorded feeding within deeper waters of the study area including Great Northern Diver, Red-throated Diver and Great Crested Grebe as well as other piscivorous species such as Cormorant, Shag and Sandwich Tern. The foraging distribution of these birds is highly influenced by water depth and tidal conditions. Many of

these species however exhibit a widespread coastal distribution during winter, utilising shallow nearshore waters to a greater degree at certain times (e.g. storms, driving onshore winds).

Although some waterbird species will be faithful to specific habitats within the SPA, many will at times also use habitats situated in proximate areas or in areas ecologically connected e.g. via coastal waters, to the SPA. These areas may be used as alternative high tide roosts, as a foraging resource or, be simply flown over, either on migration or as commuting corridors between feeding and roosting areas. (NPWS 2012b). Both Curlew and Little Egret were noted foraging on the margins of the study area, within terrestrial habitats to the south of the estuary. When tidal mudflats are covered at high water, intertidally-foraging waterbirds are excluded and many will move to nearby fields to feed. Terrestrial foraging is also important when environmental factors (e.g. low temperature) reduce the profitability of intertidal foraging (e.g. Zwarts & Wanink, 1996). The grassland to the west of Point A and near Point D appear to be used regularly by terrestrial foraging waders, in particular Curlew and Snipe. There is no evidence that the terrestrial habitats within the Proposed Development site boundary are regularly used as high tides roosts or terrestrial foraging sites.

Different habitats will vary in their sensitivity periods based around function e.g. mudflats are most important during the winter for wintering waterbirds. It must also be taken into account that numerous factors are at play when it comes to numbers and distribution of species within the study area e.g. prey abundance, habitat quality and disturbance factors. As wading bird distribution is highly correlated with the densities of their prey (Yates *et.al.* 1993) it is likely that their distribution is linked to the densities of prey items.

It is noted Cormorant is listed as a breeding and wintering SCI for the River Shannon and River Fergus Estuaries SPA. Breeding bird survey were carried out at the Proposed Development site in 2019 and 2020 (Refer to Breeding Birds EIAR **Appendix 7B-2 of Volume 4**). No signs of breeding Cormorant were recorded at the Proposed Development site and no trees suitable for use as Cormorant roosts or nesting sites were recorded within the Proposed Development site boundary.

A recent study by BirdWatch Ireland has found that the number of waterbirds wintering in Ireland has declined by 15% over the past five years and 40% since the mid-1990's. Wading bird species, including Dunlin, Golden Plover, Redshank and Knot have been the worst hit, suffering a combined loss of over 100,000 individuals (19%) over the past five years (Burke, *et al.* 2018). Oystercatcher, Dunlin, Redshank and Turnstone, four species recorded during the winter bird survey have seen a drop in numbers by more than 20%. The only species recorded within the study area to show increases were Black-tailed Godwit and Greenshank (Burke, *et al.* 2018). Thus, an assessment of potential disturbance of wintering birds is a high priority.

8. Conclusions

A total of 33 bird species were recorded during the 2018/2019 and 2019/2020 winter bird counts, with an additional 3 species during summer 2021 surveys. No species were recorded in nationally important numbers (Burke *et al.* 2018). Five Annex I species were recorded Great Northern Diver, Red-throated Diver, Golden Plover, Sandwich Tern and Little Egret. Eight other Red List species were recorded; Curlew, Dunlin, Grey Plover, Lapwing, Oystercatcher, Razorbill, Redshank and Snipe. Golden Plover is also a Red List species. Curlew and Snipe

were recorded foraging along the intertidal and terrestrial habitats within the study area. Fourteen of the 21 SCI species for the River Shannon and River Fergus Estuaries SPA were also recorded including Cormorant, Wigeon, Shelduck, Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Dunlin, Curlew, Redshank, Greenshank, Light-bellied Brent Goose and Black-headed Gull.

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate certain areas as Special Protection Areas (SPAs) for the protection of endangered species of wild birds based on several criteria (**Section 2** above). The River Shannon and River Fergus Estuaries SPA is of high value for birds and mudflat habitat supports high numbers of wintering birds. Based on the desktop review of data and the results of the bird counts it is concluded that the habitats in proximity to the Proposed Development site i.e. between Knockfinglas Point and Ardmore Point, are of low importance for wintering bird populations.

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Appendices

Appendix 1. Latin names

Species	
Black Guillemot	<i>Cepphus grylle</i>
Black-headed Gull	<i>Chroicocephalus ridibundus</i>
Common Guillemot	<i>Uria aalge</i>
Common Gull	<i>Larus canus</i>
Cormorant	<i>Phalacrocorax carbo</i>
Curlew	<i>Numenius arquata</i>
Dunlin	<i>Calidris alpina</i>
Great Black-backed Gull	<i>Larus marinus</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Great Northern Diver	<i>Gavia immer</i>
Greenshank	<i>Tringa nebularia</i>
Grey Heron	<i>Ardus cineria</i>
Grey Plover	<i>Pluvialis squatarola</i>
Herring Gull	<i>Larus argentatus</i>
Lapwing	<i>Vanellus vanellus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Light-bellied Brent Geese	<i>Branta bernicla</i>
Little Egret	<i>Egretta garzetta</i>
Mallard	<i>Anas platyrhynchos</i>
Moorhen	<i>Gallinula chloropus</i>
Mute Swan	<i>Cygnus olor</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Razorbill	<i>Alca torda</i>
Red-throated Diver	<i>Gavia stellata</i>
Redshank	<i>Tringa tetanus</i>
Ringed Plover	<i>Charadrius hiaticula</i>
Shag	<i>Phalacrocorax aristotelis</i>

Species	
Shelduck	<i>Tadorna tadorna</i>
Snipe	<i>Gallinago gallinago</i>
Teal	<i>Anas crecca</i>
Turnstone	<i>Arenaria interpres</i>
Wigeon	<i>Mareca penelope</i>

Appendix 2. Cork Ecology 2006/2007 Survey

Baseline winter bird surveys
around Knockfinglas Point and Ardmore Point,
Ballylongford, Co. Kerry

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1 Introduction

A baseline winter bird assessment of a coastal site between Knockfinglas Point and Ardmore Point and adjacent land, near Ballylongford, Co. Kerry was carried out at the request of Dixon Brosnan Environmental Consultants, by Colin Barton of Cork Ecology, as part of an Environmental Impact Assessment.

The primary aim of the survey was to assess the bird species likely to occur in the area in winter.

Location

The proposed site is located on the south shore of the Shannon Estuary, between Knockfinglas Point and Ardmore Point. The site consists of mainly rough grazing, with high hedges made up of blackthorn, hawthorn and ash trees. There is a small brackish lagoon outside the site boundary close to the shore at the western end of the site.

Conservation designations

The proposed site borders the Lower Shannon candidate Special Area of Conservation (cSAC) (site code 002165) and Ballylongford proposed Natural Heritage Area (pNHA) (site code 001332). At the present time the intertidal area, which borders the site, is not included within the River Shannon and River Fergus Estuaries Special Protection Area (SPA- site code 004077). However information received from the National Parks and Wildlife Service indicates that this area may be included within the SPA in the future.

Methodology

Six monthly surveys were conducted between October 2006 and March 2007. On each visit, three counts were made of the coastal waters between Knockfinglas Point and Ardmore Point; a) at the western end of the site, b) from Knockfinglas Point and c) at the eastern end of the site, near Ardmore Point (Figure 1). At each point, a 180° scan using a 20x telescope and 8x binoculars was made of the inshore waters and all species of wildfowl, waders and gulls were recorded. All wildfowl, waders and gulls encountered on the beach between Points A and B, and in the bay between Points B and C were also recorded. In addition, the land within the site boundary was walked and all terrestrial species recorded. Bird identification followed Mullarney *et al* (1999).

Weather

The weather during the counts is summarised below (Table 1).

Table 1. Weather conditions during counts

Date	State of tide	Weather conditions
9/10/2006	High, falling	Sunny, calm, 3/8 cloud, good visibility, sea state 2
9/11/2006	High, falling	Sunny, calm, 1/8 cloud, excellent visibility, sea state 1
20/12/2006	Low, rising	Sunny, calm, excellent visibility, sea state 1
24/1/2007	High, falling	Sunny, light north wind force 1, good visibility, sea state 1
22/2/2007	High, falling	Sunny, South wind force 2-3, 6/8 cloud, good visibility, sea state 1
14/3/2007	Low, rising	Sunny spells, SW wind force 4, good visibility, dry, Sea state 3

Figure 1 – Count areas along the coast of the proposed development

2 Results

2.1 Wildfowl, waders and gulls

A total of 60 species of birds were recorded during the winter surveys, with 29 of these recorded during the 3 point counts over the coastal water (Table 1).

Table 2.1 Peak numbers of wildfowl, waders and gulls around the site

Species	9/10/2006	9/11/2006	20/12/2006	24/1/2007	22/2/2007	14/3/2007
Red-throated Diver	0	8	5	2	8	1
Great Northern Diver	0	0	2	2	3	2
Great Crested Grebe	6	9	13	1	9	1
Cormorant	2	0	1	0	0	0
Shag	0	0	1	0	0	0
Grey Heron	1	1	1	0	1	1
Mute Swan	0	0	0	2	0	2
Mallard	0	1	1	0	2	2
Wigeon	0	5	3	6	12	0
Teal	0	4	13	8	14	2
Scaup	0	0	0	30	0	0
Red-breasted Merganser	0	0	1	0	0	0
Moorhen	0	1	0	0	1	1
Oystercatcher	1	17	4	11	1	8
Ringed Plover	5	0	0	20	9	0
Lapwing	0	0	2	60	2	0
Turnstone	4	30	3	5	10	0
Dunlin	1	0	0	250	70	0
Redshank	0	0	4	1	1	0
Curlew	6	22	3	78	51	1
Snipe	4	0	3	3	17	0
Black-headed Gull	26	6	2	22	0	0
Common Gull	0	1	5	5	0	0
Herring Gull	1	0	1	0	0	0
Lesser black-backed Gull	2	0	0	0	0	0
Great black-backed Gull	0	0	0	1	0	0
Black Guillemot	0	3	1	0	1	0
Guillemot	0	0	0	0	1	0

Razorbill	0	3	1	0	0	0
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Highest species diversity of wildfowl, waders and gulls was recorded during the December visit, when 21 species were recorded, compared to 18 species in January and February, 14 in November, 12 in October and 10 in March. No species were recorded in nationally important numbers (Crowe 2005).

Monthly summaries

Tables 2.2 to 2.7 show monthly counts of wildfowl, waders and gulls along the coastal boundary of the site (Figure 1).

In October, the majority of birds were recorded off Point A (66.7 %), at the western end of the site, with small numbers of waders recorded on the beach between Point A and B (15.0 %) (Table 2.2).

Few birds were seen offshore in October, with six Great Crested Grebes and one Cormorant recorded up to 800 m from shore from Point A, with another Cormorant seen flying west from Point B.

Table 2.2 October area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Great Crested Grebe	6				
Cormorant	1		1		
Grey Heron	1				
Oystercatcher		1			
Ringed Plover	1	4	5		
Turnstone	1	3			
Dunlin	1				
Curlew	1	1	1	2	1
Black-headed Gull	26				
Herring Gull					1
Lesser black-backed Gull	2				
Total number of birds	40	9	7	2	2
Percentage of birds in each area	66.7 %	15.0 %	11.7 %	3.3 %	3.3 %

In November, more than half of all birds recorded were around Point A (36.2 %) and on the beach and lagoon between Point A and B (28.4 %) (Table 2.3).

Numbers of Red-throated Divers increased in November, with five recorded within 1 km of the shore from Point A, and three within 800 m of shore from Point B. Numbers of Great Crested Grebes within 1 km of the shore from Point A also increased. Low numbers of ducks were recorded, mostly from Point A.

A flock of 30 Turnstones was recorded on the Beach between Points A and B, and a small flock of Curlews and Oystercatchers were on the shore between Points B & C.

Table 2.3 November area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	5		3		
Great Crested Grebe	9				
Grey Heron	1				
Mallard	2				
Wigeon	5				
Teal	2	2		4	
Moorhen		1			
Oystercatcher	7			6	4
Turnstone		30			
Curlew	2			20	
Black-headed Gull	3			2	1
Common Gull	1				
Black Guillemot	3				
Razorbill	2		1		
Total number of birds	42	33	4	32	5
Percentage of birds in each area	36.2 %	28.4 %	3.4 %	27.6 %	4.3 %

Greatest species diversity was recorded on the December survey. Again the majority of birds were recorded from Point A (73.9 %), with fewer birds recorded on the beach between Points A and B, and from Point B (Table 2.4).

Red-throated Divers, Great Northern Divers and Great Crested Grebes were only recorded from Point A, with all birds seen up to 1 km from shore. The December total of 13 Great Crested Grebes was the peak count over the 6 surveys. Small numbers of ducks and waders were also recorded from Point A, with fewer birds seen elsewhere.

Table 2.4 December area counts - Rising tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	5				
Great Northern Diver	2				
Great Crested Grebe	13				
Cormorant	1				
Shag	1				
Grey Heron	1				
Mallard		1			
Wigeon	3				
Teal	13				
Red-breasted Merganser	1				
Oystercatcher	4				
Lapwing	2				
Turnstone		2	1		
Redshank		4			
Curlew	1			2	
Snipe		2			
Black-headed Gull			2		
Common Gull	1		4		
Herring Gull	1				
Black Guillemot	1				
Razorbill	1				
Total number of birds	51	9	7	2	0
Percentage of birds in each area	73.9 %	13.0 %	10.1 %	2.9 %	0 %

Total numbers of wildfowl, waders and gulls were highest in January. The majority of birds were recorded in a high tide roost of primarily Dunlin, Lapwing and Ringed Plover on the beach between Points A and B (78.9 %) (Table 2.5).

Low numbers of Red-throated Divers, Great Northern Divers and Great Crested Grebes and a flock of 30 Scaup was recorded within 500 m of the shore from Point A. A survey in February 2005 also recorded 25 Scaup from Point A. Numbers of birds recorded between Point B and Point C were very low.

Table 2.5 January area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	2				
Great Northern Diver	2				
Great Crested Grebe	1				
Mute Swan		2			
Mallard					
Wigeon	2		5		6
Teal	2		8		
Scaup	30				
Oystercatcher		5	3		3
Ringed Plover		20			
Lapwing		60			
Turnstone		4	1		
Dunlin		250			
Redshank		1			
Snipe		3			
Black-headed Gull	20		2		
Common Gull	2		1		2
Total number of birds	61	345	20	0	11
Percentage of birds in each area	14.0 %	78.9 %	4.6 %	0 %	2.5 %

In addition, a flock of 78 Curlew were feeding on several grassy fields within the proposed site in January.

In February, the majority of wildfowl, waders and gulls were again recorded from Point A (76.5 %), with 8 Red-throated Divers, 3 Great Northern Divers and 9 Great Crested Grebes all seen offshore (Table 2.6). Up to 14 Teal and 12 Wigeon were recorded moving between Point A and Point B, and a flock of 70 Dunlin was seen flying past Point A. Numbers of birds recorded between Point B and Point C were very low.

Table 2.6 February area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	8				
Great Northern Diver	3				
Great Crested Grebe	9				
Grey Heron		1			
Mallard			2		
Wigeon	10		2		
Teal	10		14		
Moorhen		1			
Oystercatcher	1				
Lapwing	2				
Turnstone		1	9		
Dunlin	70				
Redshank		1			
Snipe		3			
Black Guillemot	1				
Guillemot					1
Total number of birds	114	7	27	0	1
Percentage of birds in each area	76.5 %	4.7 %	18.1 %	0 %	0.7 %

Lowest numbers of wildfowl, waders and gulls were recorded in March, with no concentrations of birds noted (Table 2.7). Half of all birds recorded were found at Point A (29.2 %) and on the beach and lagoon between Point A and B (20.8 %), with the remainder seen at Points B and C.

Table 2.7 March area counts - Rising tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver			1		
Great Northern Diver	1				1
Great Crested Grebe	1				
Grey Heron		1			
Mute Swan		1			
Mallard	2	2			2
Teal			2		
Moorhen		1			
Oystercatcher	2		3		3
Curlew	1				
Total number of birds	7	5	6	0	6
Percentage of birds in each area	29.2 %	20.8 %	25.0 %	0 %	25.0 %

Main areas for wildfowl, waders and gulls (see Figure 1)

Point A –Western end of site

The majority of sightings of Red-throated Diver, Great Northern Diver and Great Crested Grebe occurred from Point A, and this area usually held low numbers of ducks and waders on the beach.

Beach and Lagoon between Point A and B

This area usually held low numbers of species such as Turnstone, Oystercatcher and Ringed Plover and was occasionally used as a high tide roost e.g. in January. Grey Heron, Mute Swan, Moorhen and Snipe were regularly recorded on the small lagoon in low numbers and it is likely that Mute Swan and Moorhen breed here.

Point B - Knockfinglas Point

Divers were occasionally recorded from Point B, with low numbers of ducks and waders also seen.

Bay between Point B and Point C

Low numbers of ducks and waders were occasionally recorded along the shore of the bay between Point B and Point C.

Point C – Ardmore Point

Low numbers of ducks and waders were occasionally recorded off Point C, with one Great Northern Diver recorded in March.

2.2 Terrestrial species

The remaining 31 species were found within the site boundary, mostly along the hedgerows bordering fields (Table 2.8). Common species were those recorded on at least four visits, regular species were those recorded on two or three visits, and occasional species were only recorded on one visit.

Table 2.8 Terrestrial bird species recorded within the site

Species	Status	Species	Status
Sparrowhawk	Occasional	Blue Tit	Regular
Pheasant	Regular	Great Tit	Regular
Skylark	Regular	Magpie	Regular
Meadow Pipit	Common	Jackdaw	Occasional
Rock Pipit	Regular	Rook	Regular
Pied Wagtail	Common	Hooded Crow	Common
Wren	Common	Raven	Occasional
Duncock	Common	Starling	Occasional
Robin	Common	Chaffinch	Common
Stonechat	Common	Greenfinch	Regular
Blackbird	Common	Goldfinch	Regular
Song Thrush	Common	Linnet	Occasional
Redwing	Regular	Redpoll	Occasional
Goldcrest	Regular	Bullfinch	Occasional
Long-tailed Tit	Occasional	Reed Bunting	Common
Coal Tit	Regular		

Other species that were not recorded during winter but which could be expected to occur were Kestrel, Wood Pigeon and Fieldfare.

2.3 Breeding Birds

As the main focus of this study was on distribution of wildfowl, waders and gulls in the coastal areas of the site in winter, a specific breeding bird survey was not conducted. However, site visits during the summer months recorded a pair of Mute Swans breeding on the lagoon with Moorhen also present. A small colony of Sand Martins was recorded near the location of the proposed materials jetty. Evidence of Swallows nesting in disused farm buildings on site was also found.

The majority of terrestrial species recorded during the winter survey are likely to breed in and around the site, with the exception of Redwing, which is a winter visitor to Ireland. Other species likely to breed within the site include Sedge Warbler, Whitethroat, Blackcap, Chiffchaff and Willow Warbler.

Historical breeding data of species of conservation concern

Corncrake, Curlew, Barn Owl and Yellowhammer were recorded as breeding species in the 10 km grid square (R04) containing the proposed development in the 1976 Breeding Birds Atlas (Sharrock 1976). The New Atlas of Breeding Birds recorded Grey Partridge and Curlew breeding in the 10 km grid square (Gibbons *et al* 1993). Since the New Atlas, numbers of Grey Partridge have further declined, and the only population of wild Grey Partridge remaining in Ireland is found in County Offaly (Buckley 2005).

The proposed site does not contain suitable habitat for breeding Curlew.

A national survey of breeding hen harriers in Ireland in 2005, recorded no evidence of breeding Hen Harriers in the 10 km grid square containing the proposed development (Barton *et al* 2007).

3 Status of birds of conservation concern

BirdWatch Ireland (BWI) have compiled a list identifying bird species of high, medium and low conservation priority in Ireland, based on several criteria (Newton *et al* 1999). There are 18 species currently included on the Red List, which signifies species of high conservation concern. Rare and vulnerable bird species are also listed on Annex I of the E.U. Birds Directive (79/409/EEC).

One red-listed species, Curlew, was recorded within the proposed site. A flock of up to 78 Curlew were recorded feeding on several grassy fields within the proposed site throughout the winter. The nationally important threshold for this species has been set at 660 birds (Crowe 2005). Curlews are red-listed as there has been a greater than 50 % decline in the Irish breeding population in the last 25 years (Newton *et al* 1999).

Two species, Red-throated Diver and Great Northern Diver, recorded during the winter surveys are listed on Annex I of the EU Birds Directive (79/409/EEC). Both species were regularly recorded in

low numbers from Point A. The numbers recorded did not exceed the nationally important threshold of 20 birds set for both these species (Crowe 2005).

A total of 15 species of wildfowl, waders and gulls recorded during the winter surveys are on the BWI Amber list (Table 3.1). Amber-listed species are those which have undergone less severe declines, or are rare breeding species, or have a localised distribution or an unfavourable European conservation status (Newton *et al* 1999).

Table 3.1 Amber-listed species recorded during winter surveys (after Newton *et al* 1999)

Species	Moderate decline in Irish Breeding Population or range	Rare breeding species	> 50 % of breeding/wintering population found in fewer than 10 sites	Unfavourable conservation status in Europe
Red-throated Diver		X		X
Great Crested Grebe			X (breeding & wintering)	
Cormorant			X (breeding)	
Wigeon		X		
Teal	X (range)			
Scaup		X	X (wintering)	X
Red-breasted Merganser			X (wintering)	
Dunlin			X (wintering)	X
Snipe	X (population)			
Redshank	X (population)		X (wintering)	X
Black-headed Gull			X (breeding)	
Common Gull				X
Guillemot			X (breeding)	
Razorbill			X (breeding)	
Black Guillemot				X

In addition, five amber-listed terrestrial species (Skylark, Stonechat, Swallow, Sand martin and Redpoll) were also recorded during the surveys. Skylark is Amber-listed as there has been a moderate decline in the breeding population in Ireland over the previous 25 years. Stonechat is on the Amber list as its conservation status in Europe is deemed to be unfavourable. Redpoll is Amber-listed as there has been a moderate decline in the breeding range in Ireland over the previous 25 years (Newton *et al* 1999).

Both Swallow and Sand Martin were recorded breeding within the site in the summer months. Both species are on the Amber list as they have an unfavourable conservation status in Europe (Newton *et al* 1999).

4 Potential Impacts of the proposed development

4.1 Habitat loss

It is likely that the majority of impacts, including habitat loss, fragmentation and modification, will be direct impacts occurring during the construction phase. It is likely that the majority of hedgerows, scrub areas and disused farm buildings within the construction area of the site will be lost during the course of construction. This will result in loss of connectivity with the wider environment, as well as loss of habitat for animals and birds. In addition, it is likely that the cliffs supporting a small sand martin colony will have to be removed. Mitigations to reduce these impacts are given in Section 5.

4.2 Disturbance

Disturbance during the construction phase may potentially impact on some bird species in the site. In particular, there may be impacts arising from proposed onshore blasting operations. Blasting will be largely confined to the eastern side of the site there will probably be some temporary disturbance of birds in areas close to the eastern section of the site.

It should be noted that evidence of birds habituating to loud and sudden noises has been well documented. After an initial period of disturbance, it could be expected that wildlife in the area would become habituated to blasting noise from the site. Most birds soon learn that these sounds present no danger to them and remain on site despite their continued usage. Mitigation measures to minimise disturbance are outlined in section 5.

4.3 Impacts on birds of conservation concern

From a species conservation viewpoint, the most significant impact arising from the proposed development would be the loss of individuals of a rare species. Two Annex I listed species, Red-throated Diver and Great Northern Diver, were recorded in the inshore waters bordering the proposed site, and one BWI Red-listed species, Curlew, was recorded feeding in fields within the proposed site regularly throughout the winter months.

Depending on the timing of the construction phase, the construction of the two jetties is likely to cause disturbance to species such as Red-throated Diver and Great Northern Diver in the immediate vicinity. However, the majority of sightings of these species were from Point A (Figure 1), to the west of Knockinglas Point, where no development is proposed. Any disturbance from the construction phase is likely to be short term.

The proposed site would no longer be suitable habitat for wintering Curlew following construction of the development. However numbers of Curlew recorded on the site (maximum count of 78 birds in January) were not significant as they were well below the nationally important threshold of 660 birds (Crowe 2005). Alternative suitable fields for wintering Curlew are present in the surrounding landscape. Mitigation measures to minimise disturbance are outlined in section 5.

4.4 Impacts on the cSAC and pNHA

The proposed site borders the Lower Shannon candidate Special Area of Conservation (cSAC) (site code 002165) and Ballylongford proposed Natural Heritage Area (pNHA) (site code 001332). It is also possible that the intertidal area adjoining the site may be included in the River Shannon and River Fergus Estuaries Special Protection Area (SPA- site code 004077) in the future.

Overall, the Shannon and Fergus Estuaries site is the most important coastal wetland in Ireland and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration of international importance. In addition, it also supports internationally important numbers of three species, Dunlin, Black-tailed Godwit and Redshank, with a further 16 species occurring in numbers of national importance (NPWS 2005).

