

## 6. BIODIVERSITY

### 6.1 Introduction

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the proposed development may have on Biodiversity, Flora and Fauna and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. Impacts on avian receptors are considered in Chapter Seven of this EIAR. These include species and habitats with national and international protection under the Wildlife Acts 1976-2019, EU Habitats Directive 92/43/EEC. The full description of the proposed development is provided in Chapter 4 of this EIAR.

The chapter is structured as follows

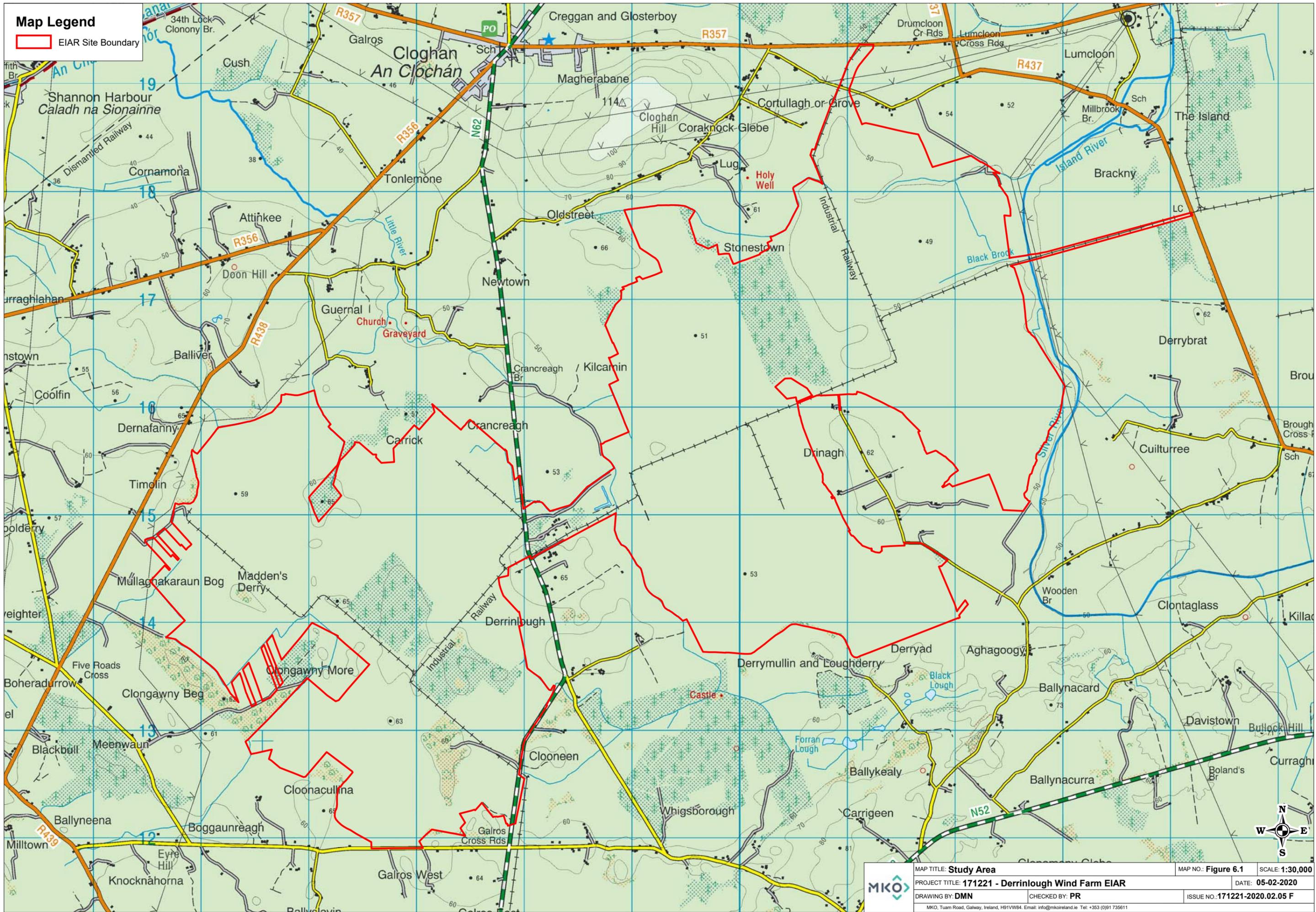
- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity, Flora and Fauna.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely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

The following defines terms utilised in this chapter:

- For the purposes of this EIAR, the entire project is referred to as ‘the Proposed Development’.
- For the purpose of this EIAR, the term ‘EIAR Site Boundary’ refers to the site red line boundary, comprising the entire area of the two Bog areas (Clongawny and Drinagh) as shown in Figure 6-1.
- “Key Ecological Receptor” (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- “Zones of Influence” (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

**Map Legend**

 EIAR Site Boundary



	MAP TITLE: <b>Study Area</b>	MAP NO.: <b>Figure 6.1</b>	SCALE: <b>1:30,000</b>	
	PROJECT TITLE: <b>171221 - Derrinlough Wind Farm EIAR</b>	DATE: <b>05-02-2020</b>		
	DRAWING BY: <b>DMN</b>	CHECKED BY: <b>PR</b>	ISSUE NO.: <b>171221-2020.02.05 F</b>	
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## Requirements for Ecological Impact Assessment

### National Legislation

The Wildlife Act, 1976–2018, is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild creatures and flora. These species are therefore considered in this report as ecological receptors. Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2017. These sites do not form part of the Natura 2000 network of European sites and the AA process, or screening for same, does not apply to NHAs or pNHAs. Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated<sup>1</sup> However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future (NPWS, 2020).

The Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under Flora Protection Order.

It is illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

### National Policy

The National Biodiversity Action Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht, 2017) (the “Plan”) demonstrates Ireland’s continuing commitment to meeting and acting on its obligations to protect Ireland’s biodiversity for the benefit of future generations through a series of targeted strategies and actions. The main objective of the Plan is to bring biodiversity into the mainstream of policy and decision-making. Objective 1 (*Mainstream biodiversity into decision-making across all sectors*) of the Plan identifies the following relevant measures in relation to future developments:

- “Incorporate into legislation the requirement for consideration of impacts on biodiversity to ensure that conservation and sustainable use of biodiversity are taken into account in all relevant plans and programmes and relevant new legislation;
- Public and Private Sector relevant policies will use best practice in SEA, AA and other assessment tools to ensure proper consideration of biodiversity in policies and plans;
- All Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure;
- Strengthen ecological expertise in local authorities and relevant Government Departments and agencies;
- Local Authorities will review and update their Biodiversity and Heritage Action Plans;
- Local Authorities will review and update their Development Plans and policies to include policies and objectives for the protection and restoration of biodiversity;
- Develop a Green Infrastructure at local, regional and national levels and promote the use of nature based solutions for the delivery of a coherent and integrated network;

<sup>1</sup> <https://www.npws.ie/protected-sites/nha> (accessed 23 January 2020).

- Continue to produce guidance on the protection of biodiversity in designated areas, marine and the wider countryside for Local Authorities and relevant sectors;
- Integrate Natura 2000 and Biodiversity financial expenditure tracking into Government Programmes internal paying agency management procedures including linkage to the Prioritised Action Framework and this NBAP;
- Develop a Natural Capital Asset Register and national natural capital accounts by 2020, and integrate these accounts into economic policy and decision-making;
- Initiate natural capital accounting through sectoral and small scale pilot studies, including the integration of environmental and economic statistics using the framework of the UN System of Experimental-Ecosystem Accounting (SEEA);
- Establish a national Business and Biodiversity Platform under the CBD's Global Business Partnership;
- Ensure Origin Green produces tangible benefits for biodiversity with increased emphasis on conservation and restoration of biodiversity;
- Implement actions from Ireland's Biodiversity Climate Change Sectoral Adaptation Plan;
- Identify and take measures to minimise the impact of incentives and subsidies on biodiversity loss, and develop positive incentive measures, where necessary, to assist the conservation of biodiversity;
- Establish and implement mechanisms for the payments of ecosystem services including carbon stocks, to generate increased revenue for biodiversity conservation and restoration;
- Develop and implement a National Biodiversity Finance Plan to set out in detail how the actions and targets of this NBAP will be delivered from 2017 and beyond; and
- Monitor the implementation of the Plan"

Such policies have informed the evaluation of ecological features recorded within the study area and the ecological assessment process.

### European Legislation

The EU Habitats Directive (92/43/EEC) (together with the Birds Directive (79/409/EEC), as subsequently codified by Council Directive 2009/147/EC on the conservation of wild birds) forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive and Birds Directive, which were transposed into Irish law through Part XAB of the Planning and Development Acts 2000-2019 (from a land use planning perspective) recognise the significance of protecting rare and endangered species of flora and fauna, and more importantly, their habitats.

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

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

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

## 6.3 Scoping/Review of Relevant Guidance and Sources of Consultation

The assessment methodology is based primarily upon the National Road Authority (NRA)’s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2 (NRA, 2009) (referred to hereafter as the NRA Ecological Impact Assessment Guidelines), and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, the following guidelines were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2018).

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1 of the EIAR.

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

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).
- Planning and Development Acts 2000 – 2019.

The following legislation applies with respect to non-native species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Offaly County Development Plan 2014 – 2020.
- Natura Impact Assessment Report on the Offaly County Development Plan, Offaly County Council, (2014).