Although the Shannon estuary supports internationally important concentrations of wildfowl and waders, no significant concentrations of divers, grebes or ducks were recorded in the inshore waters bordering the proposed site. The majority of divers and grebes were found offshore from Point A, where no development is planned.

Similarly, no significant high tide roost was found within the site, and the area did not support large numbers of feeding wildfowl or waders. A high tide roost of primarily Dunlin, Lapwing and Ringed Plover was noted on the beach east of Point A in January, but no species was recorded in nationally important numbers. No development is planned for this area of beach and although there may be some disturbance to the area during construction, any disturbance is likely to be temporary. It is noted that the sections of the Shannon estuary, which adjoin the site, do not support high numbers of breeding waders or waterfowl and therefore any blasting operations are likely to result in temporary displacement of feeding birds.

Blasting will be largely confined to the eastern side of the site and thus will be a considerable distance from the terrestrial sections of the cSAC and pNHA of high ecological value which border the western part of the site. However there may be some limited disturbance of birds in the scrub habitat, included within the cSAC, which adjoins the eastern site boundary. This scrub habitat is not of particularly high value for birds.

5 Mitigation or Remedial Measures

5.1 Construction mitigation

General measures

The zone of works will be fenced off from the outset to prevent ingress into areas that require protection. No work will take place outside the lands made available for construction, and all materials and liquids associated with the work will be stored in a manner that will not result in pollution or habitat deterioration.

Particular care will be taken at the boundary between the development site and the cSAC and pNHA so that construction activities do not cause damage to habitats in this area. Consultation will be undertaken with National Parks & Wildlife Service with regard to the nature of proposed works along this boundary.

Where possible, boundary hedges will be retained and enhanced. Any trees or hedgerows scheduled for retention will be protected from damaging construction activities by the erection of appropriate fencing. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b). Where practicable, the boundary landscape planting should be predominantly of Irish native species that reflect the existing vegetation of the area. These should be derived from local native-origin stock (NB; the terms 'native' and 'native origin' have specific technical meanings as defined by Flora Locale, 2003). Suitable native species would include Hawthorn and Blackthorn, with occasional Ash standards planted at intervals. Spinose shrub and tree species, such as Hawthorn, Blackthorn and Gorse, develop into good stock-proof barriers

According to the Wildlife (Amendment) Act 2000, it is an offence to destroy any vegetation growing in any hedge or ditch between March and August inclusive, due to adverse impacts on nesting birds, although this is waived in the "*development or preparation of sites on which any building or other structure is intended to be provided*". However, the removal of hedgerows and scrub during construction will be carried out as much as possible between September and February. Again, although this is not a road construction project, the NRA guidelines for the protection of trees and hedgerows should be followed (NRA, 2006b).

Specific measures

The cSAC and pNHA bordering the development area are, by definition, nationally important for their habitats and the species they support. ***It is essential*** that all construction staff, including all sub-contracted workers, be notified of the boundaries of the cSAC and pNHA and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these protected areas and that care must be taken with liquids or other materials to avoid spillage.

A Construction Environmental Management Plan will be prepared and implemented for the duration of the construction phase of the project. This will have particular emphasis on the protection of the cSAC and pNHA which adjoin the site.

As there is a stream running from the proposed site into the cSAC and pNHA to the sea, it is critically important that construction activities do not result in pollution of this watercourse, either through siltation, which interferes with water flow, vegetation growth and aquatic fauna, or pollution (e.g. chemical).

Landscape planting is recommended adjacent to fencing, particularly along the boundary with the cSAC and pNHA. Any such planting should be carried out as soon as practicable after fence construction, both for screening purposes and ecological reasons. The final landscape plans will be prepared in consultation with a qualified ecologist.

Consideration should be given to habitat creation (e.g. reedbed) around the proposed new pond. This would create breeding habitat for species such as Mute Swan, Moorhen and Sedge Warbler, and foraging habitat for species such as Swallow.

The demolition of the disused farm buildings will not take place in the breeding season as they are used by nesting Swallows. All demolition operations will be carried out between October and March, when birds have finished breeding. Similarly, the removal of the section of cliff that supports a small colony of breeding Sand Martins will be carried out between October and February to avoid disturbance to nesting birds. It is expected that the colony will relocate to an adjacent area of cliffs when breeding birds return.

Although blasting operations are unlikely to have significant impacts on birds a detailed method statement will be drawn up by an ecologist and agreed with the National Parks and Wildlife Service prior to commencement of works. The method statement will specify the timing of blasting operations and the need, if any, for ecological supervision.

Operation mitigation

The landscaping plan will provide for the inclusion of native tree, shrub and grassland species within the development. Landscape planting of the proposed development should indirectly mitigate for the loss of scrub and hedgerow habitats and be designed to interlink with other areas of semi-natural vegetation, including the remaining hedgerows and adjacent grassland.

Pollution safeguards will be put in place, particularly between the development and the cSAC and pNHA, to reduce the risk of potential pollutants from reaching sensitive habitats.

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Appendix 3. DixonBrosnan 2011/2012 Survey

DixonBrosnan

environmental consultants

Project			
Winter bird survey at Ballylongford			
November 2011 to February 2012			
Client			
ARUP			
Project ref	Report no	Client ref	
1256	1256		
 DixonBrosnan The Cedars, Bridewood, Ovens, Co Cork Tel 086 851 1437 carl@dixonbrosnan.com www.dixonbrosnan.com 			
Date	Rev	Status	Prepared by
06/12/12	1	1 st issue	Carl Dixon M.Sc.
			Vincent Murphy M. Sc.
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1 Introduction

Shannon LNG intend to construct a CHP Plant on a site at Ballylongford, Co. Kerry. DixonBrosnan environmental consultants were commissioned to carry out winter bird surveys during the wintering season of 2011 / 2012. Previously winter bird surveys were carried out at this site by Cork Ecology in 2006/2007 during the preparation of an EIS for a LNG storage terminal. The same methodologies as those employed by Cork Ecology were utilised for bird surveys in 2011/2012

2 Winter bird survey

Bird surveys were carried out on four occasions, 26th November 2011, 5th January 2012, 28th January 2012 and 22nd February 2012 from five locations along the Shannon LNG site at Ballylongford. Surveys were carried out using an 8X40 Luger field binoculars and a 20X60 Sahara spotting scope. The first two surveys were carried out from mid tide to high tide and the last two surveys was carried out from mid tide to low tide. Survey results are detailed in **Table 1, 2, 3 and 4**. The five survey points utilised during the surveys and are shown in **Figure 1**.

The estuarine habitat at this location is not within the boundary of the River Shannon and River Fergus Estuaries SPA 004077; however it is proposed that the SPA will be extended into this area in the future. A list of the bird species listed as features of interest for this SPA is included in **Appendix 1**. The relevance of recorded populations in relation to nationally important populations is detailed in **Appendix 2**.



Figure 1. Winter bird survey observation points.

3. Results

Table 1. Ballylongford bird survey 26-11-2011. Mid tide rising to high tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	10.30	8/8	25kmph W	1-2
Species	Count	Flew over		
Lapwing		35		
Hooded crow	8			
Curlew	6			
Oystercatcher		20		
Mallard		5		
Lesser blackbacked gull	4	2		
Whooper swan		2		
Snipe		1		
Heron	1			
Common Gull	4	8		
Red shank		45		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.45	7/8	30kmph W	1
Species	Count	Flew over		
Mute swan		2		
Teal	1			
Oystercatcher	8			
Hooded crow	2			
Starling		8		
Turnstone	9			
Glaucous gull	3			
Cormorant	2			

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.50	5/8	30kmph W	1
Species	Count	Flew over		
Hooded crow	3			
Common gull	3			
Turnstone	3			
Curlew	2			
Oystercatcher		4		
Great northern diver	1			
Blackheaded gull	3			

Location	Start time	Cloud cover	Wind	Sea state
Bay	14.00	5/8	20kmph W	1
Species	Count	Flew over		
Oystercatcher	6			
Great northern diver	2			
Common gull	3			
Curlew	1			
Lesser blackbacked gull	1	2		
Blackbird	1			
Pheasant	1			

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.10	8/8	25kmph W	1-2
Species	Count	Flew over		
Oystercatcher	4	2		
Lesser blackbacked gull	1	3		
Rook		1		

Table 2. Ballylongford bird survey 5-1-2012. Mid tide rising to high tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	9.45	7/8	25kmph NW	2
Species	Count	Flew over		
Hooded crow	5	1		
Glaucous gull	2			
Greater blackbacked gull	2	5		
Blackheaded gull		15		
Oystercatcher	11			
Lesser blackbacked gull	1	2		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.15	3/8	30kmph NW	2
Species	Count	Flew over		
Whooper swan	2			
Turnstone	4			
Greater blackbacked gull	1	2		
Oystercatcher	16	8		

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.30	3/8	30kmph NW	2
Species	Count	Flew over		
Curlew	2	24		
Lesser blackbacked gull	2	4		
Glaucous gull		4		

Common gull	1	1	
Hooded crow	2	5	
Blackheaded gull		3	

Location	Start time	Cloud cover	Wind	Sea state
Bay	14.00	3/8	30kmph NW	1-2
Species	Count	Flew over		
Oystercatcher	2			
Hooded crow	4			
Lesser blackbacked gull	2	3		
Glaucous gull	1	3		

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.30	5/8	25kmph NW	1-2
Species	Count	Flew over		
Blackheaded gull		6		
Lesser blackbacked gull	1	8		
Glaucous gull		3		
Cormorant		4		

Table 3. Ballylongford bird survey 28-1-2012. Mid tide falling to low tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	9.45	8/8	2-5kmph W	1
Species	Count	Flew over		
Cormorant	1			
Great northern diver	4			
Oystercatcher	2	45		
Redshank		31		
Common gull	2	5		
Hooded crow	9	8		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.00	6/8	2-5kmph W	1
Species	Count	Flew over		
Curlew		25		
Ringed plover	5	5		
Great northern diver	3			
Oystercatcher	3	16		
Hooded crow	7	2		
Cormorant		1		
Common gull		4		
Common scooter		2		

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.10	7/8	2-5kmph W	1
Species	Count	Flew over		
Great northern diver	1			
Teal	2	4		
Common gull	1	7		
Oyster catcher		9		
Thrush	1			

Location	Start time	Cloud cover	Wind	Sea state
Bay	13.30	8/8	2-5kmph W	1
Species	Count	Flew over		
Turnstone	35			
Oystercatcher	15	4		
Common gull	1	4		
Hooded crow	4	7		

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.00	6/8	2-5kmph W	1
Species	Count	Flew over		
Oystercatcher	6	8		
Teal	4	2		
Cormorant		4		
Common gull		7		

Table 4. Ballylongford bird survey 22-2-2012. Mid tide falling to low tide, to mid tide rising.

Location	Start time	Cloud cover	Wind	Sea state
Point A	09.30	4/8	4-7kmph SW	1
Species	Count	Flew over		
Hooded crow	18	27		
Lesser blackbacked gull		14		
Mute swan		2 (going to pond)		
Skylark*	3			
Turnstone	5			
Blackheaded gull		2		

Location	Start time	Cloud cover	Wind	Sea state
Beach	10.40	4/8	7-12kmph SW	1
Species	Count	Flew over		
Mute swan	2 (on pond)			
Hooded crow	5	8		
Cormorant		3		
Turnstone		7		
Redshank		2		
Common gull		9		
Moorhen	1			

Location	Start time	Cloud cover	Wind	Sea state
Point B	11.45	6/8	20-25kmph SW	1
Species	Count	Flew over		
Raven		1 (from Clare)		
Common gull		6		
Mallard		2		
Cormorant	1	2		
Great crested grebe	1 (moving towards bay)			

Location	Start time	Cloud cover	Wind	Sea state
Bay	12.45	6/8	15 kmph SW	1
Species	Count	Flew over		
Curlew	12			
Teal	4			
Mallard	19			
Great crested grebe	2 (one came from Point B)			
Great northern diver	1			
Cormorant	1			
Hooded crow	2	3		
Common gull		6		

Location	Start time	Cloud cover	Wind	Sea state
Point C	14.00	6/8	17-25 kmph SW	1
Species	Count	Flew over	flocking	
Raven	2			
Great northern diver	1			
Redshank		40		
Turnstone		40		
Mallard		3		
Rock pipet	2			

4. Conservations status of recorded birds.

DixonBrosnan recorded 30 bird species within the estuary, and surrounding environs from the five vantage point locations during the winter of 2011/2012. The species recorded in relation to their conservation status are displayed in **Table 5**. Species that were observed by Cork Ecology in surveys conducted during the winter of 2006/2007 are shown in **Table 6**.

Table 5. Conservation status of species recorded by DixonBrosnan 2011/2012.

Species recorded on site	SPA 004077 Features of Interest	Annex I	BoCCI*
Blackbird			Green
Blackheaded gull	✓		Red
Common Gull			Amber
Common scooter			Red
Cormorant	✓		Amber
Curlew	✓		Red
Glaucous gull			Green
Great crested grebe			Amber
Great northern diver		✓	Green
Greater blackbacked gull			Amber
Heron			Green
Hooded crow			Green
Lapwing	✓		Red
Lesser blackbacked gull			Amber
Mallard			Green
Moorhen			Green
Mute swan			Amber
Oystercatcher			Amber
Pheasant			Green
Raven			Green
Red shank	✓		Red
Ringed plover	✓		Amber
Rock pipet			Green

Rook			Green
Skylark			Amber
Snipe			Amber
Starling			Amber
Teal	✓		Amber
Thrush			Green
Turnstone			Green
Whooper swan	✓	✓	Amber

* categorised by BirdWatch Ireland as Birds of Conservation Concern in Ireland (Lynas *et al.*, 2007). Red List bird species are of high conservation concern and the Amber List species are of medium conservation.

Table 6. Conservation status of species recorded by Cork Ecology 2006/2007.

Species recorded on site	SPA 004077 Features of Interest	Annex I	BoCCI
Black guillemot			Amber
Dunlin		✓	Amber
Guillemot			Amber
Herring gull			Red
Razorbill			Amber
Red-breasted merganser			Green
Red-throated diver		✓	Amber
Scaup	✓		Amber
Shag			Amber
Wigeon	✓		Amber

5 Discussion

The Annex 1 bird species great northern diver and whooper swan were recorded from the site. Though not recorded in the winter of 2011/2012, two other Annex 1 species (dunlin and red-throated diver) were recorded in 2006/2007. Great northern diver was recorded in the area around Knockfinglas Point and whooper swan was recorded from the lagoon.

Several Amber and Red listed species were recorded, most notably, cormorant (Amber), black headed gull (Red), lesser black backed gull (Amber), lapwing (Red), curlew (Red),

common scoter (Red), oystercatcher (Amber), great crested grebe (Amber), and Redshank (Red).

Ten of the twenty-one species listed as features of interest for the River Shannon and River Fergus estuaries SPA 004077 were recorded during surveys although numbers were generally low. No nationally significant populations (See **Appendix 2**) were recorded during surveys in 2006/2007 and 2011/2012.

6. Conclusion

Several species listed as features of interest for the River Shannon and River Fergus estuaries SPA 004077, Bird Directive Annex I species and Red and Amber listed species were recorded during winter surveys. However populations were low and no nationally important numbers were recorded or are likely to occur given lack of high quality feeding habitat in proximity to the site. No significant impacts on important bird populations is envisaged.

Appendix 1.

Features of Interest	Scientific name	NPWS species code
Cormorant	<i>Phalacrocorax carbo</i>	A017
Whooper Swan	<i>Cygnus cygnus</i>	A038
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	A046
Shelduck	<i>Tadorna tadorna</i>	A048
Wigeon	<i>Anas penelope</i>	A050
Teal	<i>Anas crecca</i>	A052
Pintail	<i>Anas acuta</i>	A054
Shoveler	<i>Anas clypeata</i>	A056
Scaup	<i>Aythya marila</i>	A062
Ringed Plover	<i>Charadrius hiaticula</i>	A137
Golden Plover	<i>Pluvialis apricaria</i>	A140
Grey Plover	<i>Pluvialis squatarola</i>	A141
Lapwing	<i>Vanellus vanellus</i>	A142
Knot	<i>Calidris canutus</i>	A143
Dunlin	<i>Calidris alpina</i>	A149
Black-tailed Godwit	<i>Limosa limosa</i>	A156
Bar-tailed Godwit	<i>Limosa lapponica</i>	A157
Curlew	<i>Numenius arquata</i>	A160
Redshank	<i>Tringa totanus</i>	A162
Greenshank	<i>Tringa nebularia</i>	A164
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	A179
Wetlands & Waterbirds []		A999

Appendix 2. Nationally significant population study

Species Observed	Nationally significant populations 1%	Peak recording per day
Great northern diver	N/A	9
Great crested grebe	55	3
Cormorant	140	5
Heron	30	1
Mute swan	110	2
Whooper swan	130	2
Mallard	380	24
Teal	450	28
Common scoter	230	2
Moorhen	N/A	1
Oystercatcher	680	145
Ringed plover	150	10
Lapwing	2100	35
Turnstone	120	52
Curlew	550	26
Snipe	N/A	1
Redshank	310	45
Blackheaded gull	N/A	24
Common gull	N/A	33
Lesser blackbacked gull	N/A	23
Greater blackbacked gull	N/A	10
Glaucous gull	N/A	11
Skylark	N/A	3
Rock pipet	N/A	1
Thrush	N/A	1
Hooded crow	N/A	73
Raven	N/A	3
Starling	N/A	8
Blackbird	N/A	1
Pheasant	N/A	1
Rook	N/A	1

*N/A indicated that data are not available for these species.

Appendix 4. 2018-2020 Winter bird survey notes.

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Light Breeze	Light Breeze	Light Breeze	X	Cloud	Scattered	Scattered	Scattered	X	
			Sea (Douglas)	Smooth	Smooth	Smooth	X	Temp.	10°C	12°C	12°C	X	
Date: 18/10/2018		Tide: Low 07.15 (2.11m) & High 13.57 (3.71m)		Rain	Dry	Dry	Dry	X	Visibility	Good	Good	Good	X
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	12:00	Gulls - forming rafts on water top i.e. loafing. Great Crested Grebe foraging. Cormorant loafing on shoreline. Waders showed interchangeable behaviour between foraging and loafing/roosting.			Flooding tide Close to high tide.								
VPB	13:10	All gull species noted loafing on water with some foraging behaviour recorded. Curlew flock noted loafing/roosting on shoreline. Grebes and Loons foraging.			Flooding tide. Close to high tide.								
VPC	14..45	Oystercatcher foraging along shoreline. Black Guillemot and Cormorant foraging. All gull species noted loafing on water with some foraging behaviour recorded.			Ebbing tide. Small fishing vessel within study area prior to arrival. Left as survey commenced. Single Harbour Seal (<i>Phoca vitulina</i>) noted commuting through site.								
VPD	Vantage point added in February of 2019												

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light	Moderate	Gentle	X	Cloud	Cloudy	Overcast	Overcast	X
			Sea (Douglas)	Slight	Slight	Smooth	X	Temp.	6°C	6°C	7°C	X
Date: 22/11/2018		Tide: Low 10.50 (0.64m) & High 17.02 (4.89m)	Rain	Dry	Dry	Dry	X	Visibility	Ok	Ok	Ok	X
Vantage Points	Start time	Bird Behaviour		Notes								
VPA	11:00	All gull species noted loafing on water top with some foraging behaviour recorded. Great Crested Grebe and Shag foraging. Low tide and flooding tide. Three Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area. Waders showed interchangeable behaviour between foraging and loafing. Wigeon foraging along water’s edge.										
VPB	12:15	Oystercatcher foraging. Great Northern Diver, Black Guillemot and Cormorant foraging.		Low tide, approximately 40 m exposed, with tide in flood during survey.								
VPC	13.45	Loons and Cormorant foraging.		Low tide, with tide in flood during survey.								
VPD	Vantage point added in February of 2019											

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Gentle	Light Breeze	Moderate	X	Cloud	Cloudy	Cloudy	Cloudy	X	
			Sea (Douglas)	Slight	Smooth	Slight	X	Temp.	6°C	6°C	6°C	X	
Date: 29/11/2018		Tide: Low 16.20 (1.05m) & High 09.58 (4.29m)		Rain	Scattered - light	Scattered - light	Scattered - light	X	Visibility	Ok	Ok	Ok to poor	X
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	10:00	Waders predominately loafing/roosting on shoreline with some foraging behaviour noted. Wigeon showing mix of behaviours. Some birds loafing on shoreline others foraging at stream and river/estuary confluence. Little Egret foraging along shoreline. Cormorants, Shags, Grebes and Loons foraging.			High tide, approximately 4-5 m exposed, with tide ebbing during survey. Small number of Oystercatcher foraging within agricultural field just southeast of shoreline.								
VPB	11:15	Turnstone both foraging and loafing on shoreline. Constant movement throughout the site. Oystercatcher and Greenshank showed interchangeable behaviour between foraging and loafing. Guillemots and Loons foraging.			High tide approximately 15 m exposed, with tide ebbing during survey.								
VPC	12:45	All gull species noted loafing on water. Guillemots and Loons foraging.			High tide with tide in ebb during survey. Small fishing vessel within study area for approximately 10 minutes, approximately 60 m from shoreline.								
VPD	Vantage point added in February of 2019												

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Calm	Light Breeze	Light Breeze	X	Cloud	Overcast	Cloudy	Cloudy	X	
			Sea (Douglas)	Calm (Glassy)	Calm (Glassy)	Calm (Glassy)	X	Temp.	2°C	5°C	6°C	X	
Date: 12/12/2018		Tide: Low 14.29 (1.2m) & High 08.27 (4.5m)		Rain	Dry	Dry	Dry	X	Visibility	Good	Good	Good	X
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	08:30	Grey Plover loafing/roosting on rocky outcrop at western end of study area. Remaining wader species recorded predominately loafing/roosting on shoreline with some foraging behaviour noted. Teal and Gulls loafing on water top. Cormorants, Shags, Grebes and Loons foraging.			High tide, approximately 20 m exposed, with tide slack during survey. Two Lapwing flushed from site on arrival. Flock of Curlew (Identified via calls) foraging within field to west of study area. Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area.								
VPB	09:45	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Gulls loafing on water top. Grebes and Loons foraging, with some loafing observed.			High tide with approximately 10 m exposed, with tide ebbing during survey. Harbour Seal (<i>Phoca vitulina</i>) commuting through site. Four Bottlenose Dolphin (<i>Tursiops truncatus</i>) recorded east of study area.								
VPC	11:15	All gull species noted loafing on water top. Oystercatcher foraging. Mallard roosting on western section of shoreline. Razorbill, Great Crested Grebe and Loon foraging.			High tide with tide ebbing during survey. Deceased Otter (<i>Lutra lutra</i>) floating in water just offshore of VP.								
VPD	Vantage point added in February of 2019												

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Gentle	Light	Gentle	X	Cloud	Scattered	Lightly Cloudy	Cloudy	X	
			Sea (Douglas)	Slight	Smooth	Slight	X	Temp.	6°C	8°C	5°C	X	
Date: 18/12/2018		Tide: Low 07.49 (1.60m) & High 14.11 (4.17m)		Rain	Dry	Dry	Scattered moderate	X	Visibility	Good	Ok	Ok to poor	X
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	11:00	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Gulls loafing on water top. Cormorants, Shags, Grebes, Auks and Loons foraging.			Low tide, with tide in flood during survey. Two Lapwing flushed from site on arrival. Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area.								
VPB	12:10	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Grebes, Auks and Loons foraging, with some loafing observed.			High tide, with tide in flood during survey.								
VPC	13:45	Great Northern Diver foraging. Oystercatcher and Turnstone predominately loafing. Some foraging by Turnstone. Great Black-backed Gull loafing on water top.			High tide, approximately 5-10 m exposed, with tide in flood during survey. Scattered Light to moderate showers throughout survey period.								
VPD	Vantage point added in February of 2019												

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Breeze	Light Breeze	Moderate	X	Cloud	Overcast	Overcast	Overcast	X
			Sea (Douglas)	Calm (rippled)	Calm (rippled)	Slight	X	Temp.	4°C	4°C	6°C	X
Date: 21/01/2019		Tide: Low 11.46 (0.32m) & High 17.59 (5.05m)	Rain	Dry	Dry	Scattered heavy	X	Visibility	Ok	Ok	Ok to poor	X
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	10:00	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Gulls loafing on water top, with Common Gull loafing on the shoreline. Brent Geese loafing on shoreline, eastern area of study site. Wigeon showing mix of behaviours. Some birds loafing on shoreline others foraging at stream and river/estuary confluence. Grey Heron foraging along shoreline. Cormorants, Grebes, Auks and Loons foraging.			Low tide, with tide in ebb during survey. Farmer walking on shoreline on two separate occasions resulting in Lapwing and a single Curlew being flushed from the site. Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area.							
VPB	11:10	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour.			Low tide, with tide slack during survey.							
		Grebes, Wigeon and Loons foraging, with some loafing observed. Black-headed Gulls foraging over water.										
VPC	12:40	Common Gull foraging on sprat close to shoreline. Oystercatcher foraging along shoreline. Wigeon loafing on water.			Low tide, with tide in flood during survey. Single Irish Hare (<i>Lepus timidus hibernicus</i>) noted on western section of shoreline. Heavy periods of rainfall resulting in restricted visibility.							
VPD	Vantage point added in February of 2019											

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Fresh Breeze	Fresh Breeze	Fresh Breeze	X	Cloud	Sky Obscured	Sky Obscured	Sky Obscured	X	
			Sea (Douglas)	Slight	Slight	Slight	X	Temp.	6°C	6°C	9°C	X	
Date: 24/01/2019		Tide: Low 14.00 (0.19m) & High 07.45 (5.21m)		Rain	Scattered light	Scattered light	Scattered light	X	Visibility	Ok to poor	Ok to poor	Ok to poor	X
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	14:10	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Grebes and Loons predominately foraging with some loafing.			Low tide, approximately 50-70 m exposed, with tide during survey.								
VPB	12:55	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour. Herring Gulls foraging over water. Black-headed Gulls loafing.			Low tide, approximately 50 m exposed, with tide ebbing during survey.								
VPC	11:30	Oystercatcher foraging along shoreline.			Low tide, with tide ebbing during survey. Visibility at times very poor due to rolling mist.								
VPD	Vantage point added in February of 2019												

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Moderate	Moderate	Light Breeze	Moderate	Cloud	Mostly Cloudy	Partly Cloudy	Mostly Cloudy	Mostly Cloudy	
			Sea (Douglas)	Slight	Smooth	Slight	Slight	Temp.	5°C	7°C	5°C	5°C	
Date: 18/02/2019		Tide: Low 10.45 (0.54m) & High 16.59 (4.93m)		Rain	Scattered light	Scattered light	Scattered light	Scattered light	Visibility	Ok	Good	Ok	Ok
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	10:35	Oystercatcher foraging along shoreline. Mallard and Brent Geese loafing.			Low tide, approximately 30-50 m exposed, with tide slack during survey. Scattered showers.								
VPB	13:00	Great Crested Grebe and Loons foraging. Mallard loafing. Oystercatcher foraging along shoreline.			Low tide, approximately 30-40 m exposed, with tide in flood during survey. Scattered showers.								
VPC	09:15	Great Crested Grebe and Great Northern Diver foraging.			Low tide, approximately 30 m exposed, with tide in flood during survey. Scattered showers.								
VPD	11:45	Great Crested Grebe and Great Northern Diver foraging and loafing within transitional waters. Brent Geese loafing on shoreline and water. Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Mute Swan and Little Egret loafing within salt marsh habitat.			Low tide, approximately 30-50 m exposed, with tide in flood during survey. Scattered showers.								