### 6.3.1 Statement of Authority

This report has been prepared by David McNicholas and Pat Roberts (B.Sc. Environmental Science, MCIEEM). Pat has over 14 years' experience in ecological management and assessment. David McNicholas has over 9 years' professional ecological consultancy experience and is a full member of the Chartered Institute of Ecology and Environmental Management. The baseline ecological surveys were undertaken by David McNicholas (BSc., MSc., MCIEEM), Sarah Mullen (BSc., PhD), James Owens (BSc., MSc.), Dr. Úna Nealon, Laoise Kelly (B.Sc), Julie O'Sullivan (BSc, MSc), John Hehir and Paddy Manley (B.Sc). (CIEEM). Úna Nealon's primary expertise lies in bat ecology. She completed her PhD with the Centre for Irish Bat Research, examining the impacts of wind farms on Irish bat species. James has over 4 years' consultancy experience and is a competent expert in undertaking ecological surveys. Sarah has over 4 years' professional ecological consultancy experience and a PhD on the plant pollinator interactions in semi-natural grasslands. Laoise Kelly, Julie O'Sullivan, Paddy Manley and John Hehir all assisted in the gathering of baseline data at the proposed development site. They have relevant academic qualifications and are competent experts in undertaking the ecological surveys in which they were involved.

The survey methodologies underlined in this EIAR chapter have been peer reviewed by Dr Tom Gittings. Dr Gittings has been trading as an independent ecological consultant since 2001. He has over 18 years' experience as a professional ecologist and is a full member of the Chartered Institute of Ecology and Environmental Management.

## 6.4 Methodology

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

### 6.4.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of existing information on the proposed development site provided by Bord na Móna personnel in particular the Ecology team.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI).

- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes<sup>2</sup>.
- Available info from IPC licence P0500-01
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper
- Inland Fisheries Ireland (IFI) Reports, where available.
- Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed development is located.

## 6.4.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.6 of this EIAR.

Copies of all scoping responses are included in Appendix 2.1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2.3 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 6.1 provides a list of the organisations consulted with regard to biodiversity during the scoping process, and notes where scoping responses were received.

Table 6.1 Organisations consulted with regard to biodiversity

Consultee	Response
Butterfly Conservation Ireland (BCI)	Butterfly Conservation Ireland (BCI) were consulted during the preparation of this report. The findings of all surveys and measures for the avoidance of impact on marsh fritillary were discussed. The advice and considerations of BCI were fully taken into account in the design of the proposed development and in the design of mitigation and enhancement measures that are included in the Lepidoptera Management Plan prepared for this project.
Irish Peatland Conservation Council	Requested a Bord na Móna Rehabilitation Plan

## 6.4.3 Field Surveys

A comprehensive survey of the biodiversity of the entire site was undertaken on various dates throughout 2018 and 2019. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

<sup>2</sup> NPWS, 2019, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: <http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=7118df33693f48edbb70369d7fb26b7e>, Accessed: 26/06/2019.

#### 6.4.3.1 Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009)

Multidisciplinary walkover surveys were undertaken on the 21<sup>st</sup> June 2018, 28<sup>th</sup> September 2018, 21<sup>st</sup> and 22<sup>nd</sup> August 2019, 18<sup>th</sup> and 19<sup>th</sup> September 2019 and 5<sup>th</sup> December 2019. The majority of the survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire site was completed.

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected species. The survey included a search for badger setts and areas of suitable habitat, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the proposed development (e.g. otter etc.). In addition, an inventory of other species of local biodiversity interest was compiled including invertebrates (butterflies, dragonflies, damselflies, beetles), plants, fungi etc.

The multi-disciplinary walkover surveys comprehensively covered the entire study area and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (NRA, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

Other targeted survey methodologies undertaken at the site are described in the following subsections.

#### 6.4.3.2 Dedicated Habitat and Vegetation Composition Surveys

The walkover surveys were undertaken in order to ground truth the information provided in previous ecological surveys of the bog that were undertaken by the Bord na Móna ecology team in 2014. The Bord na Móna ecology team originally classified the habitats on site according to the Bord na Móna habitat classification system, provided in Appendix 6.1. Correspondence with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000) is also described in Appendix 6.1. Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the development footprint, with relevés undertaken within representative habitats at each turbine base, substation, borrow pits etc. Relevés were 2x2 metres for all habitats except for woodland which were 20x20 metres. Where linear sections of woodland were assessed, two 10x10 metre relevés were taken as sufficient woodland width would not allow for a 20x20 metre relevé. The extent of each habitat on site was mapped on site using aerial photography, hand held GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on site, including all relevés.

All habitats recorded on site and described in this EIAR chapter have been classified in accordance Fossitt (2000). In addition, peatland and woodland habitats outside of the proposed infrastructure footprint but within the study area are described in detail in this chapter. Full details of all the botanical surveys and results are provided in Appendix 6.4 and an assessment of the potential for the site to support Annex I habitats is also provided in this Appendix.

Botanical surveys for all turbine, road infrastructure, sub stations, grid connections and all other infrastructure were undertaken on 21<sup>st</sup> and 22<sup>nd</sup> of August and 18<sup>th</sup> - 19<sup>th</sup> of September 2019. Additional surveys of some areas of cutover bog were also undertaken on the 05 December 2019. Botanical surveys of the site were also undertaken on the 21<sup>st</sup> June 2018 and 28<sup>th</sup> September 2018. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the proposed infrastructure layout. The habitat assessment surveys described in this report have been undertaken with reference to the following guidelines and interpretation documents:

- Perrin, P.M, Martin, J.R., Barron, J.R., Roche & O’Hanrahan, B. (2014) *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland*. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service.
- Cross, J. & Lynn, D. (2013) *Results of a monitoring survey of bog woodland*. Irish Wildlife Manuals, No. 69. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) *Raised Bog Monitoring and Assessment Survey 2013*. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Commission of the European Communities (2007) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- Foss, P.J. & Crushell, P. 2008, *Guidelines for a National Fen Survey of Ireland, Survey Manual*. Report for the National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.
- NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1*. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments*. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O’Neill

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive 92/43/EEC were identified and classified as Key Ecological Receptors (KERs).

Plant nomenclature for vascular plants follows ‘*New Flora of the British Isles*’ (Stace, 2010), while mosses and liverworts nomenclature follows ‘*Mosses and Liverworts of Britain and Ireland - a field guide*’ (British Bryological Society, 2010).

### 6.4.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies, incidental records of protected species during ecological survey work and multidisciplinary walkover surveys were used to inform the scope of targeted ecological surveys required. Dedicated surveys for bats, otter and badger were undertaken at the times set out below with the methodologies followed also provided below. Following the completion of ecological walkover surveys, no requirement for further dedicated faunal surveys was identified. During the multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, beetles etc. were recorded. Given the known occurrence of the marsh fritillary butterfly in the area, this species was also focused on during the site visits with dedicated surveys undertaken in October 2018 and September 2019 to determine the occurrence, distribution and likely size of the population within the study area.

#### 6.4.3.3.1 Badger Survey

Areas identified as providing potential habitat for badger were subject to specialist targeted survey. Dedicated badger surveys were conducted on the 21<sup>st</sup> June 2018, 28<sup>th</sup> September 2018, 4<sup>th</sup> February 2019, 21<sup>st</sup> and 22<sup>nd</sup> August 2019, 18<sup>th</sup> and 19<sup>th</sup> September 2019 and 5<sup>th</sup> December 2019. The badger surveys covered the entire development footprint and surrounding suitable habitats in the study area. Targeted surveys were also undertaken in areas where incidental badger signs, setts or sightings were recorded during walkover bird surveys of the site. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys (NRA 2006a).

The badger surveys were conducted in order to determine the presence or absence of badger signs within and outside (areas of identified suitable habitat) the development footprint and study area. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and followed the 'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes' (NRA, 2006a) and CIEEM best practice competencies for species surveys (CIEEM, 2013<sup>3</sup>).

#### 6.4.3.3.2 Otter Survey

Following a review of the previously completed ecological surveys and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. The otter survey of watercourses was conducted in 21<sup>st</sup> and 22<sup>nd</sup> August 2019, 18<sup>th</sup> and 19<sup>th</sup> September 2019 and 5<sup>th</sup> December 2019. Additional otter surveys were undertaken during a fisheries assessment of the watercourses both within and downstream of the study area on the 22<sup>nd</sup> and 23<sup>rd</sup> October 2019.

The otter survey was conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter survey also followed the guidance as set out in NRA (2008) 'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes' and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

#### 6.4.3.3.3 Marsh fritillary Surveys

Following the identification of suitable habitat for marsh fritillary within the site during habitat surveys, targeted surveys for the species were undertaken by MKO on the 28<sup>th</sup> September 2018 and 18<sup>th</sup> and 19<sup>th</sup> September 2019. The survey methodology followed that described in the NRA (2009) best practice guidance document. This involved walked surveys to identify suitable areas of marsh fritillary habitat within or adjacent to the development footprint. Where suitable habitat did occur, detailed surveys to locate larval webs were undertaken. In addition, habitat suitability assessments were undertaken within areas of suitable habitat for the species following those developed by the NBDC<sup>4</sup>.

#### 6.4.3.3.4 Bat Surveys

A detailed bat survey report is provided in Appendix 6.2 of this EIAR. This document provides a detailed description of survey methodologies undertaken at the site during the survey period 2018-2019. Full details of the survey times and dates and the methodologies followed are provided in Appendix 6.2 along with details of all the surveyors.

Survey design and effort in 2018 was created in accordance with the best practice guidelines available at the time, 'Bat Surveys: Good Practice Guidelines' prepared by the Bat Conservation Trust (Hundt, 2012). Surveys undertaken in 2019 were undertaken in strict accordance with those prescribed in SNH (2019) 'Bats and onshore wind turbines: survey, Assessment and mitigation'. This is in line with standard best practice industry guidelines.