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD	
			Wind (Beaufort)	Light Air	Light Breeze	Light Air	Light Breeze	Cloud	Cloudy	Partly Cloudy	Overcast	Cloudy	
			Sea (Douglas)	Calm (rippled)	Smooth	Calm (rippled)	Smooth	Temp.	10°C	12°C	10°C	10°C	
Date: 20/02/2019		Tide: Low 12.17 (0.00m) & High 06.01 (5.35m)		Rain	Scattered light	Dry	Scattered light	Dry	Visibility	Good	Good	Ok	Good
Vantage Points	Start time	Bird Behaviour			Notes								
VPA	10:45	Duck species Loafing/roosting on eastern section of shoreline. Waders foraging along shoreline. Cormorants, Shags, Grebes, Auks and Loons foraging.			Low tide, approximately 40-50 m exposed, with tide ebbing during survey. Scattered showers. Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area.								
VPB	13:10	Waders foraging on shoreline. Great Northern Diver foraging.			Low tide. 40-50 m exposed, with tide in flood during survey.								
		Oystercatcher foraging along shoreline.			Scattered showers.								
VPC	09:30	Oystercatcher displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Common Gull and Wigeon loafing on water. Great Northern Diver and Cormorant foraging.			Low tide approximately 15 m exposed, with tide ebbing during survey. Scattered showers light to moderate at times.								
VPD	11:50	Grebes, Auks and Loons foraging and loafing within transitional waters. Brent Geese loafing on shoreline and water. Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Little Egret loafing within salt marsh habitat.			Low tide, approximately 100 m exposed, with tide ebbing during survey.								

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Fresh Breeze	Gentle Breeze	Fresh Breeze	Fresh Breeze	Cloud	Overcast	Overcast	Overcast	Overcast
			Sea (Douglas)	Slight	Smooth	Slight	Slight	Temp.	10°C	10°C	10°C	10°C
Date: 15/03/2019		Tide: Low 18.12 (1.87m) & High 12.12 (3.92m)		Rain	Scattered light	Scattered light	Scattered light	Scattered light	Visibility	Ok	Ok	Ok
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	10:45	Curlew and Grey Heron loafing on shoreline. Great Northern Diver foraging.			High tide, approximately 15 m exposed, with tide in flood during survey. Scattered showers.							
VPB	13:50	Curlew loafing and foraging on shoreline. Great Northern Diver and Cormorant foraging.			High tide, approximately 15 m exposed, with tide ebbing during survey. Scattered showers.							
VPC	10:00	Great Northern Diver and Cormorant foraging.			Low tide, approximately 25 m max exposed, with tide in flood during survey. Scattered showers.							
VPD	12:30	Redshank and Shelduck loafing/roosting on shoreline. Great Northern Diver and Cormorant foraging. Gulls loafing on water.			High tide approximately 10 m max exposed, with tide ebbing during survey.							

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2018 to March 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Air	Calm	Light Air	Light Air	Cloud	Nearly Overcast	Mostly Cloudy	Nearly Overcast	Nearly Overcast
			Sea (Douglas)	Calm (rippled)	Calm (glassy)	Calm (rippled)	Smooth	Temp.	10°C	13°C	12°C	12°C
Date: 21/03/2019		Tide: Low 11.57 (-0.09m) & High 18.13 (5.36m)		Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	11:20	Cormorants, Shags, Grebes, Auks and Loons foraging. Brent Geese foraging at stream and river/estuary confluence.			Low tide approximately 50-70 m exposed, with tide slack during survey. Two Harbour Seal (<i>Phoca vitulina</i>) noted to west of study area.							
VPB	13:40	Black Guillemot foraging.			Low tide, approximately 40-50 m exposed, with tide in flood during survey.							
VPC	10:00	Cormorant loafing on shoreline. Oystercatcher foraging on shoreline.			Low tide, approximately 30-40 m exposed, with tide ebbing during survey.							
VPD	12:30	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Herring Gulls both foraging along shoreline and loafing on water top. Snipe noted foraging in agricultural grassland to southeast of study area. Common Gull loafing on water. Great Northern Diver, Black Guillemot and Cormorant foraging.			Low tide, approximately 90 m max exposed, with tide in flood during survey. Three Harbour Seals (<i>Phoca vitulina</i>) hauled out on rocky outcrop.							

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Air	Calm	Light Air	Calm	Cloud	Lightly Cloudy	Scattered Clouds	Lightly Cloudy	Lightly Cloudy
			Sea (Douglas)	Calm (rippled)	Calm (glassy)	Calm (rippled)	Calm (glassy)	Temp.	8°C	12°C	3°C	12°C
Date: 21/10/2019		Tide: Low 05.58 (1.6m) & High 12.24 (4.2m)	Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good	Good
Vantage Points	Start time	Bird Behaviour		Notes								
VPA	10:50	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Common Gull and Black-headed Gull foraging over water along shoreline. Some Gulls loafing on water top. Cormorants, Grebes and Loons foraging.		High tide, approximately 25 m exposed, with tide in flood during survey.								
VPB	13:20	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Gulls loafing on water top and shoreline. Great Crested Grebe and Common Guillemot foraging. Teal foraging.		Low tide, approximately 30 m exposed, with tide ebbing during survey. Otter (<i>Lutra lutra</i>) foraging within study area.								
VPC	09:30	Common Gull loafing on water top. Great Crested Grebe and Common Guillemot foraging. Two Curlew noted foraging in agricultural field to west of VP.		Low tide, approximately 20 m exposed, with tide in flood during survey.								

VPD	12:00	<p>Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline.</p> <p>Herring Gulls loafing on water.</p> <p>Great Crested Grebe and Common Guillemot foraging.</p> <p>Little Egret foraging in both salt marsh habitat and shoreline.</p> <p>Black-headed Gull foraging over water, some loafing on water.</p>	<p>High tide approximately 15 m max exposed, with tide in flood during survey.</p> <p>Otter (<i>Lutra lutra</i>) commuting through study area.</p> <p>Small number of Curlew and Snipe flushed on arrival.</p>
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Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Air	Light Air	Light Air	Light Air	Cloud	Overcast	Nearly Overcast	Mostly Overcast	Overcast
			Sea (Douglas)	Calm (rippled)	Calm (rippled)	Calm (rippled)	Calm (rippled)	Temp.	6°C	6°C	3°C	8°C
Date: 25/10/2019		Tide: Low 10.22 (1.7m) & High 16.42 (4.2m)	Rain	Scattered showers.	Scattered showers.	Scattered showers.	Scattered showers.	Visibility	Ok	Ok	Ok	Ok
Vantage Points	Start time	Bird Behaviour		Notes								
VPA	09:20	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Cormorant loafing on shoreline and foraging within water. Great Crested Grebe foraging.		Low tide, approximately 40-50 m exposed, with tide ebbing during survey. Dog walker on shoreline at beginning of survey and returned half an hour into survey. Curlew and Cormorant flushed from site. Otter (<i>Lutra lutra</i>) foraging to the west of the site. Scattered showers.								
VPB	11:50	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Red-throated Diver foraging. Grey Heron loafing on shoreline.		Low tide, approximately 40-60 m exposed, with tide in flood during survey. Scattered showers.								
VPC	13:30	Herring Gull feeding on eel on water. Red-throated Diver and Cormorant foraging. Common Gull loafing on water.		Low tide, approximately 20 m exposed, with tide in flood during survey. Scattered showers.								

VPD	10:30	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Gulls largely loafing on shoreline with some foraging. Great Crested Grebe foraging. Little Egret foraging in both salt marsh habitat and shoreline.	Shoreline exposure that of low tide conditions, approximately 40-70 m max exposed, with tide in flood during survey. Eight Curlew foraging and one Snipe foraging in agricultural field to southeast of VP. Scattered showers.
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Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Gentle Breeze	Moderate Breeze	Gentle Breeze	Fresh Breeze	Cloud	Sunny	Sunny	Scattered Clouds	Scattered Clouds
			Sea (Douglas)	Smooth	Smooth	Slight	Slight	Temp.	5°C	5°C	3°C	4°C
Date: 15/11/2019		Tide: Low 13.39 (0.6m) & High 07.40 (5.2m)	Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							

VPA	11:45	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline.	Low tide, approximately 40-50 m exposed, with tide ebbing during survey. Forager on beach prior to arrival and remained for the duration of the survey period.
		Loons foraging within water.	Peregrine Falcon (<i>Falco peregrinus</i>) noted drinking water from the stream to the east of the study area.
VPB	12:55	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Gulls foraging over water.	Low tide , approximately 40-50 m exposed, with tide ebbing during survey.
VPC	09:00	Gulls foraging on water top. Oystercatcher briefly loafing non shoreline before flying west. Great Northern Diver foraging.	High tide, approximately 15 m exposed, with tide ebbing during survey.
VPD	10:40	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Black Guillemot foraging. Great Crested Grebe foraging. Little Egret loafing shoreline. Teal loafing in salt marsh.	High tide, approximately 15 m exposed, with tide ebbing during survey. Cattle on eastern section of shoreline at beginning of survey. Harbour Seal (<i>Phoca vitulina</i>) hauled out on rocky outcrop.

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Breeze	Light Air	Light Air	Light Breeze	Cloud	Sunny	Sunny	Lightly Cloudy	Lightly Cloudy
			Sea (Douglas)	Smooth	Calm (rippled)	Calm (rippled)	Smooth	Temp.	5°C	6°C	11°C	8°C
Date: 19/11/2019		Tide: Low 16.50 (1.5m) & High 10.36 (4.2m)		Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	09:15	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Black-headed Gulls foraging within water. Great Northern Diver foraging.			High tide, approximately 10 m exposed, with tide in flood during survey. Curlew foraging in field east of shoreline. Dog walker on beach for approximately 15 minutes, half an hour into survey period. Flushed Oystercatcher and Turnstone from site. Harbour Seal (<i>Phoca vitulina</i>) noted playing with fishing bouy within study area. Wigeon foraging and loafing near stream confluence to eastern section of site.							
VPB	10:20	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline.			High tide, approximately 5-15 m exposed, with tide in flood during survey.							
		Gulls foraging over water. Great Northern Diver foraging.			11.08 fishing vessels arrives onsite and proceeds to collect pots. Remains for survey period. 50-100m from shoreline. Harbour Seal (<i>Phoca vitulina</i>) commuting through site.							
VPC	13:15	Great Northern Diver, Red-throated Diver and Great Crested Grebe foraging.			High tide, approximately 15 m exposed, with tide ebbing during survey.							

VPD	11:40	<p>Oystercatcher foraging on shoreline but flushed from site on arrival.</p> <p>Black-headed Gulls roosting on shoreline.</p> <p>Wigeon loafing on water.</p> <p>Grey Plover and Dunlin loafing on rock outcrop on eastern boundary of study area.</p> <p>Redshank foraging along shoreline and within salt marsh.</p> <p>Black Guillemot, Cormorant and Great Crested Grebe foraging.</p>	<p>High tide approximately 5-15 m max exposed, with tide ebbing during survey.</p> <p>11.58 Cattle enter field along southern periphery of salt marsh habitat.</p> <p>Harbour Seal (<i>Phoca vitulina</i>) hauled out on rocky outcrop.</p> <p>Sixteen Curlew noted foraging in field south of salt marsh, flushed by cattle.</p>
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Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019		Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
		Wind (Beaufort)	Light Air	Light Breeze	Light Air	Light Breeze	Cloud	Scattered Clouds	Scattered Clouds	Scattered Clouds	Scattered Clouds
		Sea (Douglas)	Calm (rippled)	Calm (rippled)	Calm (rippled)	Smooth	Temp.	5°C	6°C	3°C	6°C
Date: 03/12/2019		Tide: Low 15.40 (1.1m) & High 09.22 (4.7m)		Rain	Dry	Dry	Dry	Visibility	Good	Good	Good
Vantage Points	Start time	Bird Behaviour		Notes							
VPA	10:55	Grey Plover roosting on outcrop at western boundary of site. Oystercatcher, Curlew, Ringed Plover and Turnstone roosting in eastern section of shoreline, i.e. near stream. Wigeon loafing on water and foraging at mouth of stream. Gulls loafing on water top. Black Guillemot and Great Northern Diver foraging.		High tide, approximately 15 m exposed, with tide ebbing during survey. Three cattle briefly on shoreline.							
VPB	12:05	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline. Gulls foraging over water. Great Northern Diver foraging.		High tide, with tide ebbing during survey. 12.25 fishing vessels passing through site. Harbour Seal (<i>Phoca vitulina</i>) commuting through site.							
VPC	09:30	Great Northern Diver and Red-throated Diver foraging. Little Egret foraging along shoreline. Gulls loafing on water top. Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline.		High tide approximately 15 m exposed, with tide slack during survey.							

VPD	13:15	Common Gulls loafing on shoreline. Brent Geese foraging and loafing on shoreline and loafing on water. Little Egret loafing on shoreline Black Guillemot and Great Crested Grebe foraging.	High tide, approximately 20-30 m max exposed, with tide ebbing during survey. Cattle moved along shoreline, in eastern section of study area, at the beginning of the survey period. Harbour Seal (<i>Phoca vitulina</i>) hauled out on rocky outcrop. Sixteen Curlew noted foraging in field south of salt marsh. Thirteen Lapwing noted in field to east of study area. Otter spraint and badger tracks recorded within study area.
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Shannon Technology and Energy Park Winter Bird Survey – Fields Notes October 2019 to December 2019			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Gentle Breeze	Light Breeze	Light Breeze	Gentle Breeze	Cloud	Lightly Cloudy	Cloudy	Cloudy	Lightly Cloudy
			Sea (Douglas)	Smooth	Calm (rippled)	Calm (rippled)	Smooth	Temp.	6°C	7°C	8°C	6°C
Date: 09/12/2019		Tide: Low 09.55 (1.1m) & High 16.11 (4.8m)		Rain	Dry	Dry	Dry	Visibility	Good	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	10:15	Waders displaying a mix of interchangeable behaviours i.e. loafing and foraging behaviour on shoreline.			Low tide approximately 40 m exposed, with tide ebbing during survey. Dog walker on shoreline prior to arrival. Four dead calves washed up on shoreline. Presumably due to storm previous night							
VPB	12:45	Turnstone loafing on shoreline.			Lo, approximately 40 m exposed, with tide noted to be in flood during survey.							
		Red-throated Diver and Common Guillemot foraging.			12.25 fishing vessels passing through site. Harbour Seal (<i>Phoca vitulina</i>) commuting through site.							
VPC	14:05	Red-throated Diver foraging. Great Black-back Gull and Oystercatcher loafing on shoreline.			High tide, approximately 15 m max exposed, with tide in flood during survey.							
VPD	11:30	Gulls predominately loafing on water top, some foraging noted. Curlew and Snipe foraging within salt marsh. Oystercatcher foraging along shoreline. Great Crested Grebe foraging.			Low tide, approximately 40 m max exposed, with tide in flood during survey. Harbour Seal (<i>Phoca vitulina</i>) hauled out on rocky outcrop.							

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes January 2020-March 2020			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Gentle Breeze	Light Breeze	Light Breeze	Gentle Breeze	Cloud	Cloudy	Cloudy	Cloudy	Lightly Cloudy
			Sea (Douglas)	Smooth	Calm (rippled)	Calm (rippled)	Smooth	Temp.	6°C	7°C	8°C	6°C
Date: 22/01/2020		Tide: Low 05:00 (1.7m) & High 11:30 (4.6m)		Rain	Dry	Dry	Dry	Dry	Visibility	Poor	Poor	Poor
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	10:15	Great crested grebe and cormorants foraging along coastal waters, quite far inland.			Still day. Black headed Gulls overflying throughout							
VPB	12:45	Turnstone loafing on shoreline. Oystercatcher foraging along margins of the bay			High tide conditions. Approximately 15 m exposed.							
VPC	14:05	Red-throated Diver foraging. Black-headed gull, small flock, loafing on water.			High tide, approximately 15 m max exposed on ebbing tide							
VPD	11:30	Curlew, Snipe and Little Egret foraging within salt marsh. Oystercatcher foraging along shoreline. Great Crested Grebe foraging near shore			High tide conditions. Grebe foraging close to shore.							

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes January 2020-March 2020			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Moderate Breeze	Moderate Breeze	Moderate Breeze	Moderate Breeze	Cloud	Cloudy	Cloudy	Cloudy	Cloudy
			Sea (Douglas)	Moderate	Moderate	Moderate	Moderate	Temp.	9°C	9°C	9°C	9°C
Date: 30/01/2020		Tide: Low 09:11 (1.42m) & High 15:50 (4.41m)		Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	10:30	Bird activity levels generally low.			Low tide, flooding tide. Curlew noted. Otter noted moving along upper shoreline							
VPB	01:00	Oystercatcher foraging along shoreline. Northern diver foraging of shore.			Moderate breeze and low levels of activity.							
VPC	14:30	Oystercatcher noted.			Approaching high tide. Numbers generally low.							
VPD	12:00	Curlew, Snipe and Little Egret foraging within salt marsh. Large flocks of wigeon Common gull roosting on shoreline			Low tide.							

Shannon Technology and Energy Park Winter Bird Survey – Fields Notes January 2020-March 2020			Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
			Wind (Beaufort)	Light Air	Light Breeze	Light Air	Light Breeze	Cloud	Overcast	Overcast	Overcast	Overcast
			Sea (Douglas)	Smooth	Smooth	Smooth	Smooth	Temp.	8°C	8°C	38C	8C
Date: 23/02/2020		Tide: Low 11.46 (0.73m) & High 5.55pm (4.69m)		Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good
Vantage Points	Start time	Bird Behaviour			Notes							
VPA	12.25	Cormorant and Great crested grebe loafing in bay. Meadow pipits displaying in grassland. Common gulls loitering and foraging at eastern section of shoreline, i.e. near stream, with Brent geese, widgeon and oystercatcher.			Low tide, flooding tide							
VPB	13.30	Rock pipits displaying breeding behaviour on rocks. Red throated Divers foraging in bay.			Low tide, flooding tide							
VPC	16.45	Wigeon loafing at shore, and Red throated Diver.			High tide, ebbing tide.							

VPD	15.15	Turnstone loafing at shoreline. 100 Brent geese loafing to west. A mixed flock of waders loafing on shoreline- 260 Dunlin, with occasional ringed plover and Redshank. Regularly spooked by rooks from fields to the south. Approximately 40% of this flock flew east at 16.00	45 Curlew noted foraging in field south of salt marsh. A concentration of bird activity of common gulls and waders was associated with mudflats and river/stream estuary to the southwest.
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		Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
Shannon Technology and Energy Park Winter Bird Survey – Fields Notes January 2020-March 2020		Wind (Beaufort)	Moderate breeze	Moderate breeze	Moderate breeze	Moderate breeze	Cloud	Rain	Showers and sun	Broken cloud	Broken coud
		Sea (Douglas)	Moderate	Moderate	Moderate	Moderate	Temp.	8°C	8°C	38C	8C
Date: 24/02/2020	Tide: Low 11.46 am (0.73m) & High 5.55pm	Rain	Consistent rain	Dry	Dry	Dry	Visibility	Moderate	Good	Good	Good
Vantage Points	Start time	Bird Behaviour		Notes							
VPA	09:00	Common and Black headed gulls loitering and foraging at eastern section of shoreline, i.e. near stream.		Sea state made it difficult to observe birds on water.							
VPB	10.05	Most bird flight very close to shore or overland.		Low tide, ebbing tide							
VPC		Not completed									

VPD	11.10	Group of black headed gulls foraging along shoreline.	Low tide, slack. 25 Curlew with 8 Starling foraging in field to southwest.
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		Weather	VPA	VPB	VPC	VPD	Weather	VPA	VPB	VPC	VPD
Shannon Technology and Energy Park Winter Bird Survey – Fields Notes January 2020-March 2020		Wind (Beaufort)	Light Breeze	Light Breeze	Light Breeze	Light Breeze	Cloud	Cloudy	Cloudy	Cloudy	Cloudy
		Sea (Douglas)	Slight	Slight	Slight	Slight	Temp.	6°C	6°C	7°C	7°C
Date: 31/03/2020	Tide: Low 17.02 (0.73m) & High 11.10	Rain	Dry	Dry	Dry	Dry	Visibility	Good	Good	Good	Good
Vantage Points	Start time	Bird Behaviour		Notes							
VPA	12:00	Northern Diver foraging close to shore Ringed plover X 3 on shoreline		High tide, ebbing. Moorhen using lagoon							
VPB	11.10	Great Crested Grebe foraging Red Throated Diver foraging.		High tide, slack Shelduck (2) overflying							
VPC	10:00	Lesser black-backed gull on water Northern diver on water approximately 200 metres offshore		Bird numbers low							
VPD	13:30	Golden plover flock noted foraging and roosting. Little Egret feeding in wetland habitats and canals		High tide, ebbing. Disturbance by farmer and dog working close to high tide line							

Shannon LNG Bird Survey – Fields Notes June 2021	Weather	VPA	VPB	VPC	VPD	Weather	VPE	VPF		
	Wind (Beaufort)	2 Light Breeze	2 Light Breeze	2 Light Breeze	1 Light Air		1 Light Air	1 Light Air		

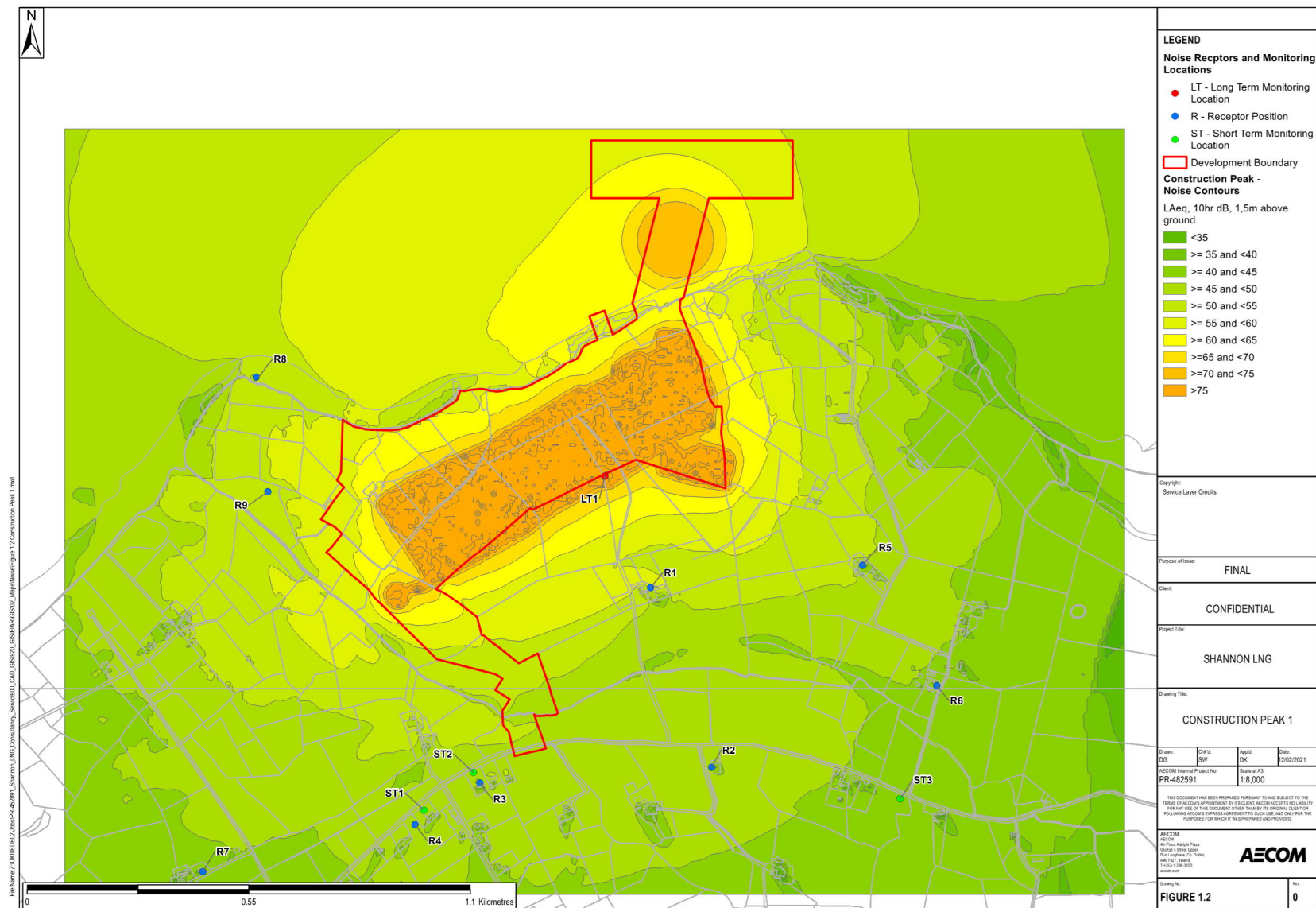
		Sea (Douglas)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)		Calm (Rippled)	Calm (Rippled)		
Date: 28/05/2021	Tide: Fri 28 01:25 0.1m 07:44 5.0m 13:46 0.4m 20:07 5.1m	Rain	None	None	None	None		None	None		
Vantage Points	Start time	Bird Behaviour		Notes							
VPA	6:10 p.m.	House Martins and Sandmartins foraging over reed beds and along lagoon shoreline. Most gulls recorded in flight; Lesser Black Backed Gull observed loafing briefly.									
VPB	5:00 p.m.	Terns vocalising while in flight, Great Black Backed gull loafing and foraging within 10 m of shoreline.									
VPC	3:50 p.m.	Rock pipits foraging on rocky shoreline, giving alarm call regularly. Egret and Heron both observed foraging on shoreline before taking flight.									
VPD	7:15 p.m.	Black guillemot recorded loafing 1000 m approximately from shore, all other birds observed in flight									
VDE	2:45 p.m.	Four Ravens vocalising while flying over.									
VDF	1:30 p.m.	Turnstone and Egret foraging on rocky shoreline, Lesser Black Backed Gulls observed loafing.		Seal observed bottling at surface with prey and feeding.							

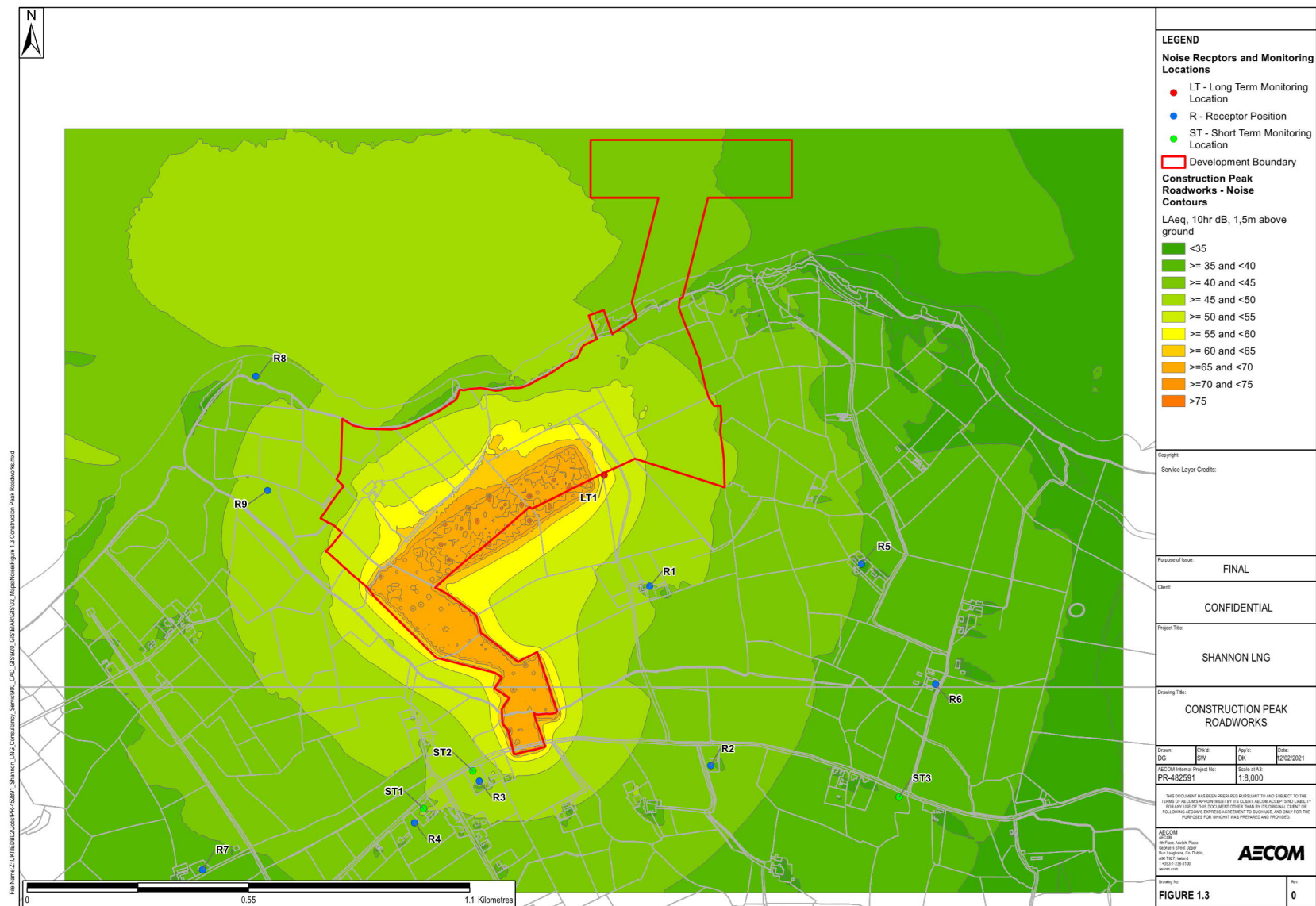
Shannon LNG Bird Survey – Fields Notes June 2021		Weather	VPA	VPB	VPC	VPD	Weather	VPE	VPF		
		Wind (Beaufort)	2 Light Breeze	2 Light Breeze	2 Light Breeze	1 Light Air		1 Light Air	1 Light Air		
		Sea (Douglas)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)		Calm (Rippled)	Calm (Rippled)		
Date: 30/06/2021	Tide: Wed 30 04:17 0.8m 10:49 4.2m 16:41 1.2m 22:59 4.3m	Rain	None	None	None	None		None	None		
Vantage Points	Start time	Bird Behaviour		Notes							
VPA		Water Rail and Moorhen audible from reed beds. Turnstone and rock pipit foraging on the lagoon.									
VPB		Whimbrel foraging on stony shoreline.									
VPC											
VPD		All birds observed in flight.									
VPE		Turnstones foraging on rocky shoreline, shelduck loafing.									
VPF											

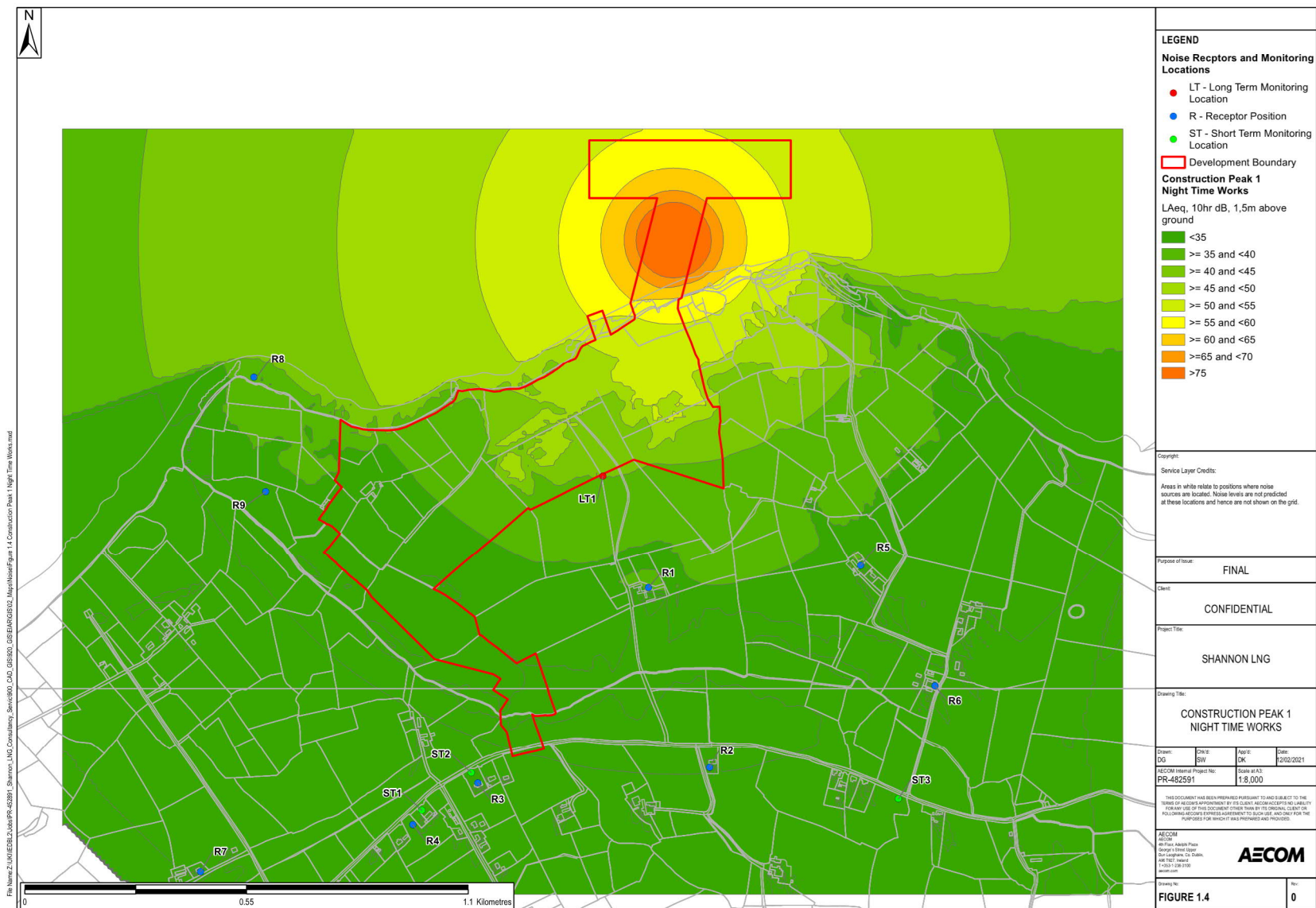
Shannon LNG Bird Survey – Fields Notes June 2021		Weather	VPA	VPB	VPC	VPD	Weather	VPE	VPF		
		Wind (Beaufort)	2 Light Breeze	2 Light Breeze	2 Light Breeze	2 Light Breeze		2 Light Breeze	2 Light Breeze		
		Sea (Douglas)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)	Calm (Rippled)		Calm (Rippled)	Calm (Rippled)		
Date:	Tide: Mon 19 01:19 4.2m 07:28 1.2m	Rain	None	None	None			None	None		

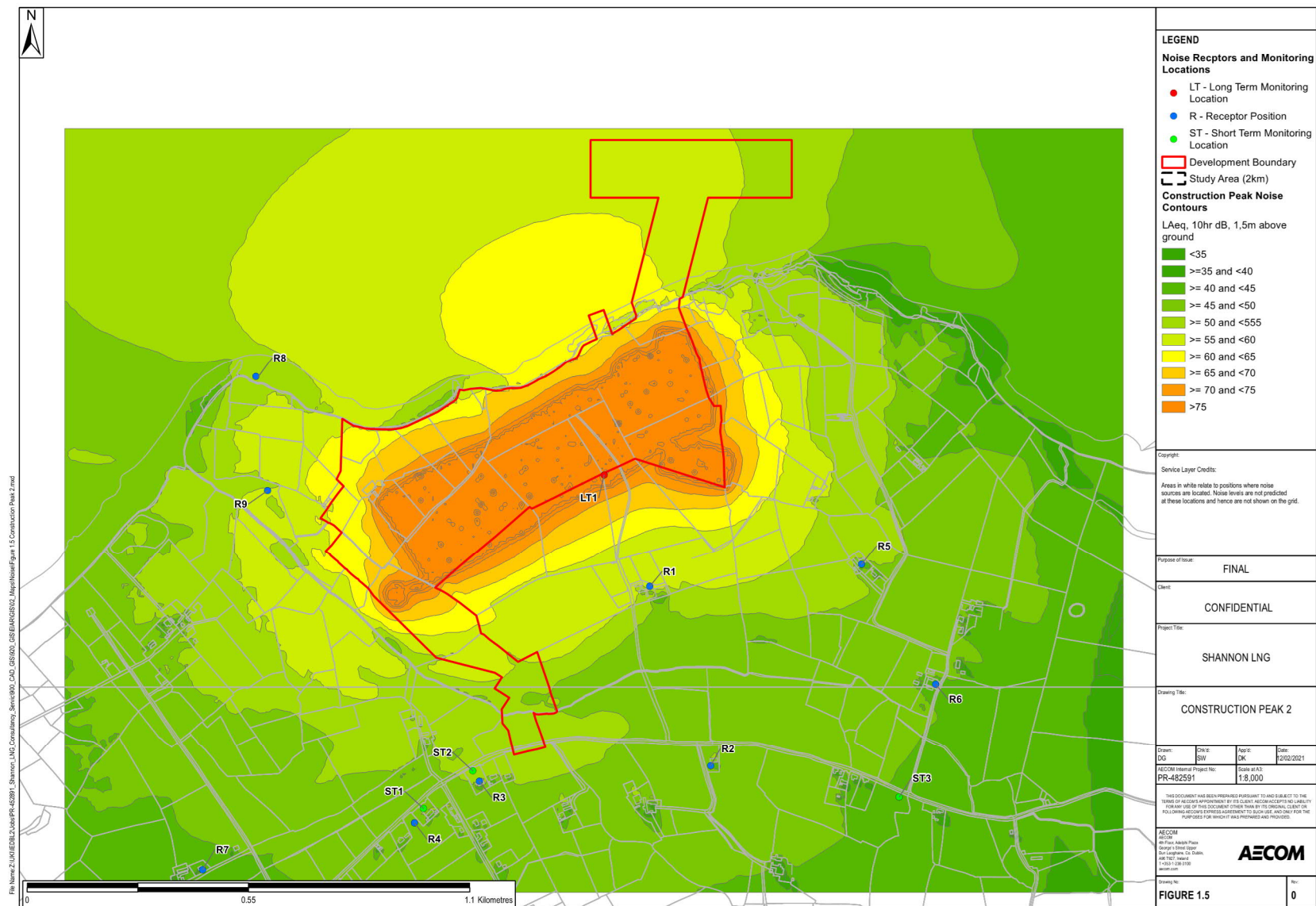
19/07/21(A,B,D)- 20/07/21(C,E,F)		14:13 4.2m 20:14 1.3m Tue 20 02:32 4.2m 08:40 1.2m 15:20 4.4m 21:28 1.1m										
Vantage Points	Start time	Bird Behaviour	Notes									
VPA	4:30 p.m.	All birds observed in flight										
VPB	5:30 p.m.	Black headed gull and common gull loafing, turnstones foraging on shoreline. All other birds observed in flight.										
VPC	7:25 p.m.	All birds observed in flight.	Low heavy cloud cover approaching, temperature declining.									
VPD	3:30 p.m.	Great Crested Grebe observed loafing, five Cormorants drying on rocky shoreline to the west, juvenile lesser black backed gull foraging on beach, Hen Harrier observed flying low above reed beds then landing into the reeds before being disturbed by dogs and flying west.										
VPE	6:05 p.m.	All birds observed in flight										
VPF	5:00 p.m.	All birds observed in flight										

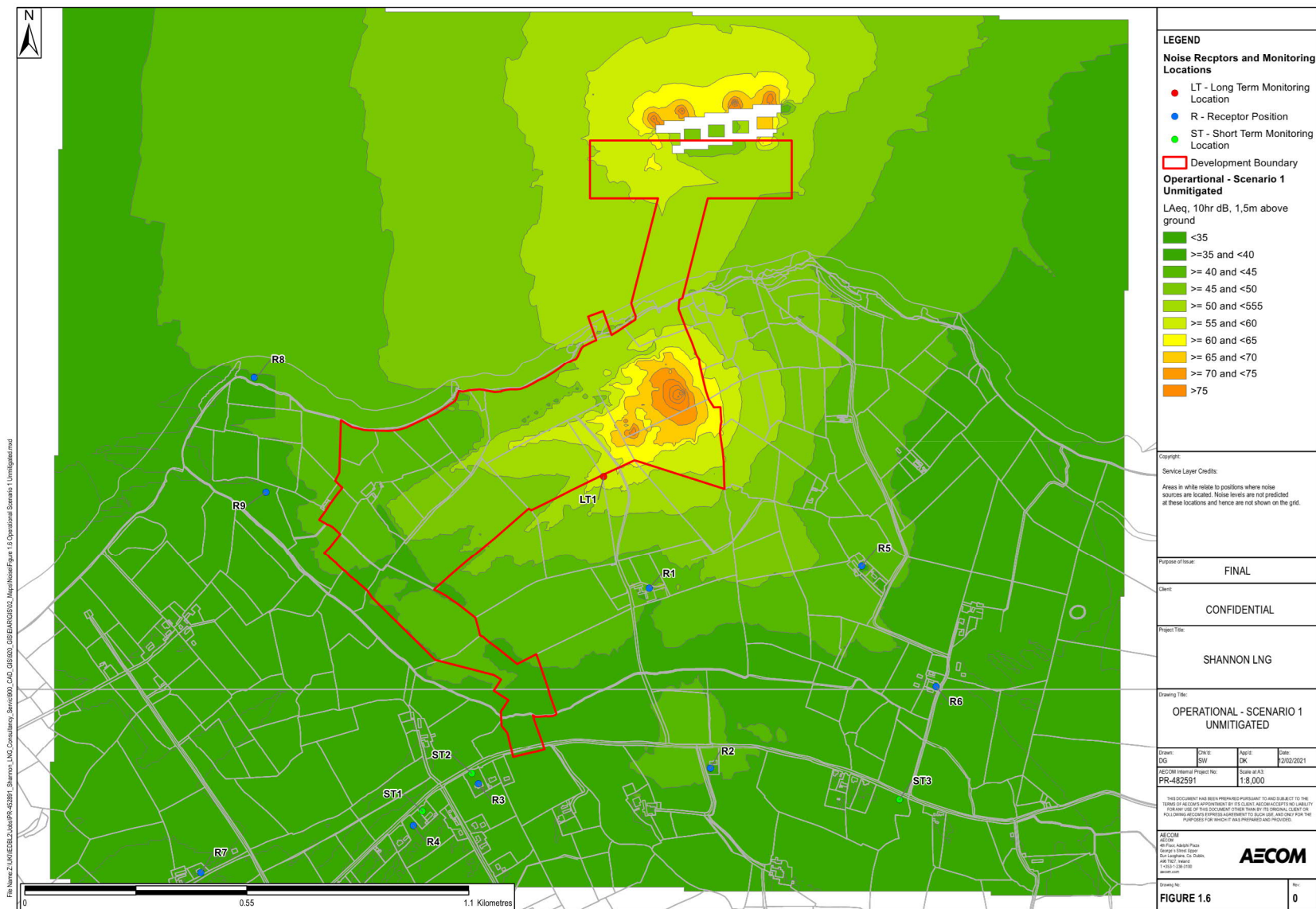
Appendix 5. Noise Contour Modelling

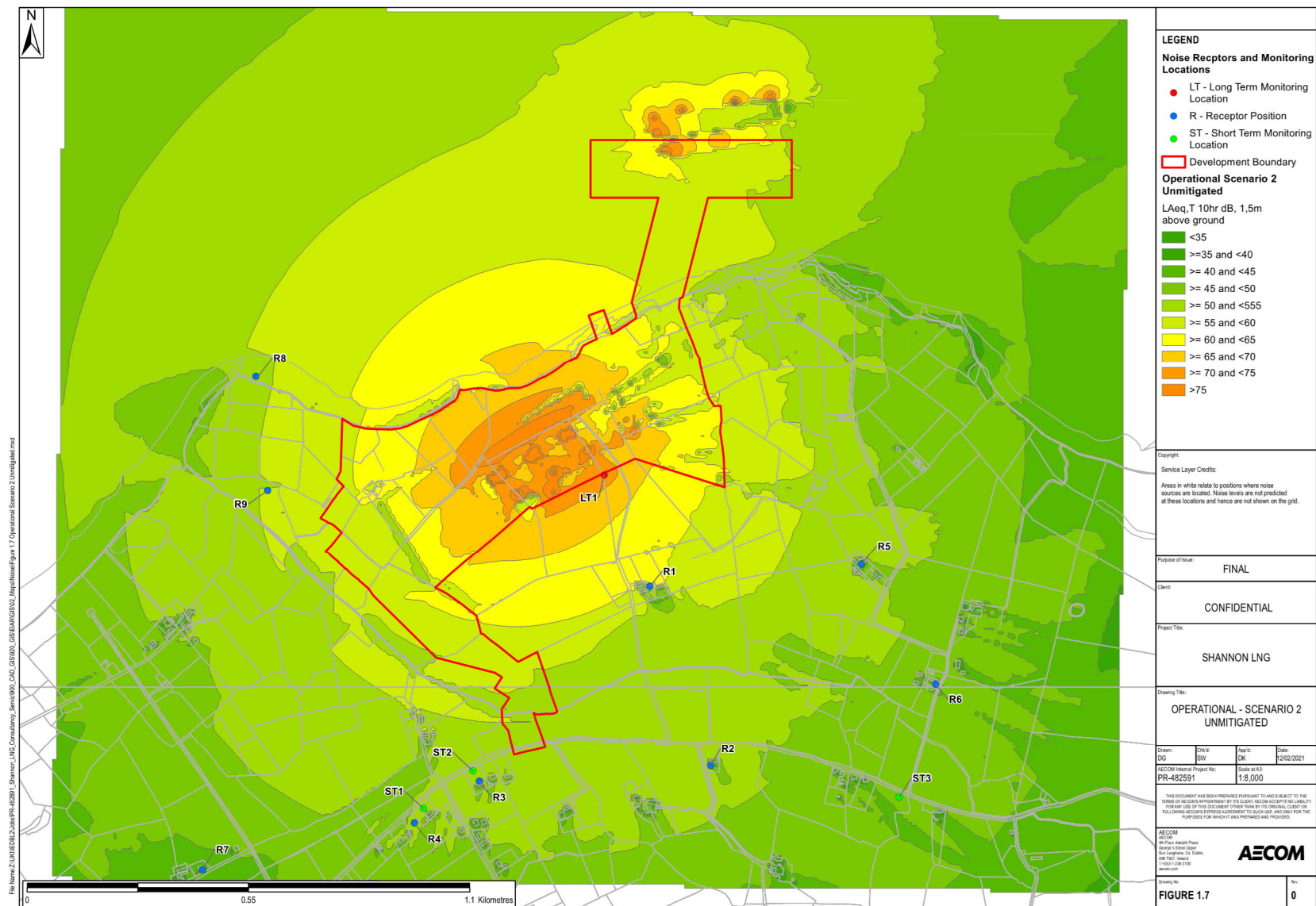




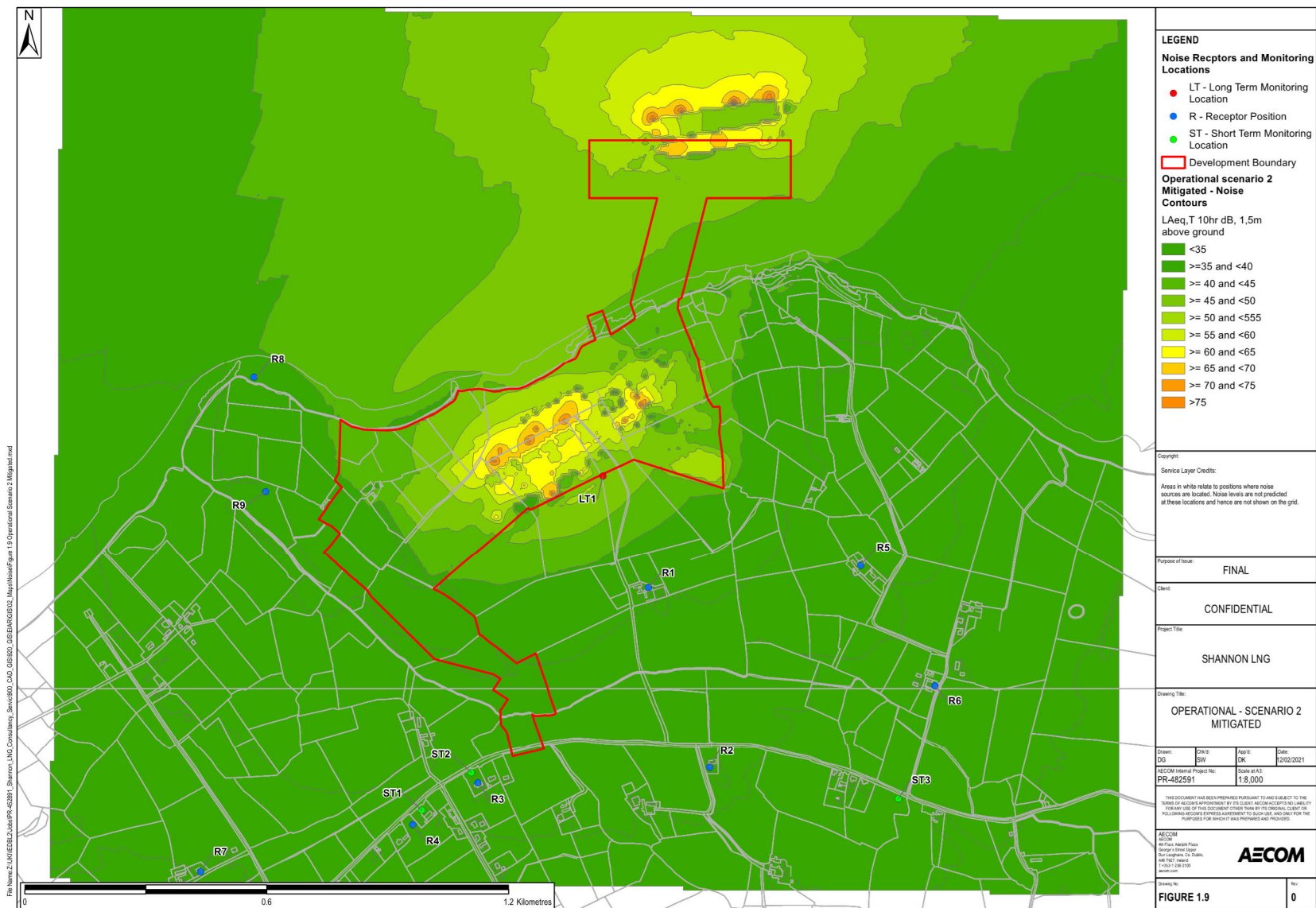












B. Breeding Bird Surveys

DixonBrosnan
environmental consultants

Shannon Technology and Energy Park (STEP) Power Plant

Breeding Bird Report

April 2024

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Project	Shannon Technology and Energy Park (STEP) Power Plant Breeding Bird Report	
Client	New Fortress Energy	
Project Ref.	24024	
Report No.	24024.01	
Client Ref.	-	
Date	Revision	Prepared By
06/03/24	1 st Draft	Sorcha Sheehy BSc PhD
03/04/24	Issue to client	Carl Dixon BSc MSc
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1. Introduction