<sup>3</sup> CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: <https://cieem.net/resource/competencies-for-species-survey-css/> Accessed: 20.06.2019

<sup>4</sup> NBDC, 2019, Habitat Condition Assessment for Marsh Fritillary, Online, Available at: <http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Marsh-Fritillary-Habitat-Condition-Form.pdf>. Accessed, 20 March 2019

#### 6.4.3.3.5 Aquatic surveys

Habitat suitability for protected aquatic species of conservation interest which are known or suspected to occur within the study area (e.g. fish species, otter etc.) were conducted. Aquatic habitats and species were assessed during the multi-disciplinary walkover surveys and where appropriate dedicated aquatic habitat and fisheries surveys were undertaken. A dedicated fisheries assessment was undertaken at the site for targeted species groups including salmon, trout and lamprey on the 22<sup>nd</sup> and 23<sup>rd</sup> October 2019. A full description of the survey methodologies is provided in the standalone report available in Appendix 6.3. Aquatic plant species protected under Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) were searched for during all aquatic surveys.

#### 6.4.3.3.6 Invasive species survey

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

#### 6.4.3.3.7 Survey limitations

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

### 6.4.4 Methodology for Assessment of Impacts and Effects

#### 6.4.4.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, initial site visits (main ecological surveys of the site undertaken 21<sup>st</sup> June 2018, 28<sup>th</sup> September 2018, 21<sup>st</sup> and 22<sup>nd</sup> August 2019, 18<sup>th</sup> and 19<sup>th</sup> September 2019 and 5<sup>th</sup> December 2019, not including bat surveys) and stakeholder consultation; “Target receptors” likely to occur in the zone of influence of the development were identified. The target receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the likely zone of impact.
- Species protected under the Wildlife Acts 1976-2019
- Species protected under the Flora Protection Order 2015

#### 6.4.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the ‘Guidelines for Assessment of Ecological Impacts of National Roads Schemes’ (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

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

#### 6.4.4.3 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM ‘Guidelines for Ecological Impact Assessment in the UK and Ireland’ (2018). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA guidance (EPA 2017). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

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

#### 6.4.4.4 Determining the Significance of Effects

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

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

When determining significance, consideration is given to whether:

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

The EPA draft Guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in

Table 6.2.

*Table 6.2 Criteria for determining significance of effect, based on (EPA, 2017) guidelines*

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

- The likely effects on ‘integrity’ should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009).
- A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018).

### Integrity

In the context of EcIA, ‘integrity’ refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (NRA, 2009). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

### Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

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

The conservation of a species is favourable when:

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

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

#### 6.4.4.5 Incorporation of Mitigation

Section 6.5 of this EIAR assesses the potential effects of the proposed development to ensure that all effects on sensitive ecological receptors are adequately addressed. Where significant effects on sensitive ecological receptors are predicted, mitigation is incorporated into the project design or layout to address such impacts. The implemented mitigation measures avoid or reduce or offset potential significant residual effects, post mitigation.

#### 6.4.4.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following surveys on numerous dates during all seasons and over 2 years; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes best practice and mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visit. No significant limitations in the scope, scale or context of the assessment have been identified.

### 6.5 Establishing the Ecological Baseline

#### 6.5.1 Desk Study

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

##### 6.5.1.1 Designated Sites

###### 6.5.1.1.1 Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Development

The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA draft Guidance 2017, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 6.6.2 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

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

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

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

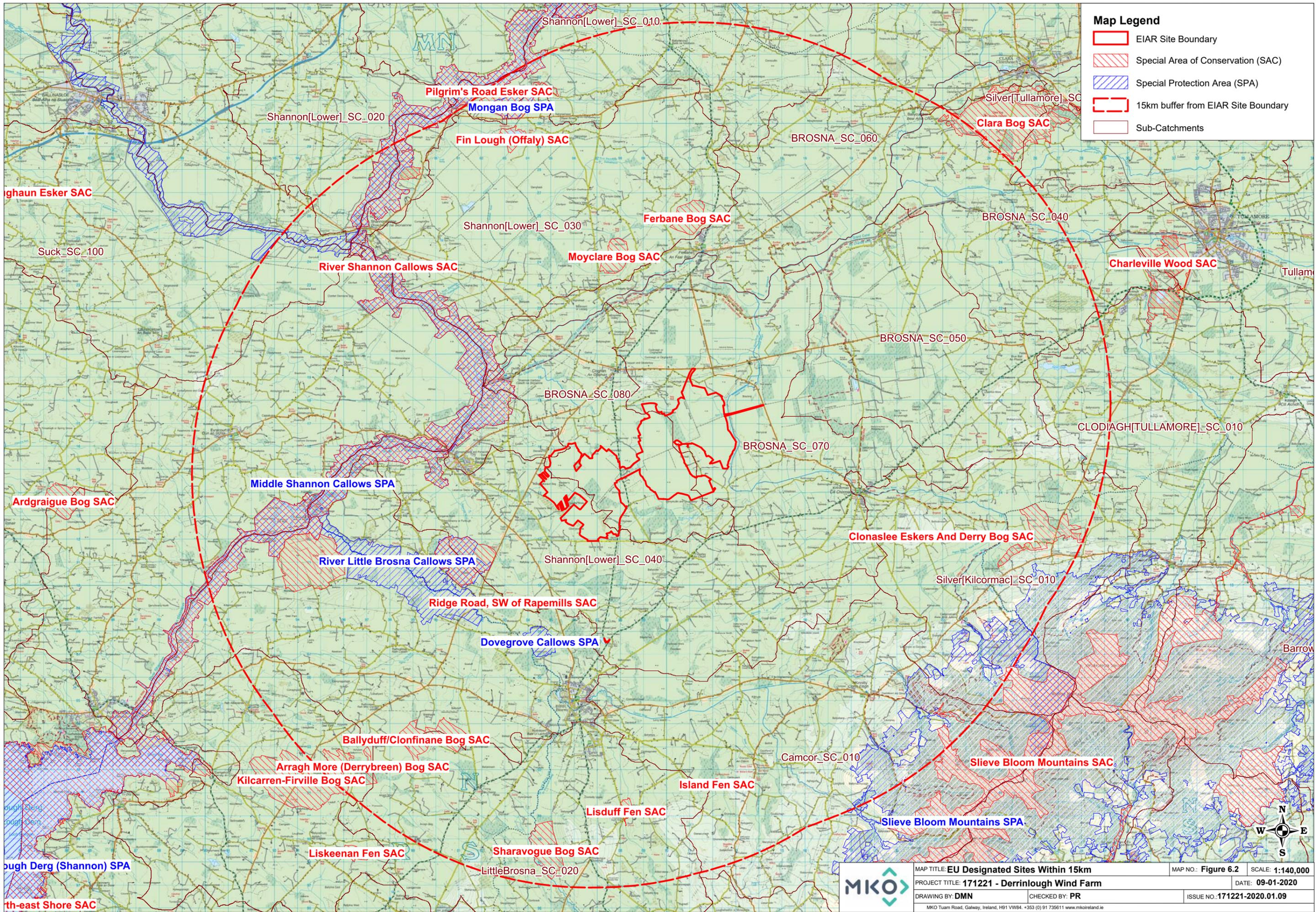
- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website ([www.npws.ie](http://www.npws.ie)) and the EPA website ([www.epa.ie](http://www.epa.ie)) on the 06/12/2019. The datasets

- were utilised to identify Designated Sites which could feasibly be affected by the proposed development.
- All designated sites within a distance of 15km surrounding the development site were identified. In addition, the potential for connectivity with European or Nationally designated sites at distances of greater than 15km from the proposed development was also considered in this initial assessment.
  - A map of all the European Sites within 15km is provided in Figure 6.2 with all Nationally designated sites shown in Figure 6.3.
  - 
  - Table 6.3 provides details of all relevant Nationally designated sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. All European Designated Sites are fully described and assessed in the Screening for Appropriate Assessment and Natura Impact Statement reports submitted as part of this planning application.
  - The designation features of these sites, as per the NPWS website ([www.npws.ie](http://www.npws.ie)), were consulted and reviewed at the time of preparing this report 30/01/2020.

Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.

Table 6.3 Identification of Nationally designated sites within the Likely Zone of Impact