1.1 Project Background

DixonBrosnan Environmental Consultants were commissioned by New Fortress Energy to survey the lands within and in the vicinity of the Proposed Development site for breeding birds. The Proposed Development consists of a Power Plant together with associated infrastructure on an approximately 41ha area in the northeast of the overall 243ha landbank. The Proposed Development site consists of grassland on the southern shores of the Shannon Estuary and is surrounded by a mixture of agricultural land, rural housing, public roads and the Shannon Estuary.

The information in this report has been used to help determine the impacts on bird populations and also inform the conclusions of the Environmental Impact Assessment Report (EIAR) for the Proposed Development. Details of the study area are included in **Appendix 1**.

This report presents the results of breeding bird surveys conducted during the 2023 breeding season. The objective of the survey was to identify breeding bird activity within the planning boundary.

This report has been written in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) *Guidelines for Ecological Report Writing* (CIEEM 2017).

The aim of this report is to provide a description of the bird survey methods used; to provide the results of breeding bird surveys; and to provide an interpretation of the results.



Figure 1. Overview of proposed development site | Source AECOM

1.2 Location

The Proposed Development will be located on the Shannon Estuary, approximately 4.5 km from Tarbert and 3.5 km from Ballylongford, Co. Kerry. Tarbert Power Station is located approximately 5 km to the north-east of the Site. Moneypoint Power Station located on the northern shore of the Shannon Estuary, approximately 3 km to the north of the Site.

There are a small number of residential properties located within 500 m of the Site. Residential properties are also located along the existing L1010 road (Coast Road) immediately south of the Site, with additional residential properties, again to the south of the Site, to the east and west along the L1010 road.

The area of the Site to be developed is characterised by predominantly improved grassland in an agricultural setting. The field boundaries predominantly consist of hedgerows with small drainage ditches. The Site is in pasture, comprising primarily improved grassland with some wet grassland adjacent to the Shannon Estuary,

1.3 Conservation Status

The breeding bird study area, focused on terrestrial habitats within the Proposed Development site and does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC) or candidate Special Area of Conservation (cSAC), Nature Reserve, or National Park. It is noted that marine elements of the Proposed Development i.e. jetty and access trestle, overlap with estuarine habitats within the SAC and SPA. The River Shannon and River Fergus Estuaries form the largest estuarine complex in Ireland and the complex spans three counties, Clare (north shore), Limerick and Kerry (southern shoreline). The value of the site has been recognised at an international level, with some 32,000 hectares designated as the River Shannon and River Fergus Estuaries SPA (Site Code 4077) under the EU Bird's Directive. Details of surveys for winter birds within the estuarine habitats to the north of the Proposed Development site have been included in the *Shannon Energy and Technology Park Estuarine Bird Report* (DixonBrosnan 2024) which has been included in EIAR **Appendix 7B-3 of Volume 4**. It is noted that breeding and wintering Cormorants *Phalacrocorax carbo* are listed as a special conservation interested (SCI) for the SPA. However no breeding Cormorant were recorded within the Proposed Development site and the small trees within the site are not suitable for nesting or roosting Cormorant.

The conservation status of bird species in Ireland can be assigned in relation to inclusion on various schedules or annexes of national or European legislation or on relevant conservation lists. A species is considered to be of "conservation concern" if it is included on one or more of the following:

- Annex I of the EU Birds Directive (2009/147/EC);
- Part 1 of the Fourth Schedule of the Wildlife Act 1976 (as amended), and
- Birds of Conservation Concern in Ireland (BoCCI) Red or Amber list (Gilbert *et al.* 2021). Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List

bird species are of high conservation concern and the Amber List species are of medium conservation concern. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable.

1.4 Authors of Report

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

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

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

Tara Challoner MSc (Ecology) is an experienced ecologist with expertise in habitat evaluation and botanical surveys in particular, as well as breeding and wintering bird surveys. She has prepared AA/NIS/habitat reports for a range of projects including wind farm and industrial developments and housing and recreational facilities in sensitive areas

2. Methodology

2.1 Breeding bird surveys

The breeding bird survey was based on the BTO Common Bird Census (CBC) methodology (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) which aims to capture a snapshot of breeding bird activity within the study area.

The study area focused on terrestrial habitats within the Proposed Development site. The aim of the breeding bird surveys was to identify any valuable bird habitats within the Site boundary and to identify birds present within the Proposed Development site and surrounding landscape. This survey area encompassed terrestrial habitats along the survey route including hedgerows, treelines and agricultural fields.

Breeding bird surveys were carried out on the 27th of March 2023, 30th of April 2023, 12th May 2023 and 29th of June 2023 (**Table 2**). DixonBrosnan previously carried out breeding bird surveys at the site in 2019 and 2020 and the results of these surveys are also detailed in this report.

During breeding bird surveys the site was walked so that all habitats within 50m of potential nesting features were surveyed. A map illustrating the routes followed and sites visited for the purposes of the survey can be found in **Appendix 1** of this report. The ornithological surveyor slowly walked through the Site, stopping at regular intervals to scan with binoculars and to listen for bird calls or song. Birds were identified by sight and song, and observations were plotted on a map. Survey visits were made in the early morning to coincide with the peak period of bird activity and all species seen or heard in the study area and immediate environs were recorded including those in flight. Visits were made during favourable weather conditions.

All species encountered during the survey were mapped and coded using standard BTO species codes and activity recorded using the BTO codes for breeding evidence (**Appendix 2**). In an effort to minimise potential disturbance, no attempts were made to locate nests as such behaviours are generally sufficient to determine probable or confirmed breeding.

2.2 Historical Breeding Data of Species of Conservation Concern

Corncrake *Crex crex*, Grey Partridge *Perdix perdix*, Curlew *Numenius arquata*, Barn Owl *Tyto alba* and Yellowhammer *Emberiza citrinella* have historically bred within 10km of the Proposed Development site (Sharrock 1976, Gibbons *et al.* 1993). A national survey of breeding Hen Harriers *Circus cyaneus* in Ireland in 2015 and 2022, recorded no evidence of breeding Hen Harriers in the 10km grid square containing the Proposed Development (Ruddock *et al.* 2016; Ruddock *et al.* 2024).

It is noted that a juvenile Hen Harrier was recorded over the reed bed habitat to the west of the Site on the 19th of July 2021). However, there is no high value foraging or suitable breeding habitat for this species within the Site boundary and there are no records of breeding Hen Harrier within 10km of the Site boundary. The habitats within the Proposed Development site do not provide suitable breeding or foraging habitat for Hen Harrier.

It is noted that a number of juvenile White-Tailed Sea Eagles *Haliaeetus albicilla* have been released in the Tarbert area (Allan Mee, personal communication). White-tailed Sea Eagle have a foraging range of up to 250km² (Evans *et al.* 2011). During the February 2023 winter bird surveys a single bird was observed overflying the estuary from a vantage point at Knockfinglas Point.

2.3 NBDC Records

The National Biodiversity Centre (NBDC) online database lists 132 species of bird recorded within grid square R04. Of these species, a number are listed under Annex I of the Birds Directive and are Red Listed Birds of Conservation Concern in Ireland (Gilbert *et al.* 2021) (Table 1).

Table 1. Bird species listed under Annex I of the Birds Directive and/or classified as Red Listed Birds of Conservation Concern in Ireland recorded within grid square R04

Species	Annex I	Red List
Bar-tailed Godwit (<i>Limosa lapponica</i>)	X	
Barn Owl (<i>Tyto alba</i>)		X
Black-tailed Godwit (<i>Limosa limosa</i>)		X
Common Goldeneye (<i>Bucephala clangula</i>)		X
Common Kestrel (<i>Falco tinnunculus</i>)		X
Common Kingfisher (<i>Alcedo atthis</i>)	X	
Common Redshank (<i>Tringa totanus</i>)		X
Common Snipe (<i>Gallinago gallinago</i>)		X
Common Swift (<i>Apus apus</i>)		X
Common Tern (<i>Sterna hirundo</i>)	X	
Corn Crake (<i>Crex crex</i>)	X	X
Dunlin (<i>Calidris alpina</i>)	X	
Eurasian Curlew (<i>Numenius arquata</i>)		X
Eurasian Oystercatcher (<i>Haematopus ostralegus</i>)		X
Eurasian Woodcock (<i>Scolopax rusticola</i>)		X
European Golden Plover (<i>Pluvialis apricaria</i>)	X	X
European Nightjar (<i>Caprimulgus europaeus</i>)	X	X
Great Northern Diver (<i>Gavia immer</i>)	X	
Grey Partridge (<i>Perdix perdix</i>)		X
Grey Plover (<i>Pluvialis squatarola</i>)		X
Hen Harrier (<i>Circus cyaneus</i>)	X	
Little Egret (<i>Egretta garzetta</i>)	X	
Mediterranean Gull (<i>Larus melanocephalus</i>)	X	
Merlin (<i>Falco columbarius</i>)	X	
Northern Lapwing (<i>Vanellus vanellus</i>)		X
Northern Shoveler (<i>Anas clypeata</i>)		X
Peregrine Falcon (<i>Falco peregrinus</i>)	X	
Red Grouse (<i>Lagopus lagopus</i>)		X
Red Knot (<i>Calidris canutus</i>)		X
Red-throated Diver (<i>Gavia stellata</i>)	X	
Ruff (<i>Philomachus pugnax</i>)	X	
Sandwich Tern (<i>Sterna sandvicensis</i>)	X	
Whooper Swan (<i>Cygnus cygnus</i>)	X	
Yellowhammer (<i>Emberiza citrinella</i>)		X

Source NBDC 12/02/24

2.3 Previous Surveys

2.3.1 Cork Ecology 2006/2007

Winter bird surveys were carried out by Cork Ecology at the Proposed Development site between October 2006 and March 2007 (Refer to EIAR **Appendix 7B-3 of Volume 4** for further detail). As the main focus of this study was on distribution of wildfowl, waders and gulls in the coastal areas of the site in winter, a specific breeding bird survey was not conducted. However, all terrestrial bird species observed/heard during the winter months were recorded and are detailed in the report. Thirty-one bird species were recorded within the site boundary between October 2006 and March 2007, mostly along the hedgerows bordering fields. Two Red List species (Gilbert *et al.* 2021) were recorded during these site visits i.e., Meadow Pipit *Anthus pratensis* and Redwing *Turdus iliacus*.

2.3.2 DixonBrosnan 2019/2020

DixonBrosnan carried out breeding bird surveys at the proposed development site in 2019 and 2020. The survey area consisted primarily of a block of improved and semi-improved grassland, which runs along the southern shore of the Shannon Estuary. The shoreline to the west of this block of land was relatively sheltered and consists of shingle or low earthen cliffs. The farmland within the Proposed Development site was used primarily for grazing in the westerly fields and for production of hay/silage in the larger drier fields to the east. The intensity of agricultural management varied across the site. A small area of reed bed and lagoon habitat was located on the western edge of the study area, approximately 400m west of the Proposed Development site boundary.

A total of 37 species were recorded during the 2019/2020 breeding bird surveys (**Table 2**). One Annex I species, Little Egret *Egretta garzetta*, was recorded within the study area. Four species are classified as Red List species (Meadow Pipit, Merlin *Falco columbarius*, Quail *Coturnix coturnix* and Stock Dove *Columba oenas*). A male Quail was recorded within wet grassland at the Site on one occasion. However, no signs of breeding were recorded and this is likely to be a migrant species passing through the Site. Eleven Amber List species of conservation concern were also recorded during breeding bird surveys (Black-headed Gull *Larus ridibundus*, Herring Gull *Larus argentatus*, House Sparrow *Passer domesticus*, Linnet *Linaria cannabina*, Mallard *Anas platyrhynchos*, Shelduck *Tadorna tadorna*, Skylark *Alauda arvensis*, Starling *Sturnus vulgaris*, Swallow *Hirundo rustica* and Willow Warbler *Phylloscopus trochilus*).

While only three species were confirmed to be breeding, the majority of terrestrial species recorded are likely to breed within the area surveyed, with the exception of Quail. Quail was recorded during the April 2020 site survey. There are no records of breeding Quail in North Kerry. A single bird was recorded, with no signs of breeding and this was likely to be a migrant bird on passage. A single Woodcock *Scolopax rusticola*, also a Red List species, was also recorded on a trail camera recording during January 2020, although no sign of this species was recorded during breeding surveys. It is noted that the Red List species Snipe *Gallinago gallinago* were not recorded during the breeding bird survey but were recorded on a number of occasions during winter bird surveys at the site (Refer to EIAR **Appendix 7B-3 of Volume 4**). Snipe could potentially breed in wet grassland or less intensely managed agricultural grassland at the west of the Proposed Development site.

It is noted that Little Egret was recorded within the salt marsh habitat which is located outside the Proposed Development site boundary. A Merlin was recorded foraging to the east of the Site, near coniferous woodland. However, no signs of breeding Merlins were recorded within the Site boundary.

Table 2. Bird species recorded during 2019 and 2020 breeding bird surveys

Species		Breeding Status	Estimated number of territories	Conservation Status: Annex I of Birds Directive or Red/Amber List*
Black-headed Gull	<i>Larus ridibundus</i>	Possible	0	Amber List
Blackbird	<i>Turdus merula</i>	Possible	Several	
Blackcap	<i>Sylvia atricapilla</i>	Possible	2	
Blue tit	<i>Cyanistes caeruleus</i>	Possible	2	
Bullfinch	<i>Pyrrhula pyrrhula</i>	Possible	1	
Chaffinch	<i>Fringilla coelebs</i>	Possible	7	
Collared dove	<i>Streptopelia decaocto</i>	Possible	1	
Goldfinch	<i>Carduelis carduelis</i>	Possible	1	
Great Tit	<i>Parus major</i>	Possible	Several	
Grey Heron	<i>Ardea cinerea</i>	Possible	0-1	
Herring Gull	<i>Larus argentatus</i>	Possible	0	Amber List
Hooded crow	<i>Corvus cornix</i>	Possible	Several	
House sparrow	<i>Passer domesticus</i>	Probable	1	Amber List
Jackdaw	<i>Corvus monedula</i>	Possible	Several	
Linnet	<i>Carduelis cannabina</i>	Probable	1	Amber List
Little egret	<i>Egretta garzetta</i>	Possible	1 (outside Proposed Development site boundary)	Annex I
Magpie	<i>Pica pica</i>	Possible	Several	
Mallard	<i>Anas platyrhynchos</i>	Confirmed	Several (outside Proposed Development site boundary)	Amber List
Meadow pipit	<i>Anthus pratensis</i>	Possible	2-3	Red List
Merlin	<i>Falco columbarius</i>	Possible	1 (outside Proposed Development site boundary)	Red List
Mistle thrush	<i>Turdus viscivorus</i>	Possible	2	
Pied wagtail	<i>Motacilla alba yarrellii</i>	Probable	1	
Quail	<i>Coturnix coturnix</i>	Non-breeding	0	Red List
Raven	<i>Corvus corax</i>	Possible	1	
Reed bunting	<i>Emberiza schoeniclus</i>	Possible	1	
Robin	<i>Erithacus rubecula</i>	Possible	Several	

Species		Breeding Status	Estimated number of territories	Conservation Status: Annex I of Birds Directive or Red/Amber List*
Rock pipit	<i>Anthus petrosus</i>	Confirmed	1-2	
Rook	<i>Corvus frugilegus</i>	Possible	Several	
Sand martin	<i>Riparia riparia</i>	Possible	Several (Outside Proposed Development site boundary)	Amber List
Shelduck	<i>Tadorna tadorna</i>	Possible	0	Amber List
Skylark	<i>Alauda arvensis</i>	Possible	1	Amber List
Songthrush	<i>Turdus philomelos</i>	Possible	1	
Starling	<i>Sturnus vulgaris</i>	Possible	2	Amber List
Stock dove	<i>Columba oenas</i>	Probable	1	Red List
Stonechat	<i>Saxicola torquata</i>	Probable	2	
Swallow	<i>Hirundo rustica</i>	Confirmed	2	Amber List
Willow warbler	<i>Phylloscopus trochilus</i>	Possible	1	Amber List
Woodpigeon	<i>Columba palumbus</i>	Possible	Several	
Wren	<i>Troglodytes troglodytes</i>	Possible	Several	

*Gilbert *et al.* (2021) ** Recorded by trail camera during winter months

Black-headed Gull, Grey Heron *Ardea Cinerea*, Little Egret, Mallard, Merlin, Shelduck and Sand Martin *Riparia riparia* are likely to be breeding outside the Proposed Development site boundary. A Sand Martin colony was recorded on sedimentary cliffs along shoreline to the north of the Proposed Development site boundary (east of Knockinglas Point). However, all these species could forage or roost within the Proposed Development site.

3. Results of Breeding Bird Surveys 2023

Dates, times and weather conditions for the surveys are included in **Table 3**. All species seen or heard were recorded, including those in flight over the site (**Table 4**). Maps of the survey location are included in **Appendix 1**.

Table 3. Dates and weather of 2023 breeding bird surveys

Date	Weather	Temperature	Wind	Rain	Cloud	Visibility
27/03/23	Sunny	13°C	7km/h from SSE	0mm	20%	Excellent
20/04/23	Cool	10°C	17km/h E	0mm	15%	Excellent
12/05/23	Mild	15°C	5km/h S	0mm	20%	Good
29/07/23	Sunny	15°C	15km/h W	0mm	20%	Good

A total of six transects were walked within and in the vicinity of the proposed development site (See **Appendix 1** for locations). The survey area consisted primarily of a block of improved and semi-improved grassland, which runs along the southern shore of the Shannon Estuary. The shoreline to the west of this block of land was relatively sheltered and consists of shingle or low earthen cliffs. The farmland within the Proposed Development site was used primarily for grazing in the westerly fields and for production of hay/silage in the larger drier fields to the east. The intensity of agricultural management varied across the survey areas, with less intensively managed grassland at the west of the survey area (outside the proposed development site). With less intensive grazing in these areas over the last number of years, scrub habitat has developed and hedgerows have matured. This has provided higher value habitat for breeding birds. Semi-natural grassland has also developed providing valuable habitat for ground nesting birds. A small area of reed bed and lagoon habitat was located on the western edge of the study area, approximately 400m west of the Proposed Development site boundary.

These transects are described below.

Transect 1

Transect 1 traverses much of the proposed development site and is representative of fields throughout the Shannon Energy Park Landbank. The southern edge of this transect, which is located outside the proposed development site boundary, passes through a derelict farmyard with a complex of farm buildings. During dusk surveys on the 11th May 2023, Barn Owl chicks could be heard calling from the chimney on a disused within the farm complex located approximately 145m west of the proposed development site boundary (See **Appendix 1 (Location A)**). Subsequently an adult emerged and flew eastward. This is an old cottage with corrugated iron overlying a sod roof and with an intact chimney which is being used as a breeding site by this species.



Plate 1 Chimney (middle chimney) used by nesting barn owl.

This transect traverses managed agricultural grassland which is grazed and/or mown for hay. Habitats here provide excellent nesting and feeding opportunities which is enhanced by the

diversity in sward structure and increased invertebrates provided by cattle grazing. Wide grassy margins along these field provide increased benefit.

Birds recorded along the route include overflying/foraging Swallows and singing Willow Warbler. Meadow Pipits and Skylarks were recorded in fields adjoining the Shannon Estuary. Skylark and Chiffchaff continued to show signs of breeding late into the season (July survey).



Plate 2. Field along midpoint of Transect 1



Plate 3. High value Hedgerow along Transect 1

Transect 2

This transect follows the western banks of the Ralappane Stream. This area is densely vegetated with overgrown hedgerows and areas of trees/scrub bordering intensively managed cattle grazed pasture. A number of BOCCI species were recorded along this transect i.e. Skylark, Linnet, Willow Warbler, Starling and Meadow Pipit.



Plate 4. High value hedgerow with field vegetation kept open by cattle grazing along Transect 2

Transect 3

Transect 3 runs through fields adjoining the coastal headland along Knockfinglas Point. The small fields in this area are less intensively managed than grassland to the east. The hedgerows here, dense and unmanaged provide excellent cover and feeding resources for birds.

A number of BOCCI species were recorded along Transect 3 i.e. Skylark and Snipe.



Plate 5. Hedgerows within Transect 3

Transect 4

This transect traverses the small fields and shingle shores adjoining the Shannon Estuary and passes a lagoon and reedbed adjoining the coast. An abandoned Sand Martin colony is also located along this transect.

A number of Mallard and a single Curlew were recorded around the lagoon. Ringed Plover was recorded along the shingle shore. Birds recorded during the March survey overlapped within wintering surveys along the Shannon Estuary and Light-bellied Brent Goose and Teal were recorded along this transect in March.



Plate 6. Looking East along Transect 4



Plate 7. Abandoned Sand Martin Colony along coast in Transect 4.

Transect 5

This route runs southwards from the Shannon Estuary towards the L1010 road, passing through several overgrown fields (many of rush pasture) and a disused farmyard. Buildings in the yard provide suitable habitat for nesting swallow and Barn owl, although no signs of nesting birds were recorded.

BOCCI species recorded along this transect include Kestrel, Meadow Pipit and Starling.



Plate 8. Scots pine of biodiversity value outside derelict house along Transect 5

Transect 6

This transect runs east to west in agricultural fields near the L1010 road. A rookery is located here in the trees along the roadside.

Table 4. Bird species recorded during 2023 breeding bird surveys

Species		Breeding Status	Estimated number of territories within survey area	Recorded within proposed development site boundary	Conservation Status: Annex I of Birds Directive or Red/Amber List*
Barn Owl	<i>Tyto alba</i>	Confirmed	1	No	Red List
Black-headed Gull	<i>Larus ridibundus</i>	Possible	0	Yes (overflying)	Amber List
Blackbird	<i>Turdus merula</i>	Possible	Several	Yes	
Blackcap	<i>Sylvia atricapilla</i>	Possible	3	Yes	
Blue tit	<i>Cyanistes caeruleus</i>	Possible	3	Yes	
Bullfinch	<i>Pyrrhula pyrrhula</i>	Possible	2	Yes	
Chaffinch	<i>Fringilla coelebs</i>	Possible	5	Yes	
Chiffchaff	<i>Phylloscopus collybita</i>	Possible	3	Yes	
Collared dove	<i>Streptopelia decaocto</i>	Possible	1	Yes	
Curlew	<i>Numenius arquata</i>	Non-breeder	0	No	Red list
Goldfinch	<i>Carduelis carduelis</i>	Possible	1	Yes	
Great Tit	<i>Parus major</i>	Possible	Several	Yes	
Herring Gull	<i>Larus argentatus</i>	Possible	0	Yes (overflying)	Amber List
Hooded crow	<i>Corvus cornix</i>	Possible	1	No	
Kestrel	<i>Falco tinnunculus</i>	Possible	1	Yes	Red List
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	Non-breeder	0	No	Amber List (Wintering)
Linnet	<i>Carduelis cannabina</i>	Probable	1	No	Amber List
Little egret	<i>Egretta garzetta</i>	Possible	1	No	Annex I
Magpie	<i>Pica pica</i>	Possible	Several	No	
Mallard	<i>Anas platyrhynchos</i>	Confirmed	Several	No	Amber List
Meadow pipit	<i>Anthus pratensis</i>	Possible	Several	Yes	Red List
Mistle thrush	<i>Turdus viscivorus</i>	Possible	3	Yes	
Pied wagtail	<i>Motacilla alba yarrellii</i>	Probable	2	No	
Robin	<i>Erithacus rubecula</i>	Possible	Several	Yes	
Rook	<i>Corvus frugilegus</i>	Possible	Several	Yes	
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	Possible	1	No	
Shelduck	<i>Tadorna tadorna</i>	Non-breeder	0	No	Amber List
Skylark	<i>Alauda arvensis</i>	Possible	Several	Yes	Amber List
Snipe	<i>Gallinago gallinago</i>	Probable	3	Yes	Red List

Species		Breeding Status	Estimated number of territories within survey area	Recorded within proposed development site boundary	Conservation Status: Annex I of Birds Directive or Red/Amber List*
Songthrush	<i>Turdus philomelos</i>	Possible	1	No	
Starling	<i>Sturnus vulgaris</i>	Possible	2	No	Amber List
Stonechat	<i>Saxicola torquata</i>	Probable	3	Yes	
Swallow	<i>Hirundo rustica</i>	Probable	3	Yes (overflying)	Amber List
Teal	<i>Anas crecca</i>	Non-breeder	0	No	Amber List
Willow warbler	<i>Phylloscopus trochilus</i>	Possible	4	Yes	Amber List
Woodpigeon	<i>Columba palumbus</i>	Possible	Several	Yes	
Wren	<i>Troglodytes troglodytes</i>	Possible	Several	Yes	

Bold text- species not recorded during previous surveys

4. Conclusion

Overall, the Proposed Development site is considered of moderate value for breeding birds. While there is some variation between results from the 2019/2020 and 2023 surveys, the species assemblages recorded are broadly similar. The intensity of agricultural management varied across the survey areas (transects), with less intensively managed grassland at the west of the survey area (outside the proposed development site). With less intensive grazing in these areas over the last number of years, scrub habitat has developed and hedgerows have matured. This has provided higher value habitat for breeding birds. Semi-natural grassland has also developed providing valuable habitat for ground nesting birds.

One Annex I species, Little Egret, was recorded during site surveys. It is noted that Little Egret was recorded within the salt marsh habitat which is located outside the Proposed Development site boundary. Little Egret is a Green List species in Ireland with the first breeding record of this species dating to 2007.

The survey area provides breeding habitats for a range of BOCCI species including Barn Owl, Kestrel, Snipe, Meadow Pipit, Skylark and Willow Warbler. Species such as Skylark, Snipe, Linnet and Meadow Pipit are under threat due to intensification of agricultural practices as they rely on less intensively managed agricultural grassland habitat. The mix of less intensively managed agricultural land and wet grassland at the site provides valuable habitat for these species.

Barn Owl is a Red-listed Bird of Conservation Concern in Ireland, due to extensive declines in their breeding population and range (Gilbert *et al.* 2021). Although Barn Owl populations have declined over recent decades, there are indications that Barn Owl populations are recovering in certain parts of their range in Ireland. This may be due to mitigation measures for national road projects to reduce the scale of vehicle collisions, protection of known nest sites and the provision of artificial nest boxes for Barn Owls and in particular the introduction and subsequent range expansion of introduced small mammal species i.e. Bank Vole and Greater White-toothed Shrew (Lusby *et al.* 2020).

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Appendices

Appendix 1. Survey map



Appendix 2. British Trust for Ornithology breeding bird survey codes

Breeding status	Confirmed breeder (Br)	Probable breeder (Pr)	Possible breeder (Po)	Non-breeder (N)
Observed behaviours	Distraction-display or injury feigning (DD)	Pair in suitable nesting habitat (P)	Observed in suitable nesting habitat (H)	Flying Over (F)
	Used nest or eggshells found from current season (UN)	Permanent Territory (T)	Singing Male (S)	Migrant (M)
	Recently fledged young or downy young (FL)	Courtship and Display (D)		Summering non-breeder (U)
	Adults entering or leaving nest-site indicating occupied nest (ON)	Visiting probable nest site (N)		
	Adult carrying faecal sac or food for young (FF)	Agitated Behaviour (A)		
	Nest containing eggs (NE)	Brood patch of incubating bird (I)		
	Nest with young seen or heard (NY)	Nest Building or excavating nest-hole (B)		

Appendix 3. Terrestrial Bird Species Recorded October 2006 to March 2007 (Cork Ecology)

Species	Status	Species	Status
Sparrowhawk	Occasional	Blue Tit	Regular
Pheasant	Regular	Great Tit	Regular
Skylark	Regular	Magpie	Regular
Meadow Pipit	Common	Jackdaw	Occasional
Rock Pipit	Regular	Rook	Regular
Pied Wagtail	Common	Hooded Crow	Common
Wren	Common	Raven	Occasional
Dunnock	Common	Starling	Occasional
Robin	Common	Chaffinch	Common
Stonechat	Common	Greenfinch	Regular
Blackbird	Common	Goldfinch	Regular
Song Thrush	Common	Linnet	Occasional
Redwing	Regular	Redpoll	Occasional
Goldcrest	Regular	Bullfinch	Occasional
Long-tailed Tit	Occasional	Reed Bunting	Common
Coal Tit	Regular		

C. Aquatic and Fisheries Survey

Aquatic baseline report for streams crossed by a proposed cable route for the Shannon Technology and Energy Park (STEP)



Prepared by Triturus Environmental Ltd. for Mott McDonald

December 2023

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by Mott McDonald Ltd. to prepare an aquatic ecological assessment to inform a constraints report for the consenting of two 220kV substations and two 220kV underground cable circuits, west of Tarbert, Co. Kerry (**Figure 2.1**). The substations and underground cables are proposed between the Shannon Technology and Energy Park (STEP) and an existing 220kV cable, close to the Kilpaddoge Substation.

Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included surveys for macroinvertebrates (biological water quality) and fish of high conservation value, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities, including potential Annex I habitat associations in the vicinity of the project (**Figure 2.1**). Aquatic surveys were undertaken in October 2022.

1.2 Project description

The proposed development will provide for a 220 kV connection to Shannon Technology and Energy Park (ABP reference: PA08.311233). The connection point is in the vicinity of the ESBN/EirGrid Kilpaddoge 220kV substation and specifically to the Kilpaddoge – Tarbert 220kV #1 Circuit, which is located approximately 5km east of the proposed Shannon Technology and Energy Park site, with connection provided via a 220 kV cable(s) under the L1010 road.

The 220 kV grid connection will require an onsite EirGrid and Customer 220 kV GIS substation which will be located approximately 350 m from the proposed Shannon Technology and Energy Park site entrance. The proposed 220 kV substation will comprise lightning protection masts, cable sealing ends, high voltage disconnectors, circuit breaker, reactor, current and voltage transformers all contained within a fenced area, approximately 90 m by 65 m. The electrical equipment is not expected to exceed 9 m in height with the exception of the lightning protection monopoles which are expected to be between 15 – 18 m in height. The substation will comprise a two storey GIS building of steel-clad construction, up to 18m height. The 220 kV substation will in turn connect to the cable close to the Kilpaddoge substation. The proposed development will be subject to a detailed planning design prior to lodging of any planning application, with the final design to be confirmed.

2. Methodology

2.1 Selection of watercourses for assessment

Three small streams are crossed by the proposed cable route and thus were considered as part of the current aquatic and fisheries assessment as they were the only freshwater habitats in the footprint of the proposed project (**Table 2.1, Figure 2.1** below). The nomenclature for the watercourses surveyed is per the Environmental Protection Agency (EPA). Aquatic surveys were located on the Ralappane Stream (EPA code 24R30) and Farranawana Stream (EPA code 24F33) (**Table 2.1**) and situated within the Ralappane_010 sub-basin.

The proposed development was not located within a European site (**Figure 2.1**). However, there was potential downstream hydrological connectivity between the proposed project and the River Shannon and River Fergus Estuaries SPA (004077) and the Lower River Shannon SAC (002165). The Lower River Shannon SAC (002165) itself is a site designated for numerous aquatic qualifying interests (NPWS, 2012).

2.2 Aquatic site surveys

Aquatic surveys of the watercourses within the vicinity of the proposed pipeline project were conducted on the 30th October 2023. Survey effort focused on both instream and riparian habitats at each aquatic sampling location (**Figure 2.1**). Surveys at each of these sites included a fisheries assessment (habitat appraisal), white-clawed crayfish (*Austropotamobius pallipes*) survey, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling). This holistic approach informed the overall aquatic ecological evaluation of each site in context of the proposed project and ensured that any aquatic habitats and species of high conservation value would be detected to best inform aquatic ecological constraints.

In addition to the ecological characteristics of the site, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/water body characteristics (i.e., width, depth etc.), including associated evidence of historical drainage
- Substratum type, listing substratum fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type, by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition

Table 2.1 Summary of $n=3$ stream sites crossed by the proposed cable route, Tarbert, Co. Kerry

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
1	Farranawana Stream	24F33	Kilpaddoge	504978	647724
2	Ralappane Stream	24R30	Coolnagoonagh	503572	647730
3	Ralappane Stream	24R30	Ralappane	502312	647980

2.3 Fisheries appraisal

A fisheries habitat appraisal survey of the three stream sites was undertaken to establish their fisheries value. The surveys focused on evaluating the spawning, nursery and/or holding habitat for salmonids and lamprey species. but also considered European eel and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O’Grady (2006), Hendry et al. (2003), Armstrong et al. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O’Grady, 2006) to broadly characterise the riverine sites (i.e., channel profiles, substrata etc.).

2.4 Environmental DNA (eDNA)

To validate site surveys and to detect potentially cryptically-low populations within the study area, eDNA samples were collected from the Ralappane Stream (2 crossing locations) and Farranawana Stream (single crossing). These were analysed for white-clawed crayfish (*Austropotamobius pallipes*), Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*) and European eel (*Anguilla anguilla*) environmental DNA (eDNA).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species’ DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of $n=12$ qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species’ presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species’ DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix C** for full eDNA laboratory analysis methodology.

2.5 White-clawed crayfish survey

White-clawed crayfish (*Austropotamobius pallipes*) surveys were undertaken at the aquatic survey sites in August 2023 under a National Parks and Wildlife (NPWS) open national licence (no. C24/2023), as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the

crayfish sampling started at the uppermost site(s) of the catchment/sub-catchments in the survey area (moving downstream) to minimise the risk of upstream transfer of invasive species or pathogens.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds et al. (2010). An appraisal of white-clawed crayfish habitat at each site was conducted based on physical habitat attributes (Gammell et al., 2021; Peay, 2003), water chemistry and incidental records in mustelid spraint.

2.6 Biological water quality (Q-sampling)

The 3 no. stream sites were assessed for biological water quality through Q-sampling in October 2023 (**Figure 2.1**). All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per Environmental Protection Authority (EPA) methodology (Feeley et al., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley et al., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification. Samples were converted to Q-ratings as per Toner et al. (2005) and assigned to WFD status classes. Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley et al., 2020) and other relevant taxa (i.e. Byrne et al., 2009; Nelson et al., 2011).

Table 2.2 Reference categories for EPA Q-ratings (Q1 to Q5)

Q Value	WFD status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.7 Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the $n=3$ stream survey sites, with specimens identified onsite. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species (Flora Protection Order or Wyse-Jackson et al., 2016) or habitats corresponding to the Annex I habitats, e.g., ‘Water courses of plain to montane levels, with submerged or floating vegetation of the *Ranunculion fluitantis* and *Callitriche-Batrachion* (low water level during summer) or aquatic mosses [3260]’ (more commonly referred to as ‘floating river vegetation’).

2.8 Aquatic ecological evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

2.9 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Cognisance was given towards preventing the spread or introduction of crayfish plague. Furthermore, staff did not undertake any work in a known crayfish plague catchment for a period of <72hrs in advance of the survey. Where feasible, equipment was also thoroughly dried (through UV exposure) between survey areas. Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

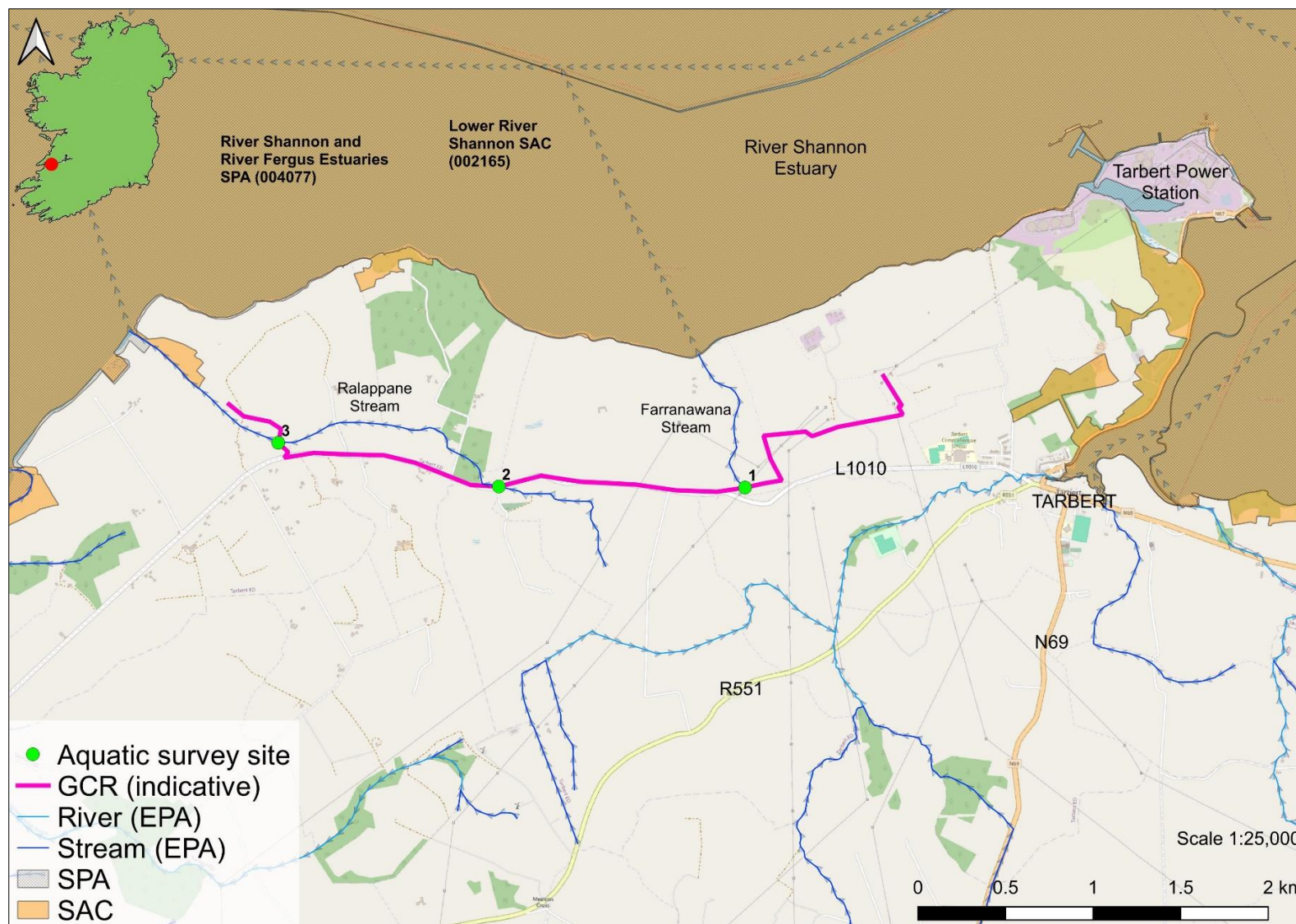


Figure 2.1 Overview of the $n=3$ aquatic survey sites crossed by the proposed underground cable route, October 2023

3. Receiving environment

3.1 Survey area description

The survey area is situated in the townlands of Ralappane, Carhoonakineely and Farranawana, West of Tarbert, Co. Kerry (**Figure 2.1**) in hydrometric area 24 (Shannon Estuary South). The aquatic survey sites were located within the Ralappane_010 river sub-basin. The watercourses and aquatic surveys sites crossed by the proposed underground cable route were small, modified lowland depositing channels (FW2; Fossitt, 2000). The watercourses flowed over geologies of mudstone, siltstone and sandstone (Geological Survey of Ireland data). Land use practices in the survey area were dominated by pastures (CORINE 231) with localised coniferous forest plantations (CORINE 312).

3.2 Fisheries asset of the survey area

Fisheries data was not available for the minor watercourses in the study area at the time of survey on review of WFD fish datasets.

3.3 EPA water quality data (existing data)

There was no contemporary EPA biological monitoring data available for the small stream sites in the study area. The Ralappane and Farranawana Streams both had moderate status during the 2016-2021 monitoring period according to the EPA¹. The risk status of the Ralappane_010 sub-basin in failing to its Water Framework Directive (WFD) objectives by 2027 is currently 'under review'.

¹ <https://gis.epa.ie/EPAMaps/Water>; accessed 7th December 2023

4. Results of aquatic surveys

4.1 Aquatic survey site results

4.1.1 Site 1 – Farranawana Stream, Farranawana

Survey site 1 was situated on the Farranawana Stream a small lowland depositing watercourse (FW1) 1m wide and between 0.05-0.15m deep with moderate flows. The channel had bank heights of 1.5-2m and had been historically deepened. The stream had a bed of mixed angular boulder, cobble and gravels with moderate siltation pressures (silt plumes underfoot). The stream supported scattered fool's watercress in the margins. The Farranawana Stream had dense bramble (*Rubus fruticosus*) with scattered hogweed (*Heracleum mantegazzianum*), wild angelica (*Angelica sylvestris*), nettle (*Urtica dioica*), hedge bindweed (*Calystegia sepium*) and rank grasses in the riparian areas that graded into mixed broadleaved woodland (WD1) in the valley slopes downstream of the proposed cable crossing. Given the channel was very shallow and small, its value for salmonids was low near the proposed crossing. However, the semi-natural profile of shallow glide and riffle with a stoney bed offered some low value nursery value for brown trout. However, no brown trout (*Salmo trutta*) or Atlantic salmon (*Salmo salar*) were recorded in the eDNA sample collected at the site (**Appendix B**). The stream was of too high energy for lamprey and none were recorded from the eDNA sample. The stream had some lower value as an eel nursery given a stoney bed and localised shallow pools and the species was recorded from the eDNA sample.

Biological water quality was calculated as **Q3-4 (moderate status)** (**Appendix A**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling. This included an absence of crayfish during targeted sweep sampling and hand searching of refugia.



Plate 4.1 Representative image of site 1 at the proposed GCR crossing on the Farranawana Stream, October 2023



Plate 4.2 Representative image of site 1 downstream of the proposed GCR crossing on the Farranawana Stream, October 2023

4.1.2 Site 2 – Ralappane Stream, Cockhill

Survey site 2 was situated on the Ralappane Stream a very small lowland depositing watercourse (FW2), 1m wide and between 0.1-0.2m deep with very slow flowing water. The channel had bank heights of 1-1.5m and had been historically deepened and realigned north along the L1010 local road. The stream was of similar character upstream and downstream of the local road with a slow, shallow glide dominated profile. The bed had gross siltation with silt up to 0.2m deep on the bed with very limited coarse substrata. The channel had no macrophytes apart from fool's watercress upstream of the proposed cable crossing. The channel was bordered by an earthen embankment along the roadside with scattered mature ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), ivy (*Hedera helix*) and bramble. The Ralappane Stream was bordered by heavily improved pasture (GA1).

Given the channel suffered from both heavy siltation and enrichment pressures (based on its physical condition), it was considered a poor salmonid habitat. As the coarse gravels were blocked with silt given historical hydromorphological pressures (i.e., drainage), and from soil erosion, the nursery and spawning value were also poor. Also the low autumnal flows and its diminutive size would preclude salmonid presence as validated by the eDNA sampling results (i.e. no salmon or trout recorded; **Appendix B**). While the stream supported some lower quality lamprey ammocoete habitat given widespread depositional areas, the poor flows, small size of the stream and absence of spawning habitat indicated conditions were unsuitable for the species (**Appendix B**). The Ralappane Stream was considered a poor quality eel nursery given the absence of coarse substrata refugia and limited deeper water. The eDNA results supported the absence of eel, lamprey or salmonids. However, eel were recorded downstream at site 3.

Biological water quality was calculated as **Q3 (poor status)** (**Appendix A**). No macroinvertebrate species of conservation value greater than ‘least concern’, according to national red lists, were recorded via Q-sampling. This included an absence of crayfish during targeted sweep sampling and hand searching of refugia.



Plate 4.3 Representative image of site 2 on the Ralappane Stream north of the local road L1010 (realigned historically along field boundaries)



Plate 4.4 Representative image of site 2 on the Ralappane Stream south of the local road L1010 (realigned historically along field boundaries)

4.1.3 Site 3 – Ralappane Stream, Ralappane

Survey site 3 was situated on the Ralappane Stream was a small lowland depositing watercourse (FW2), 1.5m wide and between 0.1-0.4m deep. The channel had bank heights of 1-1.5m and had been historically deepened. The flow profile comprised of shallow glide with localised riffle and pool. The bed had very heavy siltation and much of the bed was covered with flocculent silt up to 0.3m deep. Patches of cobble and mixed coarse gravel were present in localised riffle areas. The soft sediment dominated bed supported abundant fool's watercress with locally frequent brooklime (*Vernonia beccabunga*), while hemlock water-dropwort (*Oenanthe aquatica*) was recorded as rare. No submerged macrophytes were present apart from common water-starwort (*Callitriche stagnalis*). The instream cobble supported the moss species *Leptodictyum riparium*, a species that is indicative of enrichment pressures. The south bank of the river was open and did not support trees while the north bank supported mature hawthorn (*Crataegus monoygna*), grey willow (*Salix cinerea* sp. *oleifolia*), ivy, bramble and gorse (*Ulex europaeus*). The channel was bordered by heavily improved pasture (GA1) with evident cattle poaching pressures on the south bank. Given the channel suffered from both heavy siltation and enrichment pressures it was considered a poor salmonid habitat. As the coarse gravels were blocked with silt given historical hydromorphological pressures (i.e., drainage) and from soil erosion, the nursery and spawning value were poor. The poor stream condition supported the absence of salmonids in the eDNA results (**Appendix B**). While the stream supported some low-quality lamprey ammocoete habitat, poor flows, small size, and the absence of spawning habitat precluded the presence of the species, as supported by the eDNA results (**Appendix B**).

The Ralappane Stream was, however, a moderate quality eel nursery given the species often buries in silt and under cobbles and gravels. The presence of suitable nursery habitat and good food resources would support eel and a single elver was recorded during Q-sampling. The eDNA results also detected European eel (**Appendix B**).

Biological water quality was calculated as **Q3 (poor status) (Appendix A)**. No macroinvertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling. This included an absence of crayfish during targeted sweep sampling and hand searching of refugia.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site C3 was of **local importance (lower value) (Table 4.5)**.