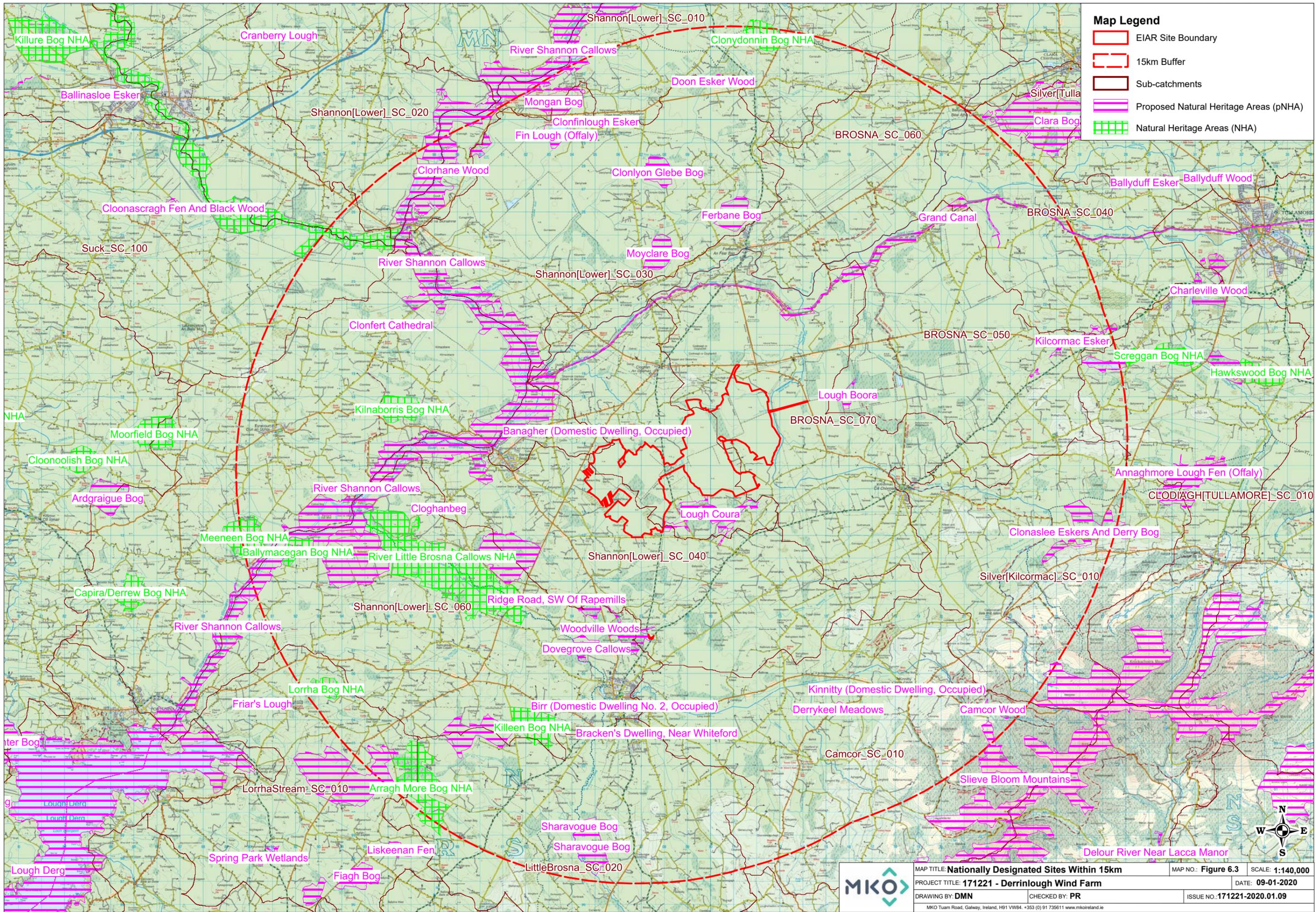
Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
<b>Natural Heritage Areas</b>		
Little Brosna Callows NHA	4.5km	This NHA is in a separate water catchment with no hydrological connectivity to the development site. As this site is also designated as a SPA for a variety of bird species, impacts on this designated site are fully considered under the European designation within the NIS. It is not within the Likely Zone of Impact.
Kilnaborris Bog NHA	7.1km	These NHAs are in a separate water catchment with no hydrological connectivity to the development site. They are not within the Likely Zone of Impact.
Kileen Bog NHA	8.5km	
Ballymacegan Bog NHA	11.1km	
Suck River Callows NHA	12.4km	
Arragh More Bog NHA	12.4km	
Lorrha Bog NHA	12.7km	
Moneen Bog NHA	13.2km	
Clonydonnin Bog NHA	14.5km	
<b>Proposed Natural Heritage Area (pNHA)</b>		



**Map Legend**

- EIA Site Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- 15km buffer from EIA Site Boundary
- Sub-Catchments

	MAP TITLE: <b>EU Designated Sites Within 15km</b>		MAP NO.: <b>Figure 6.2</b>	SCALE: <b>1:140,000</b>
	PROJECT TITLE: <b>171221 - Derrinlough Wind Farm</b>		DATE: <b>09-01-2020</b>	
	DRAWING BY: <b>DMN</b>	CHECKED BY: <b>PR</b>		ISSUE NO.: <b>171221-2020.01.09</b>
	MKO Tuam Road, Galway, Ireland, H91 VW84. +353 (0) 91 735611 www.mkofireland.ie			



**Map Legend**

- EIAR Site Boundary
- 15km Buffer
- Sub-catchments
- Proposed Natural Heritage Areas (pNHA)
- Natural Heritage Areas (NHA)

	<b>MAP TITLE: Nationally Designated Sites Within 15km</b>	<b>MAP NO.: Figure 6.3</b>	<b>SCALE: 1:140,000</b>	
	<b>PROJECT TITLE: 171221 - Derrinlough Wind Farm</b>	<b>DATE: 09-01-2020</b>		
	<b>DRAWING BY: DMN</b>	<b>CHECKED BY: PR</b>	<b>ISSUE NO.: 171221-2020.01.09</b>	
	MKO Tuam Road, Galway, Ireland, H91 VW84. +353 (0) 91 735611 www.mkoireland.ie			

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Lough Coura	Located adjacent to the south of the site.	This designated Site is located adjacent to the proposed development site. On a precautionary basis, it is included within the Likely Zone of Impact.
Banagher (Domestic Dwelling, Occupied)	0.7km	This site is designated for roosting bats although is located outside of the required survey distance from the proposed development. This site is assessed in the bat report prepared for the proposed development, see Appendix 6.2. No potential for impact on this site has been identified and it is not within the Zone of likely Impact.
River Shannon Callows	2.3km	<p>There is hydrological connectivity between the proposed development and this pNHA via watercourses within the site boundary which discharge to the River Shannon, including the Madden's Derry stream, Grants Island Stream, Mullaghakaraun bog, Feeghroe/ Mountcareret stream and several small tributary streams of the Little Cloghan river.</p> <p>This site is also designated as a SAC and SPA for a variety of habitats and species. As such it is within the Likely Zone of Impact but impacts on this designated site are fully considered under the European designation within the NIS.</p>
Lough Boora	3.1km	<p>These pNHAs are in a separate water catchment with no hydrological connectivity to the proposed development site. They are not within the Zone of Likely Impact.</p>
Woodville Woods	3.1km	
Ross And Glens Eskers	3.1km	
All Saints Bog And Esker	3.1km	
Grand Canal	3.2km	
Ridge Road, SW Of Rapemills	4.0km	
Dovegrove Callows	4.7km	
Moyclare Bog	5.4km	
Ferbane Bog	6.1km	
Cloghanbeg	6.4km	

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Birr (Domestic Dwelling No.1, Occupied)	7.2km	The proposed development is outside of the designated site boundaries and over 7km away. No potential for impact on these sites has been identified and they are not within the Zone of likely Impact.
Birr (Domestic Dwelling No.2, Occupied)	7.3km	
Bracken's Dwelling, Near Whiteford	8.5km	
Clonlyon Glebe Bog	8.5km	These pNHAs are in a separate water catchment with no hydrological connectivity to the development site. They are not within the Zone of likely Impact.
Redwood Bog	8.9km	
Ballyduff/Clonfinane Bog	9.8km	
Derrykeel Meadows	9.9km	
Clonfert Cathedral	10.3km	The proposed development is outside of the designated site boundaries and over 10km away. No potential for impact on these sites has been identified and they are not within the Zone of likely Impact.
Kinnitty (Domestic Dwelling, Occupied)	10.6km	
Kilcormac Esker	11.1km	These sites are in a separate hydrological catchment. No potential for impact on these sites has been identified and it is not within the Zone of likely Impact.
Clonfinlough Esker	12.1km	
Sharavogue Bog	12.2km	
Fin Lough (Offaly)	12.2km	
Clonaslee Eskers And Derry Bog	12.4km	
Doon Esker Wood	12.4km	
Clorhane Wood	13.2km	
Mongan Bog	13.3km	
Pallas Lough	13.4km	
Lough Nanag Esker	13.5km	
Camcor Wood	13.5km	
Kilcarren-Firville Bog	13.6km	
Pilgrim's Road Esker	13.6km	
Slieve Bloom Mountains	14.1km	

Lough Coura pNHA is located adjacent to the proposed development site. On a precautionary basis, it is included within the Likely Zone of Impact.

Surface water connectivity was identified between the proposed development and River Shannon Callows pNHA approximately 2.3km downstream. As this pNHA has also been designated as both a River Shannon Callows SAC and Middle Shannon Callows SPA, impacts on this designated site are fully considered under the European designation within the NIS. This is further described in Section 6.6.2 of this Chapter.

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

- River Shannon Callows SAC (located 2.3km downstream and contiguous with the River Shannon Callows pNHA).
- Lough Derg North East Shore SAC (located over 29km downstream but included on a precautionary basis).

### 6.5.1.2 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the Heath, Bogs and Mires, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient and Long Established Woodland datasets were conducted prior to undertaking the multi-disciplinary walkover survey.

Available NPWS datasets were downloaded and overlain on the proposed development study area. None of the NPWS GIS datasets contain polygon or point data within the EIAR Study Area. The National Survey of Native Woodlands recorded bog woodland within All Saints Bog and Esker SAC, located 4km to the west of the site. There are no records for Annex I bog or heath habitats within these datasets in close proximity to the proposed development. The nearest Transition Mire occurs 1.7km to the southeast of the site, however its Annex I status has not been assessed. The nearest ancient and long established woodland in the study area occurs outside the southwest of the site at Clooneen and is separated from the site by the N62. This area of woodland comprises of a number of small areas within an area now largely planted in conifers. An area of ancient and long-established woodland was also identified to the west of the N62 at Kennedy’s cross. Although there are proposed junction modifications at Kennedy’s Cross associated with the proposed delivery route, all proposed works are located to the east of the N62 entirely outside of the proposed woodland area. The nearest mapped grasslands surveyed are located along the River Shannon 2.3km to the northwest of the site. The nearest mapped distribution of both wet and dry heath habitats is over 13km to the southeast within the Slieve Blooms.

### 6.5.1.3 Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order (1999, as amended 2015) had been recorded in the relevant 10km squares in which the study site is situated (N01). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in

Table 6.4.

Table 6.4 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad N01

Common Name	Scientific Name	Hectad	Status
Meadow barley	<i>Hordeum secalinum</i>	N01	FPO, VU

Opposite-leaved pondweed	<i>Groenlandia densa</i>	N01	FPO, NT
Red hemp-nettle	<i>Galeopsis angustifolia</i>	N01	FPO, VU

#### 6.5.1.4 Bryophytes

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

#### 6.5.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) website was conducted prior to the commencement of site surveys, on the 12/02/2020. This helped to inform survey effort and provide a baseline of likely species composition in the area. Records of protected fauna recorded from hectads N01 and N11 are provided in

Table 6.5.