Plate 4.5 Representative image of site 3 on the Ralappane Stream showing very heavy siltation and high macrophyte growth at proposed GCR crossing



Plate 4.6 European eel recorded in a sweep sample at site 3 on the Ralappane Stream

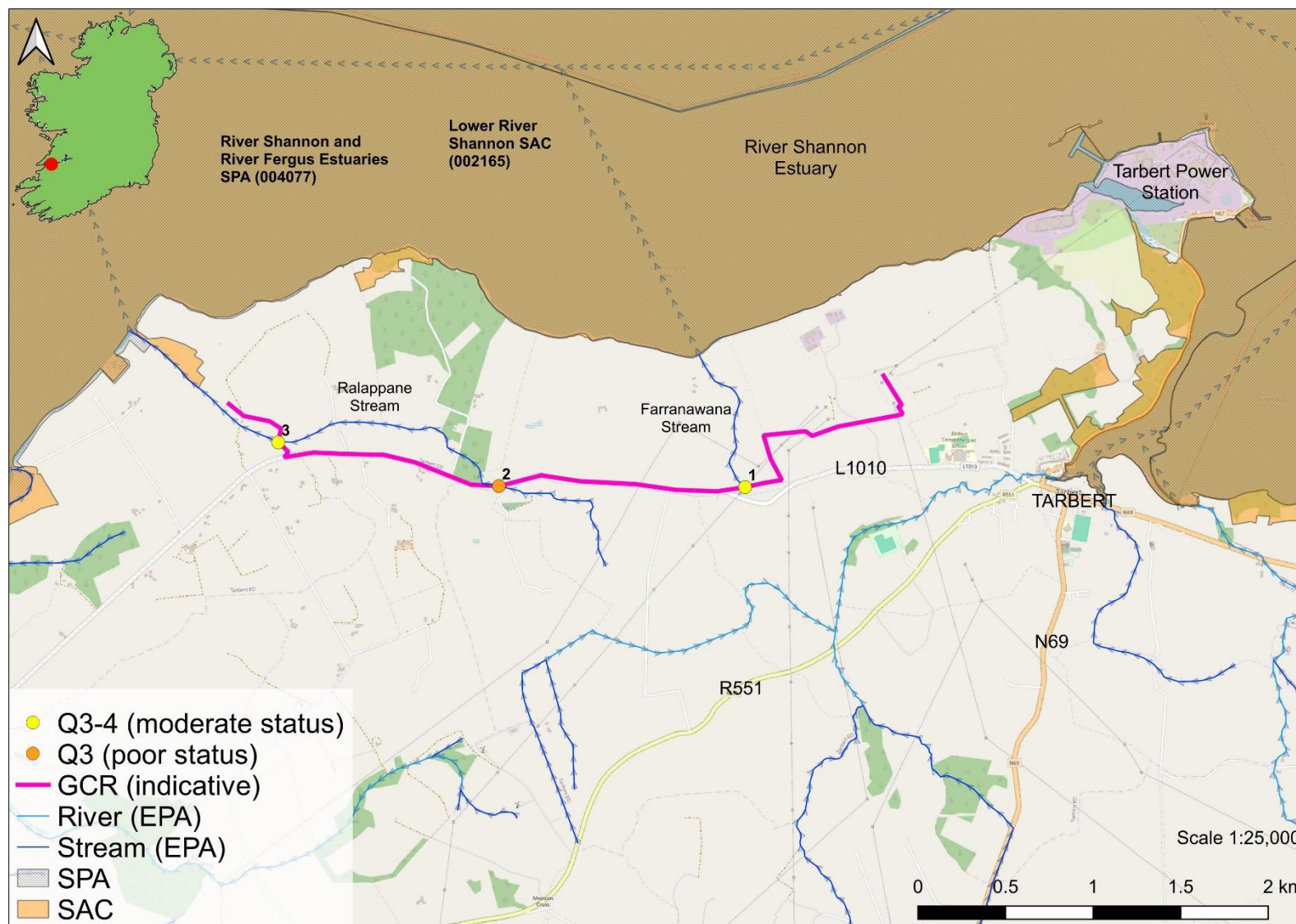


Figure 4.1 Overview of the biological water quality status in streams crossed by the proposed grid cable route alignment, October 2023

4.2 Aquatic ecological evaluation

An aquatic ecological evaluation of each survey site was based on the results of desktop review (i.e., presence of species of high conservation value), fisheries assessments and habitat assessments, the presence of protected or rare invertebrates (e.g., white-clawed crayfish), environmental DNA analysis, the presence of rare macrophytes and aquatic bryophytes and / or associated representations of Annex I habitats (**Table 4.1**). Furthermore, biological water quality status also informed the aquatic evaluation.

Both Farranawana Stream (site 1) and Ralappane Stream (sites 2 & 3) streams suffer from hydromorphological pressures (historical deepening and straightening) in addition to siltation and eutrophication pressures. There is also an absence of Annex I habitats, rare macrophytes, rare invertebrates in addition to an absence of salmon, trout and lamprey as supported by eDNA sampling (**Appendix B**). However, both streams support endangered European eel (detected in eDNA) which supported their evaluation as of **local importance (higher value)** (**Table 4.2**).

Table 4.1 Summary of aquatic species & habitats of higher conservation value recorded in the survey area

Site	Watercourse	Fish species of high conservation value*	Annex I aquatic habitats	Rare or protected macrophytes/aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
Site 1	Farranawana Stream	European eel	None recorded	None recorded	None recorded	None recorded
Site 2	Ralappane Stream	None	None recorded	None recorded	None recorded	None recorded
Site 3	Ralappane Stream	European eel	None recorded	None recorded	None recorded	None recorded

***Conservation value:** Atlantic salmon (*Salmo salar*) are listed under Annex II and V of the Habitats Directive [92/42/EEC]. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011). Data includes fish recorded during ecological surveys by DixonBrosnan (2008) and current survey results.

Table 4.2 Aquatic ecological evaluation summary of watercourses according to NRA (2009) criteria

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
Site 1	Farranawana Stream	24R30	Local importance (higher value)	Small stream with poor hydromorphology and low flows. Eutrophication & high siltation pressures with Q3-4 (moderate status) water quality. No salmonids, or lamprey detected in the eDNA sample. However, European eel were present and detected in eDNA sample.
Sites 2 & 3	Ralappane Stream	24T01	Local importance (higher value)	Small, shallow, heavily modified lowland depositing streams (FW2) with low flows. Evident high siltation and enrichment pressures that were reflected by the Q3 (poor status) water quality. No aquatic species or habitats of high conservation apart from European eel were detected in the eDNA sample collected at sites 2 & 3. They were also recorded present in a sweep sample collected at site 3.

Conservation value: Atlantic salmon (*Salmo salar*) are listed under Annex II and V of the Habitats Directive [92/42/EEC]. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011). Apart from the Inland Fisheries Acts 1959 to 2017, brown trout and coarse fish species have no legal protection in Ireland.

5. Discussion

5.1 Aquatic ecology summary

5.1.1 Fisheries

Both the Ralappane and Farranawana Streams, that are crossed by the proposed underground cable route, were typically small, heavily modified channels with poor summer flows. Historical straightening and deepening of watercourses removes flow heterogeneity, encourages sediment deposition and invariably results in an irreparable reduction in fisheries potential, particularly for salmonids (O’Grady et al., 2017, O’Grady, 2006). These factors among others explain the absence of trout and salmon from the Ralappane and Farranawana Streams in the eDNA results (**Appendix B**).

Gross siltation was also visible in the Ralappane Stream (sites 2 and 3). While siltation pressures were lesser in the Farranawana Stream they were also excessive. Sediment not only blocks interstitial spaces in substrata and limits oxygen supply to salmonid eggs (required for healthy embryonic development & successful hatching) but can also smother substrata, thus reducing available spawning habitat and impact macroinvertebrate communities on which salmonids feed (Kelly-Quinn et al., 2020; Davis et al., 2018; Conroy et al., 2016; Cocchiglia et al., 2012; Louhi et al., 2008, 2011; Walling et al., 2003; Soulsby et al., 2001). Sedimentation of salmonid habitat is a particular problem in Irish rivers flowing through agricultural catchments (Evans et al., 2006). Low summer flows are a common occurrence in the wider survey area (e.g., DixonBrosnan, 2008). The continuing trend in Irish rivers is for reduced summer flows (Meresa et al., 2022) and this, coupled with increased drought events (O’Briain, 2019), will have increasingly significant impacts on aquatic biota (O’Briain et al., 2017).

The absence of lamprey (*Lampetra* sp.) in the eDNA sampling (**Appendix B**) reflected the poor quality supporting habitat for lamprey in the study area. This included poor-quality spawning habitat in addition to low flows, which reduce the extent of fine gravels required for spawning (Dawson et al., 2015; Rooney et al., 2013; Lasne et al., 2010). Poor flow velocities discourage the deposition of oxygenated fine, organic-rich sediment ≥5cm in depth generally required by larval *Lampetra* spp. (Aronsoo & Virkkala, 2014; Goodwin et al., 2008; Gardiner, 2003). The streams are also considered too small for larger lamprey species such sea lamprey (*Petromyzon marinus*) that are susceptible to predation in shallow streams and favour deep glide with strong flows for spawning (pers. obs.). No lamprey were recorded in the wider catchment during previous surveys carried out supporting known poor conditions for lamprey species in the wider catchment (DixonBrosnan, 2008).

In summary, apart from European eel (detected from both the Farranawanna Stream (site 1) and Ralappane Stream (sites 2 & 3) (**Appendix B**)), no other fish of high conservation value were recorded. The presence of European eel, despite hydromorphological and water quality pressures, supports that both streams are nursery habitats for this ICUN critically endangered species (Pike et al. 2020).

5.1.2 Biological water quality & macroinvertebrates

Biological water quality was of poor status (**Q3**) at sites 2 and 3 on the Ralappane Stream but was of moderate status (**Q3-4**) on the Farranawanna Stream. The biological water quality on both streams, therefore, failed to attain target ‘good status’ water quality (≥Q4; EQR ≥0.8) as required under the

Water Framework Directive (2000/60/EC) at all three stream survey areas. No rare or protected macro-invertebrates, were present in the survey areas (**Appendix A**).

Furthermore, in keeping with previous surveys, white-clawed crayfish were not recorded in the current survey and the species is not known within the wider survey area, presumably due to unsuitable (siliceous) geologies (Demers et al., 2005; Lucey & McGarrigle, 1987).

5.1.3 Macrophytes & aquatic bryophytes

No rare or protected macrophytes or aquatic bryophytes were recorded and no examples of Annex I aquatic habitats were present in the survey areas.

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7. Appendix A – Q-sample results (biological water quality)

Table 7.1 Macro-invertebrate Q-sampling results in streams crossed by the proposed grid cable route alignment, October 2023

Taxon	Family	Binomial name	Site 1 Farranawana Stream	Site 2 Ralappane Stream	Site 3 Ralappane Stream	EPA Groups
Ephemeroptera	Heptageniidae	<i>Rhithrogena semicolorata</i>	3			A
Trichoptera	Cased caddis pupa	sp. indet.				B
Trichoptera	Limnephilidae	<i>Potamophylax cingulatus</i>	2		1	B
Trichoptera	Sericostomatidae	<i>Sericostoma personatum</i>			1	B
Amphipoda	Gammaridae	<i>Gammarus duebeni</i>	51	31	38	C
Arachnida	Hydrachnidae	sp. indet.		1		C
Coleoptera	Elmidae	<i>Limnius volckmari</i>	3		3	C
Diptera	Ceratopogonidae	sp. indet.	3			C
Diptera	Chironomidae	Non-chironomus spp.		1	1	C
Diptera	Simuliidae	sp. indet.	2	1	7	C
Ephemeroptera	Baetidae	<i>Baetis rhodani</i>	9	14	18	C
Trichoptera	Hydropsychidae	<i>Diplectrona felix</i>	18			C
Trichoptera	Philopotamidae	<i>Wormaldia occipitalis</i>	17			C
Trichoptera	Polycentropodidae	<i>Plectrocnemia conspersa</i>		2		C
Hirudinidae	Glossiphoniidae	sp. indet.	3	2	3	D
Diptera	Chironomidae	Chironomus spp.	3	3		E
Annelidae	Oligochaeta	sp. indet.			2	N/A
Mollusca	Tateidae	<i>Potamopyrgus antipodarum</i>	4		10	N/A
Total abundance			118	55	84	
Species richness			12	8	10	
Q Rating			Q3-4	Q3	Q3	
Water quality status			Moderate	Poor	Poor	

8. Appendix B – eDNA Laboratory results

Folio No: 152-2023
 Purchase Order: eDNA Oct 23
 Contact: Triturus Environmental Ltd
 Issue Date: 15.11.2023

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
11686	Site 2 Ralappane		Atlantic salmon	Pass	Negative	0
			Brook lamprey	Pass	Negative	0
			Brown (sea) trout	Pass	Negative	0
			European eel	Pass	Positive	9
11693	Site 3 Ralappane		Atlantic salmon	Pass	Negative	0
			Brook lamprey	Pass	Negative	0
			Brown (sea) trout	Pass	Negative	0
			European eel	Pass	Positive	12
11699	Site 1 Farranawana		Atlantic salmon	Pass	Negative	0

SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE, UK
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Folio No: 152-2023
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Contact: Triturus Environmental Ltd
Issue Date: 15.11.2023



Brook lamprey	Pass	Negative	0
Brown (sea) trout	Pass	Negative	0
European eel	Pass	Positive	5

Matters affecting result: none

Reported by: Lauryn Jewkes

Approved by: Chelsea Warner

SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE, UK
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Folio No: 152-2023
Purchase Order: eDNA Oct 23
Contact: Triturus Environmental Ltd
Issue Date: 15.11.2023

Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check: Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.





Triturus Environmental Ltd.

42 Norwood Court,

Rochestown,

Co. Cork,

T12 ECF3.

D. Consultation Responses



Your Ref: 229100682

Our Ref: **G Pre00173/2024**

(Please quote in all related correspondence)

13 June 2024

Michael Sterling
Mott MacDonald Ireland Limited
South Block
Rockfield
Dundrum
Dublin 16

Via email: Michael.Sterling@mottmac.com cc: elaine.a.bennett@mottmac.com

Re: Pre-Planning Consultation by Mott MacDonald Ireland Limited on behalf of Shannon LNG Limited for proposed construction of two new substations and the construction and installation of approximately 4.9 km of high voltage underground cables at Kilpaddoge – Tarbert, County Kerry. The proposed project is referred to as the Shannon Technology and Energy Park (STEP) 220 kV – Grid Connection project.

A Chara

I refer to correspondence received in connection with the above.

The Department has reviewed the Environmental Impact Assessment (EIA) Scoping Consultation documentation provided for the Proposed Shannon Technology and Energy Park (STEP) 220 kV Grid Connection project. Outlined below are heritage-related observations/recommendations of the Department under the stated headings.

Terrestrial Archaeology

The information provided was not sufficiently detailed to allow for a full assessment of the archaeological implications of this proposal, however the Department notes that an Archaeological Impact Assessment (AIA) is scoped into the proposed EIA process as part of the overall Cultural Heritage Impact Assessment (CHIA) of the proposed development. This assessment must be carried out by a suitably qualified Consultant Archaeologist. The CHIA should incorporate a robust desk-study supported by a comprehensive field inspection as well as a Visual Impact Assessment (to assist in identifying any possible impacts to the setting of sites or monuments). The CHIA should include an assessment of the possible effects of the proposal on the wider archaeological landscape. It is of importance that the study area for the CHIA should be of sufficient size and extent to support this.



Further to the above, and by way of general archaeological advice, please note that, whilst the proposed development site (PDS) may or may not contain within it known or subsurface Recorded Monuments and/or Archaeological sites that may require assessment as part of the overall CHIA, the PDS itself is located within a wider area of known archaeological settlement and activity (as per initial review by the National Monuments Service of the Record of Monuments and Places¹, and cartographic sources). All of these Recorded Monuments, both within and outside the PDS, are subject to statutory protection in the Record of Monuments and Places, established under section 12 of the National Monuments Act 1930-2014.

In that regard the Department notes that the proposed scheme would be located in close proximity to a number of known archaeological sites including: KE003-009---- (Ringfort – rath), KE003-010---- (Ringfort – rath) and KE003-011---- (Ringfort – rath).

The Department further advises that the following are also carried out as part of the overall CHIA to ensure a comprehensive assessment of the proposed development:

- The desk-study and field inspection regime should inform:
 - Targeted non-intrusive advance geophysical survey or prospection (such as Ground Penetrating Radar Surveys)
 - Targeted advance archaeological test excavation
- Any and all intrusive advance investigations (such as, but not limited to, ground investigations for soils/geology/hydrogeology) carried out as part of the EIA or design process should be subject to a programme of archaeological monitoring by a suitably qualified archaeologist

The results of these investigations should inform the EIA process and be incorporated within the EIA Report. In that regard the Department notes that the western end of the scheme has previously been subject to a programme of archaeological geophysical survey and archaeological test excavation. The Department advises that the findings from these investigations are incorporated within the EIA report. Advance investigations in greenfield areas at the eastern end of the scheme route may still be necessary to ensure that a suitably comprehensive assessment of the scheme is carried out, however.

Notwithstanding the above, the Department awaits the submission of this assessment before commenting further.

The Department is happy to provide further advice and clarification, as and if required, in relation to the preparation of suitably comprehensive assessments as outlined above, with particular regard to the scope and locations for any advance non-intrusive prospection or

¹ www.archaeology.ie



advance test excavation that would be appropriate to inform the assessment of this proposed scheme.

Underwater Archaeology

The following comments are provided with a view to assisting the proponents with fulfilling their statutory obligations in relation to the protection of archaeological heritage within the ambit of the project and its design process.

It is noted that the proposed development area includes Recorded Monuments that are subject to statutory protection in the Record of Monuments and Places established under Section 12 of the National Monuments (Amendment) Act 1930-2014. Prior archaeological fieldwork undertaken for previous planning applications for the core development site included a desk-study Environmental Impact Assessment Report (EIAR) assessment (Sheila Lane 2007), an intertidal survey and marine archaeo-geophysical survey (Donal Boland; licence 07R048), a partial wade and metal-detection survey of a watercourse that traverses the site (Aisling Collins 07D63/ 07R196), a terrestrial geophysical survey of portions of the development area (Target Geophysics, 2006, 06R167), a built heritage survey and archaeological testing carried out in 2009 (Headland Archaeology, licence 08E587). Overall, the prior investigations have documented within the proposed development area a significant archaeological landscape, which is probably largely of prehistoric date and represented by burnt mounds, kilns/furnaces/charcoal production pits, archaeological complexes/settlement areas, clusters of archaeological features and miscellaneous/isolated features. The archaeological discoveries that have been made on the site may provide a terrestrial context for some of the internationally significant discoveries made in the upper Shannon estuary by the Discovery Programme's Shannon estuary intertidal survey (O Sullivan, Foragers, Farmers and Fishers..., Discovery Programme, 2001). It is further noted that the proposed grid connection route is in the environs of underwater cultural heritage, including wrecks protected under Section 3 of the 1987 National Monuments (Amendment) Act. The Wreck Inventory of Ireland Database (WIID) is the official register of historic shipwrecks protected under the National Monuments Acts. All wrecks over 100-years old, and archaeological objects underwater, are protected under the 1987 and 1994 (Amendment) Acts of the National Monuments Acts. Over 18,000 wrecks have been recorded to date within the WIID, ranging from small fishing boats, logboats and coastal traders to steamships and ocean-going ships. Though earlier sources have been included where obtainable, the Inventory is largely based on documentary sources available from after 1700AD. As such, it is important to stress that previously unrecorded wreck sites, including those dating to earlier periods, may await discovery in the application area under consideration here. National policy, as set out in *Frameworks and Principles for the Protection of the Archaeological Heritage* states 'there should always be a presumption in favour of avoiding developmental impacts on the archaeological heritage' and, given the archaeological sensitivity of the application area, this core principle should be proactively enshrined within the design process.



In light of the above, the Department recommends that the following specific investigations are undertaken prior to applying for planning permission/consent in order to inform the engineering and architectural design of the development, the contents of the Cultural Heritage assessment in the EIAR/Planning Application and its attendant mitigation proposals.

- A project archaeologist with experience of underwater cultural heritage should be appointed to the design team to advise on the underwater cultural heritage aspects of the design, assessment and mitigation.
- A desk based assessment should address the archaeological and cultural heritage (archaeological, built, vernacular, marine and industrial heritage) of the proposed grid route, to include a full inventory, mapping and surveys (photographic, descriptive, photogrammetric, as appropriate) of all archaeological, underwater and cultural heritage features and structures identified by field inspections, cartographic analysis, historical and archival research and prior archaeological investigations. The field survey should include a visual inspection of the proposed grid route watercourse crossings. The desk-study, supported by comprehensive archival and historical research and detailed field inspection should inform (as appropriate), the scope and range of further archaeological investigations to be undertaken.
- Advance Underwater Archaeological Impact Assessment (UAIA), to include dive/wade, metal detection surveys of all areas where in-water works (including temporary works) are proposed. UAIA should be undertaken in order to adequately assess the nature, depth, extent and artefact-bearing potential of the marine/riverine/intertidal stratigraphy, to assess the potential for the remains of underwater cultural heritage, including fording points and other structures and features, archaeological objects underwater and to facilitate further characterisation of underwater cultural heritage features and structures that have been identified by prior research.
- Comprehensive buildings archaeology assessments of any built heritage structures and features that may be impacted upon by the proposed grid connection route. To inform an overall appraisal of the historical, archaeological and built heritage significance of any built heritage structures proposed for removal, it is vital that detailed buildings archaeology assessment including measured survey is undertaken at the earliest opportunity.
- All intrusive advance underwater investigations (such as, but not limited to, ground investigations for soils/geology/hydrogeology) carried out as part of the EIA or design process should be subject to advance archaeological screening (to be agreed with the Department) and a programme of archaeological monitoring by a suitably qualified archaeologist.



Archaeological test-excavations and monitoring will be carried out under a Section 26 (National Monuments Act 1930) licence from the National Monuments Service and in accordance with an approved method statement. Licensed metal detection will be undertaken in tandem with the test excavations. A Dive/Survey Licence (Section 3 1987 National Monuments Act) and Detection Device consent (Section 2 1987 National Monuments Act) will be required for the dive/wade surveys and metal detection, respectively. Licences should be applied for to the National Monuments Service and should be accompanied by a detailed method statement. Note a period of 3-4 weeks should be allowed to facilitate processing and approval of the licence application and method statement. All archaeological wading/diving should comply with the Health and Safety Authority's Safety, Health and Welfare at Work (Diving) Regulations 2018/2019.

The results of these investigations should form part of the EIA/planning application process and be incorporated within the EIA Report/planning application. The Department is happy to provide further advice and clarification as and if required in relation to the preparation of suitably comprehensive assessments as outlined above, with particular regard to the scope and locations for any advance non-intrusive prospection, advance test excavation, underwater archaeology dive/wade surveys or built heritage surveys that would be appropriate to inform the assessment of this proposed scheme.

Nature Conservation

The following comments are not comprehensive, and without prejudice to any submissions that the Minister for Housing, Local Government and Heritage may make to the Planning Authority concerning the final planning application, Natura Impact Statement (NIS) or any Ecological Impact Statement.

Mitigation measures, to avoid deterioration of water quality in the Lower River Shannon Special Area of Conservation (SAC) (Site Code: 002165), River Shannon and River Fergus Estuaries Special Protection Area (SPA) (Site Code: 004077), and Ballylongford proposed Natural Heritage Area (pNHA) (Site Code: 001332), need to be clearly specified and assessed.

Where suitable habitat occurs, a bat and otter survey by a competent experienced bat-worker and ecologist following best-practice guidelines is recommended, as are measures to ensure the maintenance of foraging connectivity and avoidance of significant impacts of lighting on foraging bats, especially lesser horseshoe bats if these are found to occur. Any proposed works likely to damage the breeding sites and resting places of strictly protected species (bats, otter), or cause deliberate disturbance to these species particularly during the period of breeding, rearing, hibernation or migration, will require a derogation licence application.

- (1) There is an old (1890s) record of the protected plant species Penny Royal (*Mentha pulegium*) in the Tarbert area. The potential for the habitat of this species occurring along, or adjacent and downslope from, the cable route, should be assessed, and if



suitable habitat is identified, then it should be surveyed for the presence of this species. If the species is found, a Wildlife Act licence application will be necessary if its environment or habitat is likely to be altered.

The above observations/recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations that the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in his role as statutory consultee under the Planning and Development Act, 2000, as amended.

Should you require any further information or clarification on any of the above submission please do not hesitate to contact this Department. You are requested to send any further communications to this Department's Development Applications Unit (DAU) at manager.dau@npws.gov.ie, or to the following address:

The Manager
Development Applications Unit (DAU)
Government Offices
Newtown Road
Wexford
Y35 AP90

Is mise, le meas

A handwritten signature in blue ink, which appears to read 'Sinéad O'Brien', is placed below the text 'Is mise, le meas'.

Sinéad O' Brien
Development Applications Unit
Administration

RE: EIAR Scoping letter for STEP 220 kV Grid Connection project

Eoin Kelleher <eoin.kelleher@kerrycoco.ie>

Thu 2024-06-06 11:41

To: Michael Sterling <Michael.Sterling@mottmac.com>

You don't often get email from eoin.kelleher@kerrycoco.ie. [Learn why this is important](#)

Michael,

Further to the scoping consultation issued, you are requested to have regard to the following general best practice considerations as part of the proposal:-

- (i) Crossing of watercourses, including the Ralappane Stream, should have regard to the requirements of Inland Fisheries Ireland and flood risk management principles. In addition, care should be given to protect riparian vegetation.
- (ii) Fine Sediment Control proposals should have regard to S1.3.6 of Volume 6 of the Kerry CDP 2022-2028.
- (iii) The requirements of the Water Framework Directive should be taken into account.
- (iv) Selection of site compound locations should be informed by ecological survey. Areas of particular ecological / environmental sensitivity or in close proximity to sensitive watercourses, should be avoided.
- (v) Any required accommodation works should be subject to environmental assessment.
- (vi) 'Soil and stone' generated from the proposal should be disposed of at authorised places of disposal. Procedures / protocols should be put in place so as to ensure excavated material is not used to fill wetlands, or other lands of ecological value or semi-natural areas which may support protected species – unless the necessary consents have first been obtained.
- (vii) Invasive species protocols should be provided for, as part of the proposal. As part of this, 'Ireland's invasive alien species soil and stone pathway action plan 2023 – 2027' should be taken into account.
- (i) Proposals including construction related lighting should have regard to the 'Lesser Horseshoe Bat Species Action Plan 2022-2026'. As part of this, the connectivity of lesser horseshoe bat populations in Kerry and Clare should not be adversely impacted.
- (ii) Should an NIS be required, any mitigation measures contained therein should be presented in a clear and specific manner, compatible with the recommendations of [S3.2.4](#) of the following EC Commission Notice 2021/C 437/01 guidance document 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'.