Table 6.5 NBDC records for species of conservation interest in hectads N01 and N11

Common name	Scientific name	Designation	Hectad
Large white-moss	<i>Leucobryum glaucum</i>	HD Annex IV	N01, N11
Marsh fritillary	<i>Euphydryas aurinia</i>	HD Annex II	N01, N11
Common frog	<i>Rana temporaria</i>	HD Annex V, WA	N01, N11
Common lizard	<i>Zootoca vivipara</i>	WA	N01
Leisler's bat	<i>Nyctalus leisleri</i>	HD Annex IV, WA	N01
Daubenton's bat	<i>Myotis daubentonii</i>	HD Annex IV, WA	N01, N11
Common pipistrelle	<i>Pipistrelle (Pipistrellus pipistrellus sensu lato)</i>	HD Annex IV, WA	N01, N11
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA	N01
Otter	<i>Lutra lutra</i>	HD Annex II, IV, WA	N01, N11
Pine marten	<i>Martes martes</i>	HD Annex V, WA	N01, N11
Freshwater white-clawed crayfish	<i>Austropotamobius pallipes</i>	HD Annex II, WA	N11
Brook lamprey	<i>Lampetra planeri</i>	HD Annex II	N11
Reindeer lichen	<i>Cladonia portentosa</i>	HD Annex V	N11
Reindeer moss	<i>Cladonia rangiferina</i>	HD Annex V	N11

Desmoulin's whorl snail	<i>Vertigo (Vertigo) moulinsiana</i>	HD Annex II, WA	N11
Smooth newt	<i>Lissotriton vulgaris</i>	WA	N01,N11
Red deer	<i>Cervus elaphus</i>	WA	N01, N11
Atlantic salmon	<i>Salmo salar</i>	HD Annex II, V	N11
Badger	<i>Meles meles</i>	WA	N01, N11
Red squirrel	<i>Scuirus vulgaris</i>	WA	N01, N11
Eurasian pygmy shrew	<i>Sorex minutus</i>	WA	N01, N11
European hedgehog	<i>Erinaceus europaeus</i>	WA	N01, N11
Fir clubmoss	<i>Huperzia selago</i>	Annex V	N01, N11
Meadow barley	<i>Hordeum secalinum</i>	FPO; EN	N01

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

### 6.5.1.6 Bat Records

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 10 km radius of the proposed site (IG Ref: E208260 N214907; last search 29/11/2019). A number of observations have been recorded (Table 6.6). At least four of Ireland's nine resident bat species were recorded within 10 km of the proposed works including common and soprano pipistrelle, Leisler's bat and Daubenton's bat. The results of the database search are provided in Table 6.6.

Table 6.6 National Bat Database of Ireland records within 10km

Grid Square	Species	Record Count	Latest Record	Dataset
N01	Daubenton's bat	36	26/08/2014	National Bat Database of Ireland
N01	Lesser Noctule	2	18/05/2012	Ireland's BioBlitz
N01	Pipistrelle sp.	2	18/05/2012	Ireland's BioBlitz
N01	Soprano pipistrelle	2	18/05/2012	Ireland's BioBlitz
N11	Daubenton's bat	4	18/05/2012	Ireland's BioBlitz
N11	Pipistrelle sp.	2	18/05/2012	Ireland's BioBlitz
N11	Soprano pipistrelle	2	18/05/2012	Ireland's BioBlitz
N02	Daubenton's bat	9	02/09/2014	National Bat Database of Ireland
N02	Soprano pipistrelle	1	26/05/2009	National Bat Database of Ireland
N12	Daubenton's bat	2	26/05/2009	National Bat Database of Ireland
N12	Lesser Noctule	1	26/05/2009	National Bat Database of Ireland
N12	Soprano pipistrelle	2	26/05/2009	National Bat Database of Ireland

### 6.5.1.7 NPWS

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectads N01 and N11. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 14<sup>th</sup> February 2019. A response was received on the 28<sup>th</sup> February 2019. Table 6.7 lists rare and protected species records obtained from NPWS.

Table 6.7 NPWS records for rare and protected species

Common name	Scientific name	Designation	Hectad
Marsh fritillary	<i>Euphydryas aurinia</i>	HD Annex II	N01
Common frog	<i>Rana temporaria</i>	HD Annex V, WA	N01, N11
Common lizard	<i>Zootoca vivipara</i>	WA	N01
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA	N11
Otter	<i>Lutra lutra</i>	HD Annex II, IV, WA	N01, N11
Pine marten	<i>Martes martes</i>	HD Annex V, WA	N01, N11
Freshwater white-clawed Crayfish	<i>Austropotamobius pallipes</i>	HD Annex II, WA	N01, N11
Reindeer moss	<i>Cladonia rangiferina</i>	HD Annex V	N01
Fallow Deer	<i>Dama dama</i>	WA	N01, N11
<i>Ephemerum hibernicum</i>	<i>Ephemerum hibernicum</i>		N01
Blue fleabane	<i>Erigeron acer</i>		N01, N11
Opposite-leaved pondweed	<i>Groenlandia densa</i>	FPO, VU	N01
Smooth newt	<i>Lissotriton vulgaris</i>	WA	N01
Badger	<i>Meles meles</i>	WA	N01, N11
Irish Hare	<i>Lepus timidus subsp. hibernicus</i>	Annex V, WA	N01, N11
Irish Stoat	<i>Mustela erminea subsp. hibernica</i>	WA	N01, N11
Red squirrel	<i>Sciurus vulgaris</i>	WA	N11
Hedgehog	<i>Erinaceus europaeus</i>	WA	N01, N11
Fir Clubmoss	<i>Huperzia selago</i>	Annex V	N11
Red Hemp-nettle	<i>Galeopsis angustifolia</i>	FPO, VU	N01
Meadow barley	<i>Hordeum secalinum</i>	FPO, EN	N01
Green-winged orchid	<i>Orchis morio</i>	VU	N01, N11

Common name	Scientific name	Designation	Hectad
Shepherd's-needle	<i>Scandix pecten-veneris</i>	RE	N01, N11
<i>Weissia controversa</i> var. <i>densifolia</i>			N01

FPO = Flora Protection Order; RL = Red List, VU = Vulnerable.

### 6.5.1.8 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The NPWS *Margaritifera* Sensitive Area map (Version 8, 2017) was consulted during the desk study. There is no surface water connectivity between the proposed development site and any *Margaritifera* catchment. The proposed development site boundary is located 18.7km northwest of the Nore Upper *Margaritifera* Sensitive Area and 21.4km northwest of the Barrow *Margaritifera* Sensitive Area, with no connectivity to either.

### 6.5.1.9 Marsh Fritillary (*Euphydryas aurinia*)

The closest NBDC records for marsh fritillary were located in the hectad (N11). The Bord Na Móna Biodiversity Action Plan 2016-2021 states that marsh fritillary, listed in Annex II of the EU Habitats Directive, are known to occur on 'marginal areas of regenerating cutaway' of Clongawny bog (Bord na Móna, 2016).

### 6.5.1.10 Inland Fisheries Ireland Data

The Little and Silver rivers both feed into the River Shannon. A search of the Inland Fisheries Ireland (IFI) online database was carried out to determine the species richness of both rivers. The results are presented in

Table 6.8. European eel (*Anguilla Anguilla*), is classified as 'critically endangered' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011). Lamprey (*Lampetra* sp.) are classified as 'near threatened' in 'Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish' (King *et al.*, 2011) and all three species of Ireland's lamprey are protected under Annex II of the EU habitats directive, with River Lamprey classified under Annex II and Annex V. Salmon (in freshwater) is listed on Annexes II and V of the EU Habitats Directive, and is listed as "Vulnerable," on King *et al.*'s Red list (2011).

Brown trout (*Salmo trutta*) and salmon (*Salmo salar*) were recorded in both the Little River and the Silver River, signifying their importance for salmonid species.

Table 6.8 Water quality monitoring stations and associated Q values

Station Name	Species	Status	Assessment Year
Little River	Brown trout; European eel; lamprey sp.; minnow	Moderate	2011
Silver (Kilcormac)	Brown Trout; gudgeon; minnow; salmon; stone loach; three-spined stickleback	Moderate	2011
Shannon (Upper)	European eel; lamprey sp.; perch; pike; roach	Moderate	2010

### 6.5.1.11 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of 'high impact' invasive species for hectads N01 and N11 are provided in Table 6.9.



Table 6.9 NBDC records for invasive species (hectads N01 and N11)

Common Name	Scientific Name	Hectad
Canadian waterweed	<i>Elodea canadensis</i>	N01, N11
Parrot's feather	<i>Myriophyllum aquaticum</i>	N11
Indian Balsam	<i>Impatiens glandulifera</i>	N01
Japanese knotweed	<i>Fallopia japonica</i>	N01
Nuttall's waterweed	<i>Elodea nuttallii</i>	N01
Rhododendron	<i>Rhododendron ponticum</i>	N01, N11

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) include legislative measures to deal with the introduction, dispersal, dealing in and keeping of non-native species. Japanese knotweed (*fallopian japonica*) and Rhododendron (*rhododendron ponticum*) are two species subject to restrictions under Regulations 49 and 50 and are included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

### 6.5.1.12 Baseline Hydrology

Regionally, the proposed wind farm development site is located in the River Shannon surface water catchment (IE25\_01) within Hydrometric Area 25 of the Shannon River Basin District. A regional hydrology map is shown in Figure 9.2, Chapter 9 of this EIAR.

On a more local scale, the majority of the site is located in the Brosna river sub-catchment (Brosna\_SC\_080). The Little River flows in a northwesterly direction through the centre of the site and crosses the N62 ~1.5km north of the Derrinlough Briquette factory. The Little River discharges to the Brosna River at the confluence in the townland of Moytown Demense, ~5.5km northwest of the site. The Brosna then flows west, where it meets the River Shannon near Shannon Harbour.

The eastern side of the Drinagh bog is mapped within the Brosna\_SC\_070 sub-catchment. The Silver River flows north through this catchment, along the eastern boundary of the site. It flows north before joining the Brosna river ~3km southeast of Ferbane. The western edge of the site, within the Clongawny bog, is drained by the Shannon lower sub-catchment (Shannon [Lower]\_SC\_040). A number of small tributaries flow west/southwest before joining the Rapemills River, which drains the sub-catchment. The Rapemills River then flows north for ~5.5km before entering the Shannon River just west of Banagher. A local hydrology map is shown as Error! Reference source not found., Chapter 9 of this EIAR.

There are 3 no. pumping stations across the two bogs (P15/006, P15/007, and P15/008). These are identified on the site drainage map (Error! Reference source not found.) in Chapter 9 of this EIAR. Surface water draining/pumped from the site is routed via large settlement ponds prior to discharge to off-site drainage channels which flow into the local rivers (i.e. Little River and Silver River).

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

### 6.5.1.12.1 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envirovision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envirovision map viewer was consulted on 30<sup>th</sup> January 2020 regarding the water quality status of the rivers which run within and directly adjacent to the Study Area. The WFD River Waterbody Status 2013 – 2018 for the watercourses which flow through the site have been assessed in Table 6.10.

Table 6.10. Watercourses on site with relevant water quality statuses

Name	Location	Status	Risk
Little River	Branches between both portions of the site, flowing north-west	Moderate	At risk
Silver (Kilcormac)	Flows in a north-easterly direction at the eastern portion of the site	Moderate	At risk
Shannon (Lower)	Is the recipient watercourse for the Little River and Silver River	Unassigned	Unassigned

**Status – WFD River Waterbody Status 2010-2015 Risk – WFD River Waterbodies Risk**

Table 6.11 illustrates the respective Q-value status results from monitoring stations located along rivers which flow through the site (as is the case with the Little River) or along rivers which are fed directly by watercourses which flow through or around the site (in the case of the Silver River, for example).

Table 6.11 Water quality monitoring stations and associated Q values

Name	Location	Status	Risk
Little River- SW of Cloghan	E206296, N217769	4-5 (Good)	2017
Silver (Kilcormac) - Lumcloon Br	E213921, N219777	4-5 (Good)	2017
Incherky Quay (d/s Banagher)	E195270, N214307	3-4 (Moderate)	2017
Bellmount d/s Ferbane	E207399, N222269	3-4 (Moderate)	2017

### 6.5.1.13 Existing Baseline Habitat Mapping

The habitats within the entire study area of Derrinlough has been mapped in detail by the Bord Na Móna Ecology team since 2014. This information has been reviewed as part of the baseline ecological data. Detailed GIS shapefiles of all habitat mapping prepared was received from Bord Na Móna and ground truthed by MKO when undertaking detailed habitat assessments and relevés of the proposed infrastructure footprint. Detailed habitat maps of the study area are provided in Section 5.6.2 of this EIAR.

In addition to detailed habitat mapping of the study area by Bord na Móna, the following documents were also reviewed:

- Bord na Móna Biodiversity Action Plan 2010-2015 (Bord na Móna, 2010)
- Bord na Móna Biodiversity Action Plan 2016-2021 (Bord na Móna, 2016)

The Bord na Móna, (2010) document states that ‘examples of valuable sites are mineral islands found within larger bog areas such as those in Clongowney (the western parcel of the study area) .... These mineral islands are refuges for Old Woodland habitat and represent precious remnants of a woodland cover that once extended across the island of Ireland’. In addition, small areas of oak woodland have been planted within Clongowney as part of a native woodland scheme. The Bord na Móna (2016) document also referred to the large waterbodies within the Drinagh part of the study area (eastern parcel of the study area) and states that these have been created through drain blocking as part of rewetting of this part of the site.

#### 6.5.1.14 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in Hectad N11, within which the proposed development site is located. The site is situated within the River Shannon surface water catchment (IE25\_01) within Hydrometric Area 25 of the Shannon River Basin District. On a more local scale, the majority of the site is located in the Brosna river sub-catchment (Brosna\_SC\_080). Surface water draining/pumped from the site is routed via large settlement ponds prior to discharge to off-site drainage channels which flow into the local rivers (i.e. Little River and Silver river). A number of watercourses that drain the study area, leads to the following downstream EU designated sites. The desktop study has provided information about the existing environment in Hectad N11, within which the proposed development site is located.

A number of watercourses that drain the study area, lead to the following downstream EU Designated Sites, and are further considered in the Natura Impact Statement prepared for the proposed development:

- River Shannon Callows SAC (2.3km downstream),
- Lough Derg, North-east Shore SAC (29.2km downstream).

The desk study identified that a variety of protected faunal species are known to occur within the study area, including bats, marsh fritillary, otter, freshwater white-clawed crayfish, brook lamprey, Atlantic salmon, badger and red squirrel. A review of bat roost records for the area did not identify any roosts within or immediately adjacent to the proposed development. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits.

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

## 6.5.2 Ecological Walkover Survey Results

### 6.5.2.1 Description of Habitats and Flora within the Ecological Survey Area

The habitats on the site of the proposed development were the subject of a detailed survey and assessment by Bord na Móna ecologists and a habitat map was produced of the entire landholding at proposed development. This habitat mapping and assessment was undertaken following the Bord na Móna habitat classification scheme and was cross referenced with ‘*A Guide to Habitats in Ireland*’ (Fossitt, 2000). The proposed development covers only a section of the overall area of Clongawny and Drinagh bogs but the habitats of the entire area are described in this section. The habitat descriptions in this section are based on the Bord na Móna habitat assessments undertaken in 2014 (that were ground truthed during 2018 and 2019) and detailed vegetation surveys undertaken by MKO in 2018 and 2019. Detailed botanical quadrat data is provided in Appendix 6.4 of this EIAR.

The study area comprises two large cutover raised bogs. Some areas of the site have been out of commercial peat production by Bord na Móna for a significant period of time and thus vegetation,

dominated primarily by birch scrub, common cottongrass and marsh arrowgrass, has regenerated over much of these areas. Other large areas within the southwest, northwest and southeast remain in active peat extraction, see Figure 6.4 'Habitat map'. Small areas/remnant of uncut raised bog occur at various locations at its edges of the site, although these areas occur outside of the development footprint.

The main habitat types on the site included woodlands and scrub (dominated by birch), cutover bog habitats with a vegetative composition that is similar to degraded dry and wet heath type communities (dominated by Ling heather), poor fen, bare peat communities and small areas of grasslands (occurring alongside railway tracks). These habitats occur in intimate mosaics throughout the study area as is shown in Figure 6.4a and 6.4b. Areas of open water occur where peat extraction has ceased and the water levels in these areas are no longer managed through the onsite pumping and drainage infrastructure. The largest area of open water and reed swamp occurs to the east of the study area within an area known as the Drinagh wetlands. This area was deliberately avoided by Bord na Mona in the design of the development and will not be negatively affected by it. Another large wetland also occurs within the south-eastern portion of the Clongawny peatland, adjacent to the N62. Small mineral islands/derries occur within the study area and are dominated by native oak woodlands. These areas were also constrained out as part of the proposed development design.

Habitat maps (Figures 6.4a and 6.4b, as prepared by Bord na Móna ecologists, show the location and relative cover of the habitats recorded within the proposed development site at a high level. Figures 6.4c and 6.4d show the habitats that occur beneath the proposed development footprint.

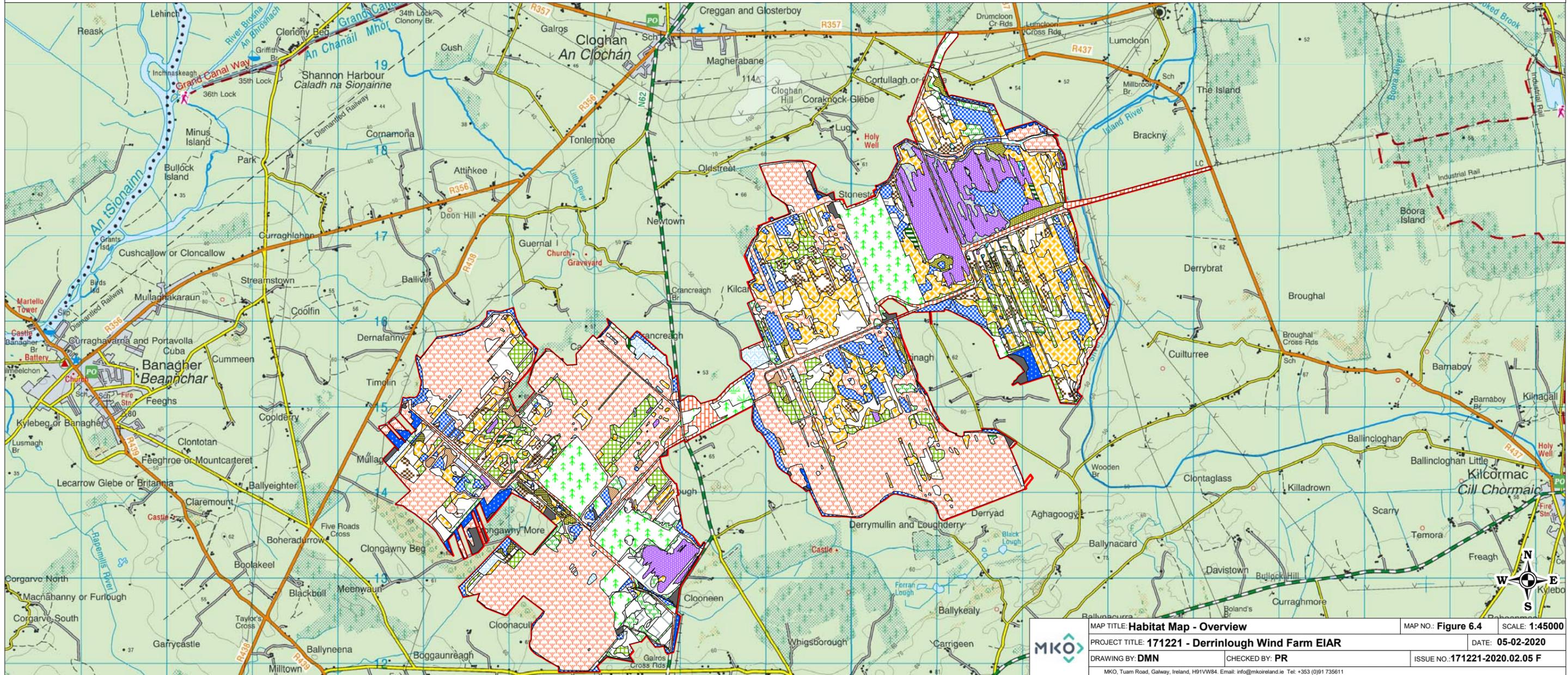
#### 6.5.2.1.1 Cutover Bog (PB4)