Please contact me should you require clarification of any of the above

Regards Eoin

Eoin Kelleher
Planner & Ecologist
Environmental Assessment Unit
Kerry County Council

Mott MacDonald Restricted

From: Michael Sterling <Michael.Sterling@mottmac.com>

Sent: Wednesday, May 8, 2024 1:33 PM

To: plan <plan@kerrycoco.ie>

Cc: Elaine A Bennett <elaine.a.bennett@mottmac.com>

Subject: Shannon Technology and Energy Park (STEP) 220 kV Grid Connection project

[CAUTION FROM KERRY COUNTY COUNCIL I.T. DEPARTMENT: EXTERNAL SENDER] This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon,

Shannon LNG Limited, a subsidiary of New Fortress Energy, are proposing to apply to An Bord Pleanála under Section 182A of the Planning and Development Act 2000 (as amended) for the construction of two new substations and the construction and installation of approximately 4.9 km of high voltage underground cables. The proposed project is referred to as the Shannon Technology and Energy Park (STEP) 220 kV Grid Connection project

Mott Macdonald are currently preparing an Environmental Impact Assessment Report, on behalf of Shannon LNG Limited, to support the submission. Information on the project and a map illustrating the location of the substation and underground cables is attached.

Mott MacDonald would welcome any comments on the proposed development to aid the environmental assessments for the proposed works.

Please return any comments you may have before 14th June, 2024.

Many thanks

Michael

Michael Sterling

MA MSc (Hons)

Senior Environment Scientist

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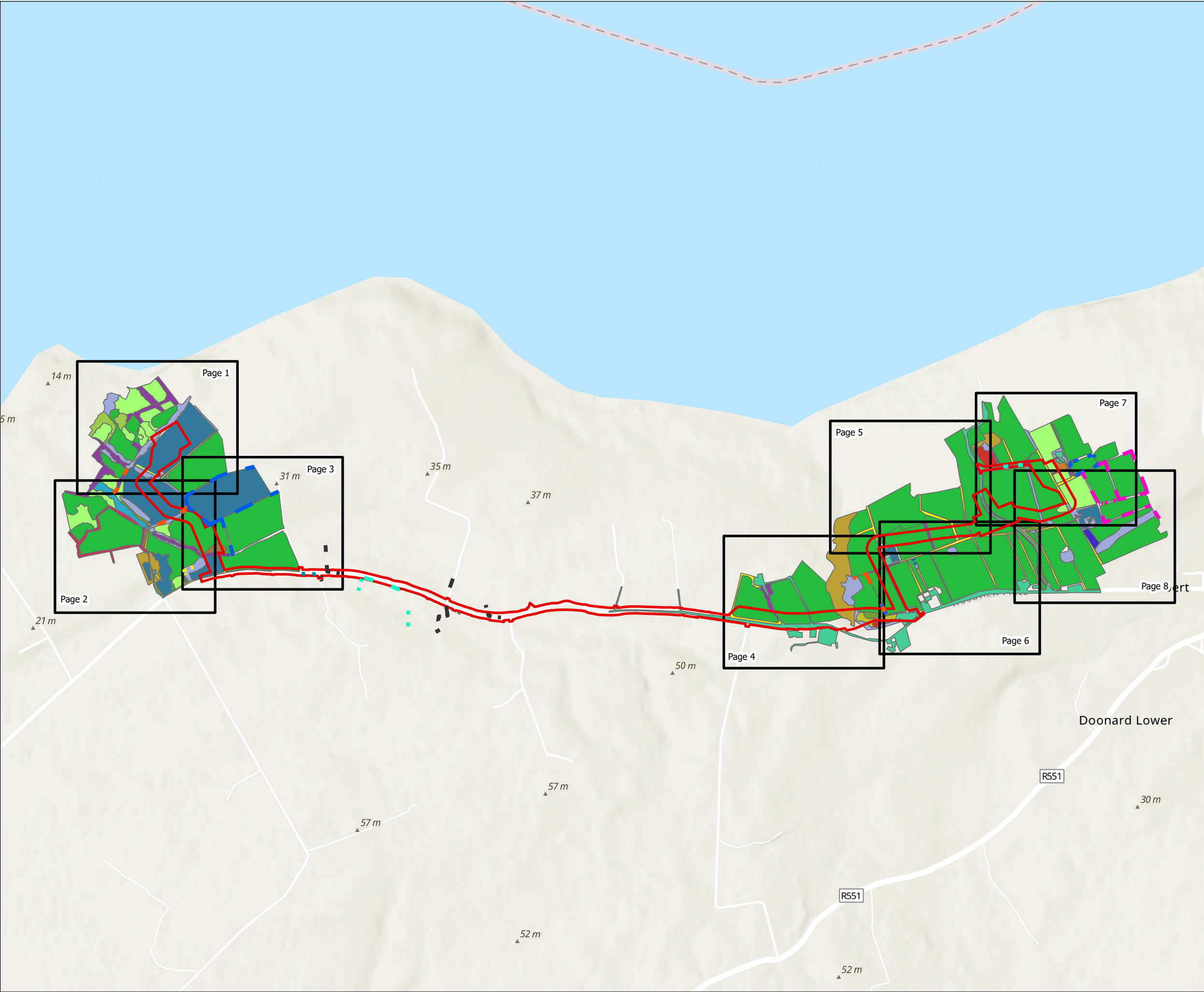
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E. Designated Site Map




F. Habitat Map



- Fossit Code Linear Habitats
- WL1 - Hedgerows
 - WL1/WL2 - Hedgerows/Treelines
 - WL2 - Treelines
 - FW4/FW2 - Drainage Ditches/Depositing Lowland Rivers
 - FW4 - Drainage Ditches
 - GS2 - Dry Meadows and Grassy Verges
 - FW2 - Depositing Lowland River
- Fossit Code Habitats
- ED2 - Spoil and Bare Ground
 - ED3 - Recolonising Bare Ground
 - ED5 - Refuse and Other Waste
 - GA1 - Improved Agricultural Grassland
 - GM1 - Marsh
 - GS1 - Dry Calcareous and Neutral Grassland
 - GS1/GM1 - Dry Calcareous and Neutral Grassland/Marsh
 - GS2 - Dry Meadows and Grassy Verges
 - GS4 - Wet Grassland
 - WD1 - (Mixed) Broadleaved Woodland
 - WD2 - Mixed Broadleaved / Conifer Woodland
 - WD5 - Scattered Trees and Parkland
 - WL1 - Hedgerows
 - WL1/WL2 - Hedgerows/Treelines
 - WL2 - Treelines
 - WL2 / WS1 - Treeline/Scrub
 - WN5 - Riparian Woodland
 - WN6 - Wet-willow-alder-ash Woodland
 - WS1 / ED3 - Scrub / Recolonising Bare Ground
 - WS1 - Scrub
 - BL3 - Building and Artificial Surfaces
 - Red Line Boundary

Projection: Transverse Mercator; Datum: IRENET95

Data sources: Esri, Intermap, NASA, NGA, USGS, Esri Community Maps Contributors, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri, TomTom, Garmin, Foursquare, FAO, METI/NASA, USGS



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Shannon LNG Grid Connection Assessment

Habitat Map - Overview

Drawn E Tiri	GIS Checked E Tiri	Checked R Boyle	Approved R Boyle
Scale at A3 1:15,000	Status INF	Revision 01	Security STD

229100682-MMD-GIS-DR-0008



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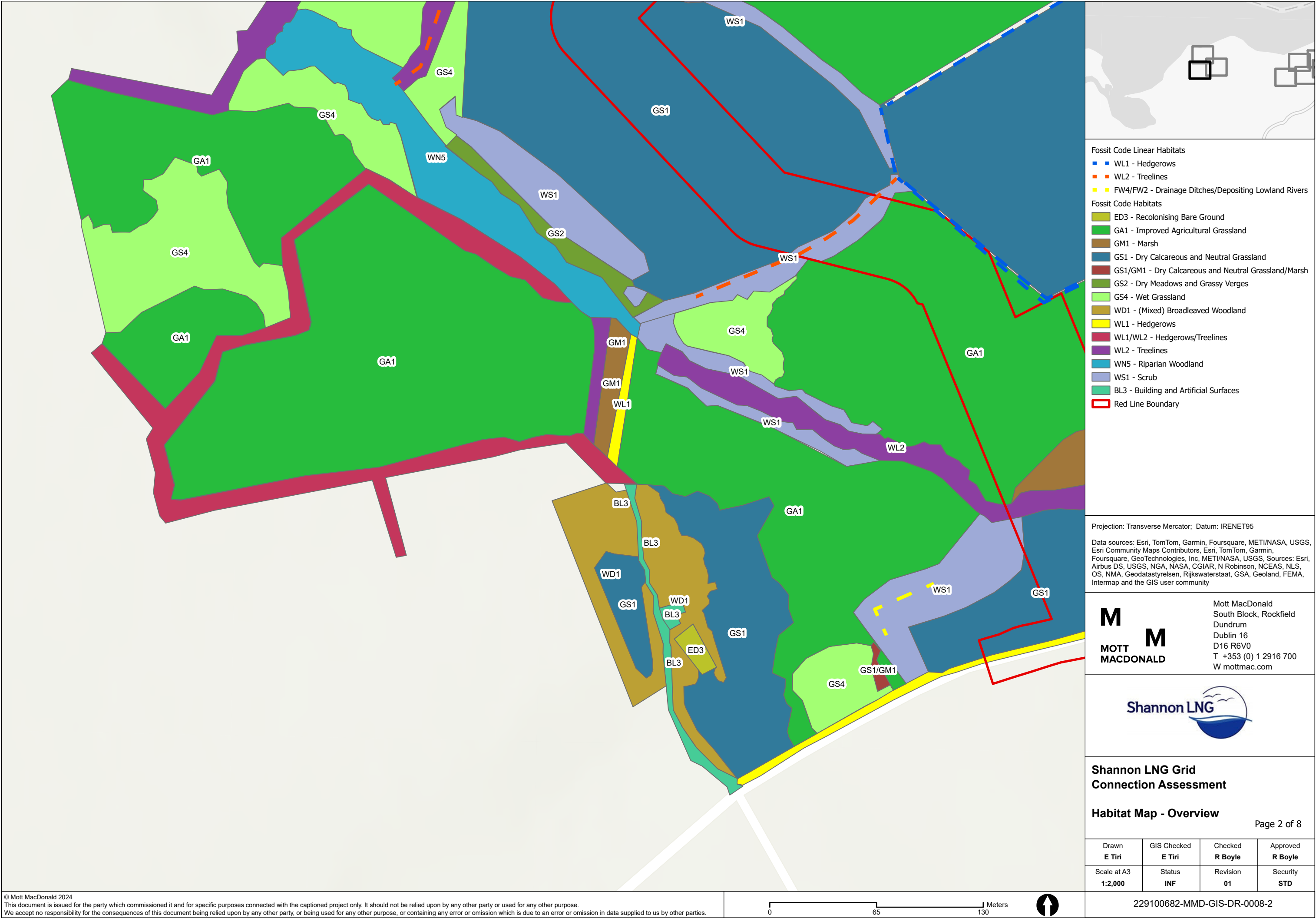


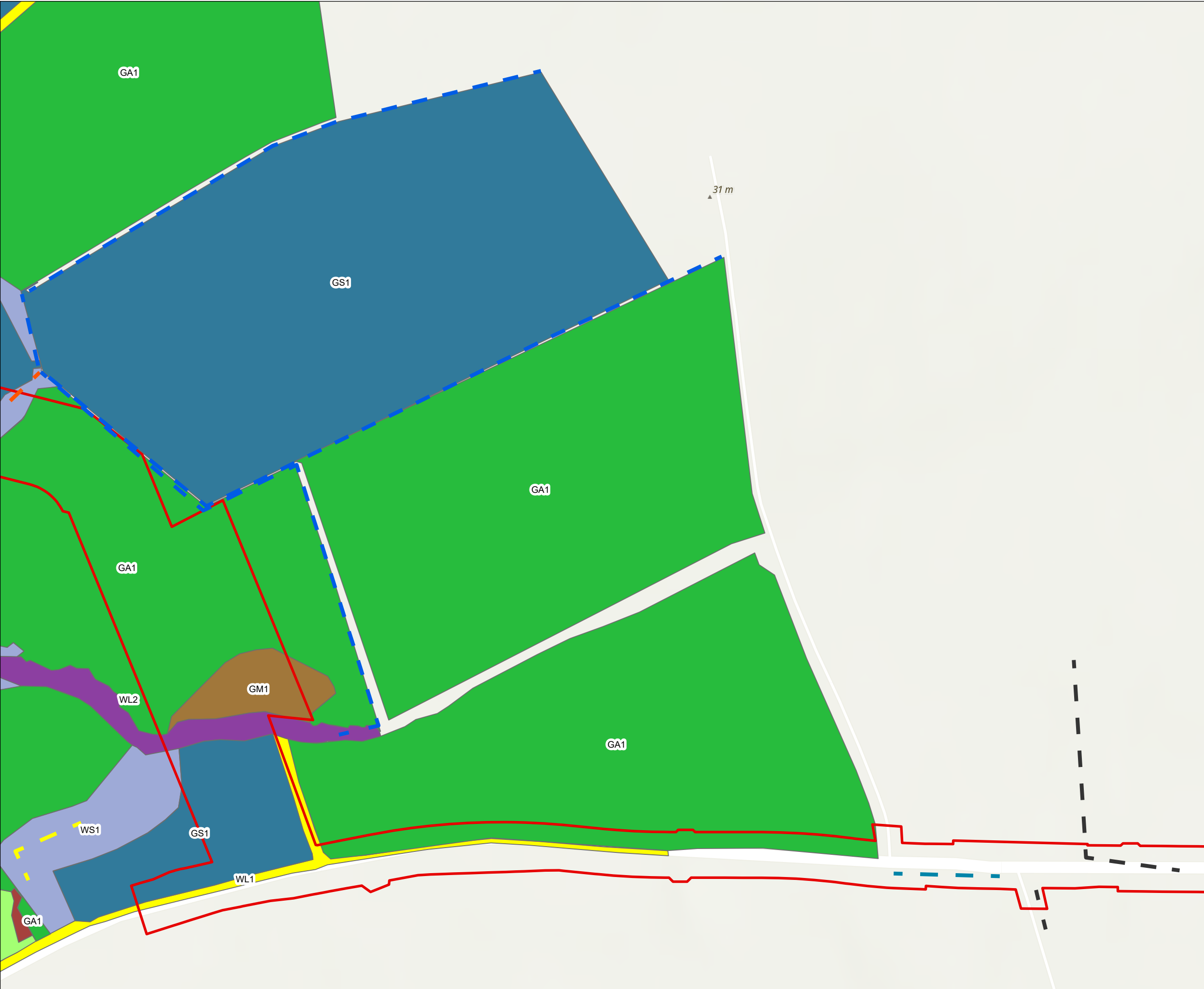
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Connection Assessment

Habitat Map - Overview

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Scale at A3 1:2,000	Status INF	Revision 01	Security STD

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 - GS4 - Wet Grassland
 - WL1 - Hedgerows
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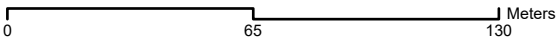
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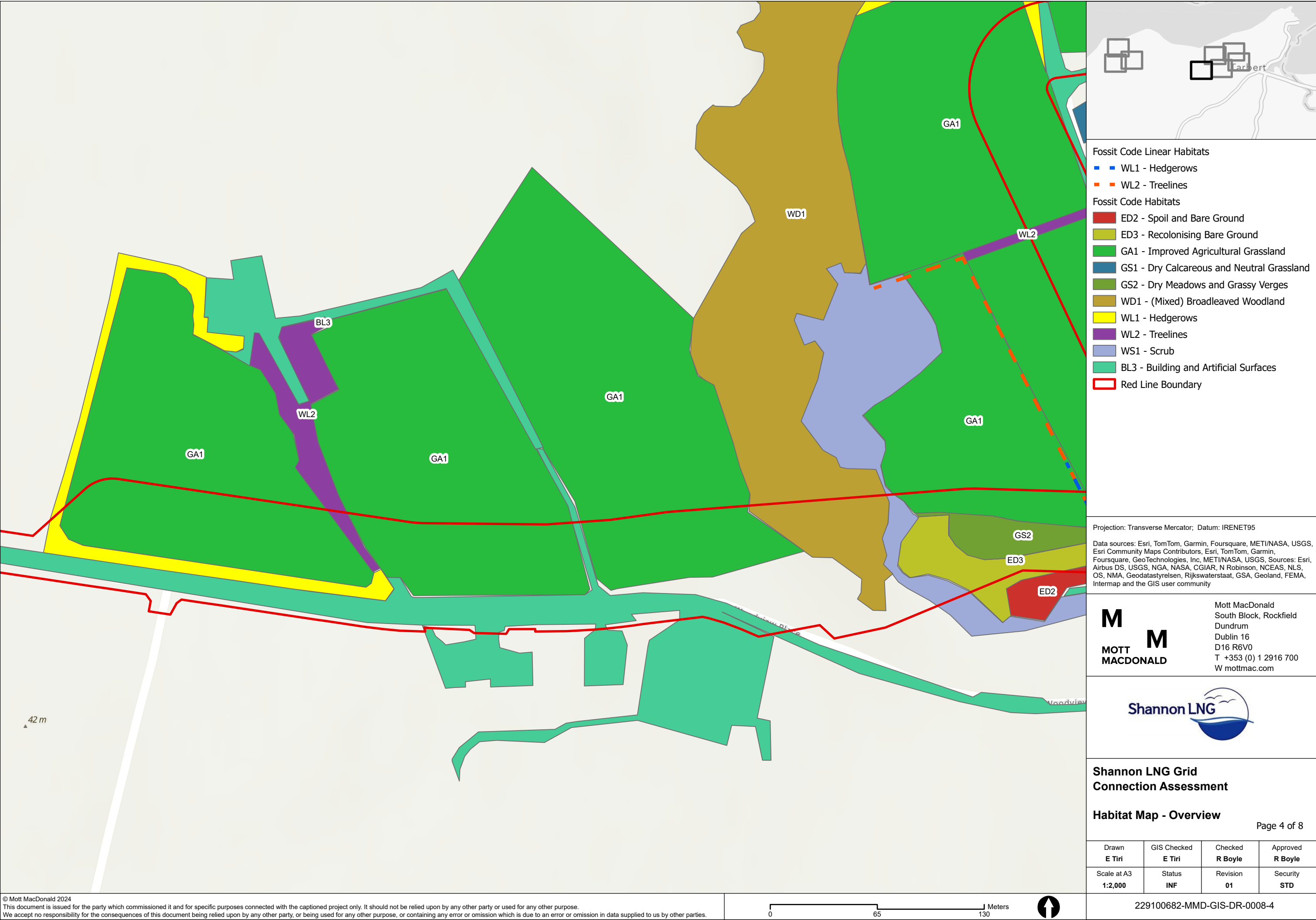


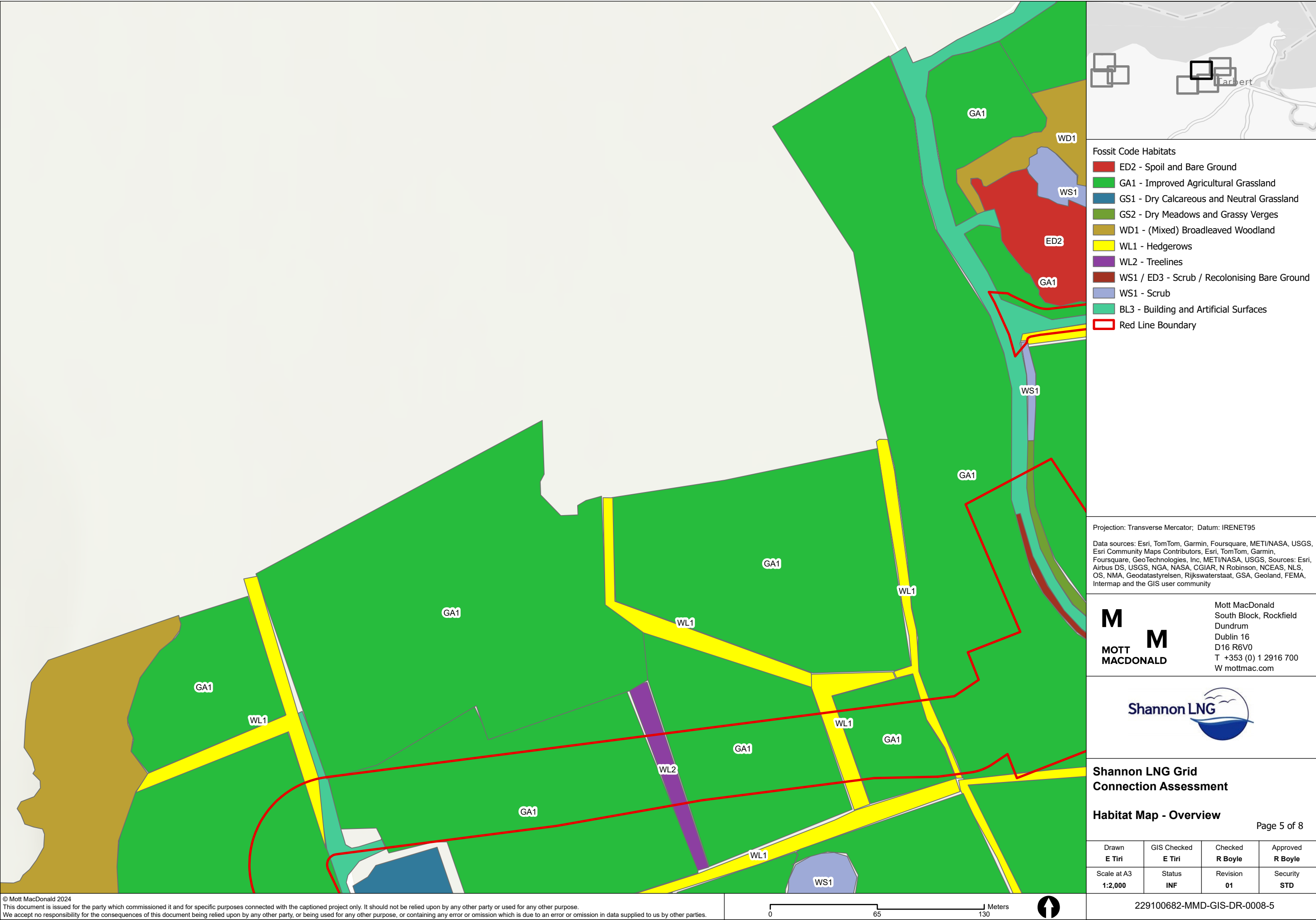
Shannon LNG Grid Connection Assessment

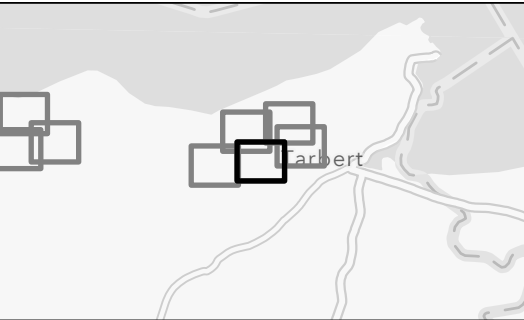
Habitat Map - Overview

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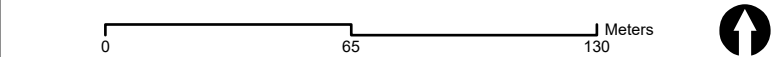


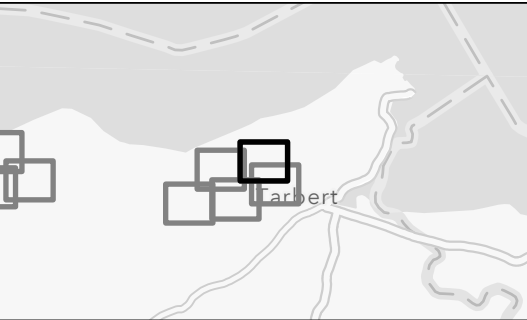
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Habitat Map - Overview

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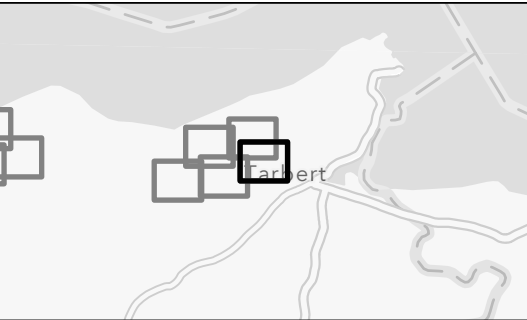
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