The vast majority of the site, with the exception of small remnant sections of raised bog around the peripheries of the site, comprise of cutover or cutaway peat. Large areas of the study area were in active peat production in 2019 or have recently ceased to be in active production. These areas are dominated by bare peat with little growth of vegetation, see Plate 6.1. Where peat production/extraction has ceased for some time, these areas have begun to revegetate, predominantly by poor fen and birch dominated scrub/woodland. The following subsections provide a description of the secondary habitats that have begun to form on the cutover bog following cessation of peat extraction/milling.

# Habitat Map

## Vegetation communities occurring on Cutover Bog (PB4)

- |  |   |  |   |  |  |
|--|---|--|---|--|--|
|  | Acid oligotrophic lakes (FL2)   |  | Cutover bog (PB4), Scrub (WS1), Dry calcareous and neutral grassland (GS1)  |  | Poor fen and flush (PF2)   |
|  | Acid oligotrophic lakes (FL2), Poor fen and flush (PF2) mosaic                  |  | Cutover bog (PB4), Scrub (WS1), Poor fen and flush (PF2) mosaic             |  | Raised bog (PB1)   |
|  | Acid oligotrophic lakes (FL2), Reed and large sedge swamp (FS1) mosaic          |  | Cutover bog (PB4), Wet grassland (GS4) mosaic                               |  | Recently-planted woodland (WS2)                                    |
|  | Buildings and artificial surfaces (BL3)   |  | Cutover bog (PB4), Wet grassland (GS4), Poor fen and flush (PF2) mosaic     |  | Recolonising bare ground (ED3)                                     |
|  | Conifer plantation (WD4)  |  | Dense bracken (HD1)   |  | Reed and large sedge swamps (FS1)                                  |
|  | Cutover bog (PB4)   |  | Depositing/lowland rivers (FW2)   |  | Reed and large sedge swamps (FS1), Poor fen and flush (PF2) mosaic |
|  | Cutover bog (PB4) pioneering Dry Heath (HH), Poor fen (PF2), Scrub (WS1) mosaic |  | Dry calcareous and neutral grassland (GS1)                                  |  | Refuse and other waste (ED5)                                       |
|  | Cutover Bog (PB4), Bog woodland (WN7)   |  | Dry calcareous and neutral grassland (GS1), Poor fen and flush (PF2) mosaic |  | Rich fen and flush (PF1)   |
|  | Cutover bog (PB4), Exposed sand, gravel or till (ED1) mosaic                    |  | Dry calcareous and neutral grassland (GS1), Recolonising bare ground (ED3)  |  | Scrub (WS1)  |
|  | Cutover bog (PB4), Pioneering Dry Heath (HH)                                    |  | Dry meadows and grassy verges (GS2)   |  | Scrub (WS1), Dry grassland (GS2), pioneering Dry heath (HH1)       |
|  | Cutover bog (PB4), Pioneering Dry Heath (HH), Dry grassland (GS1) mosaic        |  | Dry-humid acid grassland (GS3)  |  | Scrub (WS1), Poor fen and flush (PF2) mosaic                       |
|  | Cutover bog (PB4), pioneering Dry Heath (HH), Poor fen and flush (PF2) mosaic   |  | Hedgerow (WL1)  |  | Scrub (WS1), Wet grassland (GS4) mosaic                            |
|  | Cutover bog (PB4), pioneering Dry Heath (HH), Scrub (WS1) mosaic                |  | Improved grassland (GA1)  |  | Scrub (WS1), Wet grassland (GS4), Poor fen and flush (PF2) mosaic  |
|  | Cutover bog (PB4), Poor fen (PF2), Dry grassland (GS1) mosaic                   |  | Mixed broad-leaved woodland (WD1)   |  | Wet grassland (GS4)  |
|  | Cutover bog (PB4), Poor fen (PF2), Reed and large sedge swamps (FS1) mosaic     |  | Oak-Ash-Hazel woodland (WN2)  |  | Wet grassland (GS4), Poor fen and flush (PF2) mosaic               |
|  | Cutover bog (PB4), Poor fen and flush (PF2) mosaic                              |  | Other artificial lakes and ponds (FL8)                                      |  |  |
- EIAR Site Boundary



	MAP TITLE: <b>Habitat Map - Overview</b>	MAP NO.: <b>Figure 6.4</b>	SCALE: <b>1:45000</b>	
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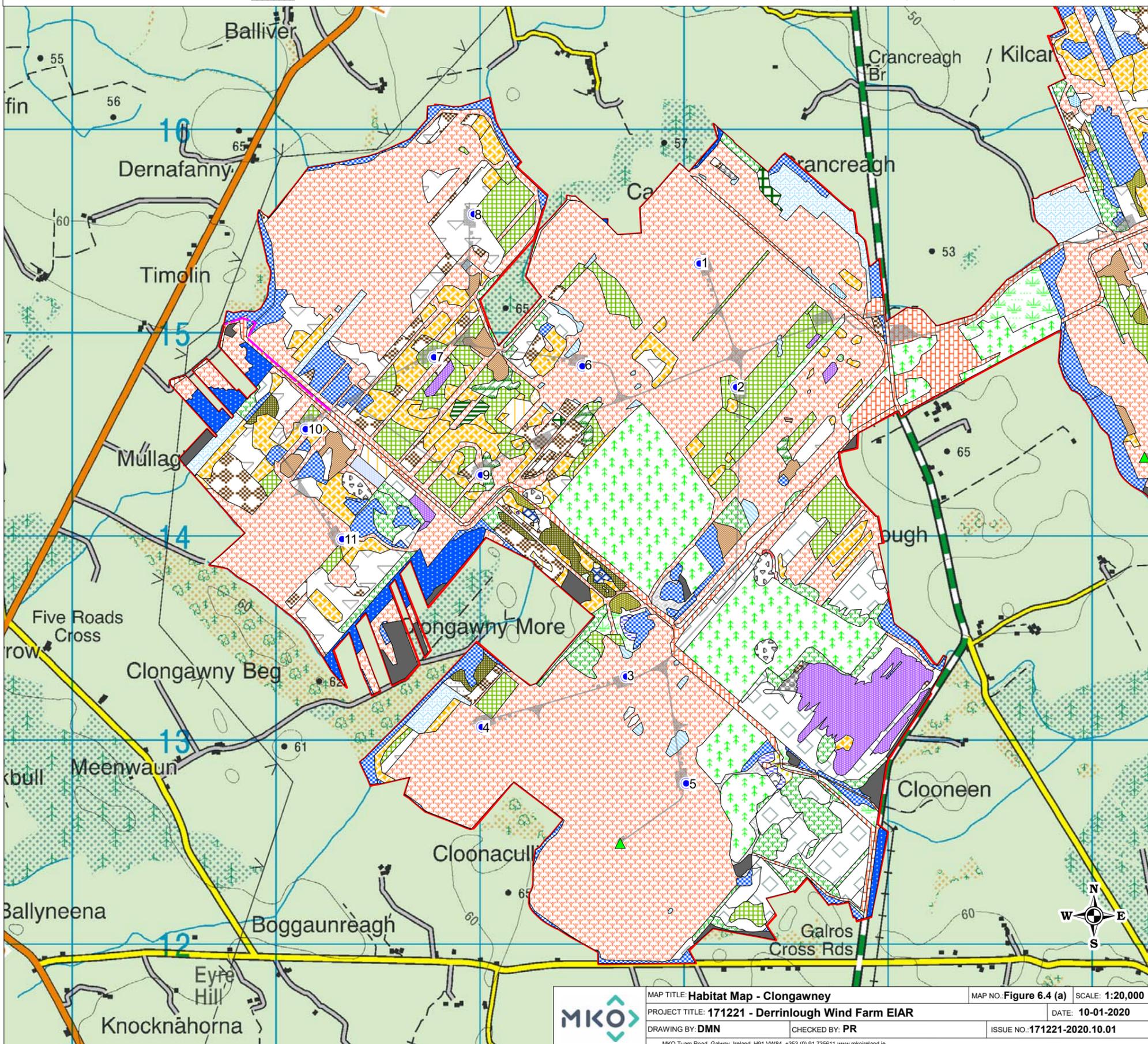
# Habitat Map

Vegetation communities occurring on Cutover Bog (PB4)

- Acid oligotrophic lakes (FL2)
- Acid oligotrophic lakes (FL2), Poor fen and flush (PF2) mosaic
- Acid oligotrophic lakes (FL2), Reed and large sedge swamp (FS1) mosaic
- Buildings and artificial surfaces (BL3)
- Conifer plantation (WD4)
- Cutover bog (PB4)
- Cutover bog (PB4) pioneering Dry Heath (HH), Poor fen (PF2), Scrub (WS1) mosaic
- Cutover Bog (PB4), Bog woodland (WN7)
- Cutover bog (PB4), Exposed sand, gravel or till (ED1) mosaic
- Cutover bog (PB4), Pioneering Dry Heath (HH)
- Cutover bog (PB4), Pioneering Dry Heath (HH), Dry grassland (GS1) mosaic
- Cutover bog (PB4), pioneering Dry Heath (HH), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), pioneering Dry Heath (HH), Scrub (WS1) mosaic
- Cutover bog (PB4), Poor fen (PF2), Dry grassland (GS1) mosaic
- Cutover bog (PB4), Poor fen (PF2), Reed and large sedge swamps (FS1) mosaic
- Cutover bog (PB4), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), Scrub (WS1), Dry calcareous and neutral grassland (GS1)
- Cutover bog (PB4), Scrub (WS1), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), Wet grassland (GS4) mosaic
- Cutover bog (PB4), Wet grassland (GS4), Poor fen and flush (PF2) mosaic
- Dense bracken (HD1)
- Depositing/lowland rivers (FW2)
- Dry calcareous and neutral grassland (GS1)
- Dry calcareous and neutral grassland (GS1), Poor fen and flush (PF2) mosaic

- Dry calcareous and neutral grassland (GS1), Recolonising bare ground (ED3)
- Dry meadows and grassy verges (GS2)
- Dry-humid acid grassland (GS3)
- Hedgerow (WL1)
- Improved grassland (GA1)
- Mixed broad-leaved woodland (WD1)
- Oak-Ash-Hazel woodland (WN2)
- Other artificial lakes and ponds (FL8)
- Poor fen and flush (PF2)
- Raised bog (PB1)
- Recently-planted woodland (WS2)
- Recolonising bare ground (ED3)
- Reed and large sedge swamps (FS1)
- Reed and large sedge swamps (FS1), Poor fen and flush (PF2) mosaic
- Refuse and other waste (ED5)
- Rich fen and flush (PF1)
- Scrub (WS1)
- Scrub (WS1), Dry grassland (GS2), pioneering Dry heath (HH1)
- Scrub (WS1), Poor fen and flush (PF2) mosaic
- Scrub (WS1), Wet grassland (GS4) mosaic
- Scrub (WS1), Wet grassland (GS4), Poor fen and flush (PF2) mosaic
- Wet grassland (GS4)
- Wet grassland (GS4), Poor fen and flush (PF2) mosaic

- EIAR Site Boundary
- Proposed Site Infrastructure
- Proposed Anemometry Mast Location
- Proposed Amenity Pathways

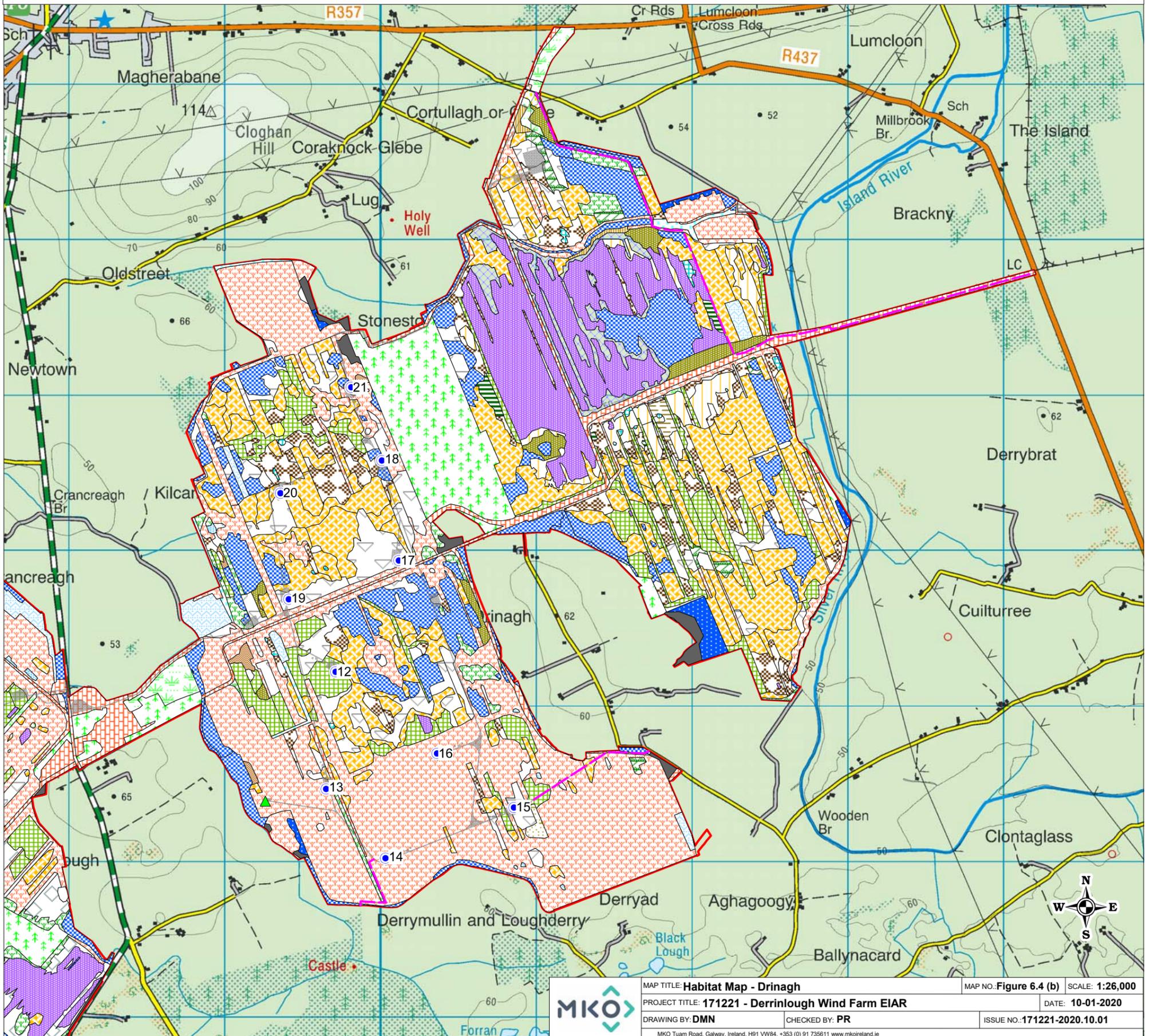


# Habitat Map

## Vegetation communities occurring on Cutover Bog (PB4)

- Acid oligotrophic lakes (FL2)
- Acid oligotrophic lakes (FL2), Poor fen and flush (PF2) mosaic
- Acid oligotrophic lakes (FL2), Reed and large sedge swamp (FS1) mosaic
- Buildings and artificial surfaces (BL3)
- Conifer plantation (WD4)
- Cutover bog (PB4)
- Cutover bog (PB4) pioneering Dry Heath (HH), Poor fen (PF2), Scrub (WS1) mosaic
- Cutover Bog (PB4), Bog woodland (WN7)
- Cutover bog (PB4), Exposed sand, gravel or till (ED1) mosaic
- Cutover bog (PB4), Pioneering Dry Heath (HH)
- Cutover bog (PB4), Pioneering Dry Heath (HH), Dry grassland (GS1) mosaic
- Cutover bog (PB4), pioneering Dry Heath (HH), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), pioneering Dry Heath (HH), Scrub (WS1) mosaic
- Cutover bog (PB4), Poor fen (PF2), Dry grassland (GS1) mosaic
- Cutover bog (PB4), Poor fen (PF2), Reed and large sedge swamps (FS1) mosaic
- Cutover bog (PB4), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), Scrub (WS1), Dry calcareous and neutral grassland (GS1)
- Cutover bog (PB4), Scrub (WS1), Poor fen and flush (PF2) mosaic
- Cutover bog (PB4), Wet grassland (GS4) mosaic
- Cutover bog (PB4), Wet grassland (GS4), Poor fen and flush (PF2) mosaic
- Dense bracken (HD1)
- Depositing/lowland rivers (FW2)
- Dry calcareous and neutral grassland (GS1)
- Dry calcareous and neutral grassland (GS1), Poor fen and flush (PF2) mosaic
- Dry calcareous and neutral grassland (GS1), Recolonising bare ground (ED3)
- Dry meadows and grassy verges (GS2)
- Dry-humid acid grassland (GS3)
- Hedgerow (WL1)
- Improved grassland (GA1)
- Mixed broad-leaved woodland (WD1)
- Oak-Ash-Hazel woodland (WN2)
- Other artificial lakes and ponds (FL8)
- Poor fen and flush (PF2)
- Raised bog (PB1)
- Recently-planted woodland (WS2)
- Recolonising bare ground (ED3)
- Reed and large sedge swamps (FS1)
- Reed and large sedge swamps (FS1), Poor fen and flush (PF2) mosaic
- Refuse and other waste (ED5)
- Rich fen and flush (PF1)
- Scrub (WS1)
- Scrub (WS1), Dry grassland (GS2), pioneering Dry heath (HH1)
- Scrub (WS1), Poor fen and flush (PF2) mosaic
- Scrub (WS1), Wet grassland (GS4) mosaic
- Scrub (WS1), Wet grassland (GS4), Poor fen and flush (PF2) mosaic
- Wet grassland (GS4)
- Wet grassland (GS4), Poor fen and flush (PF2) mosaic

- EIAR Site Boundary
- Proposed Site Infrastructure
- Proposed Anemometry Mast Location
- Proposed Amenity Pathways



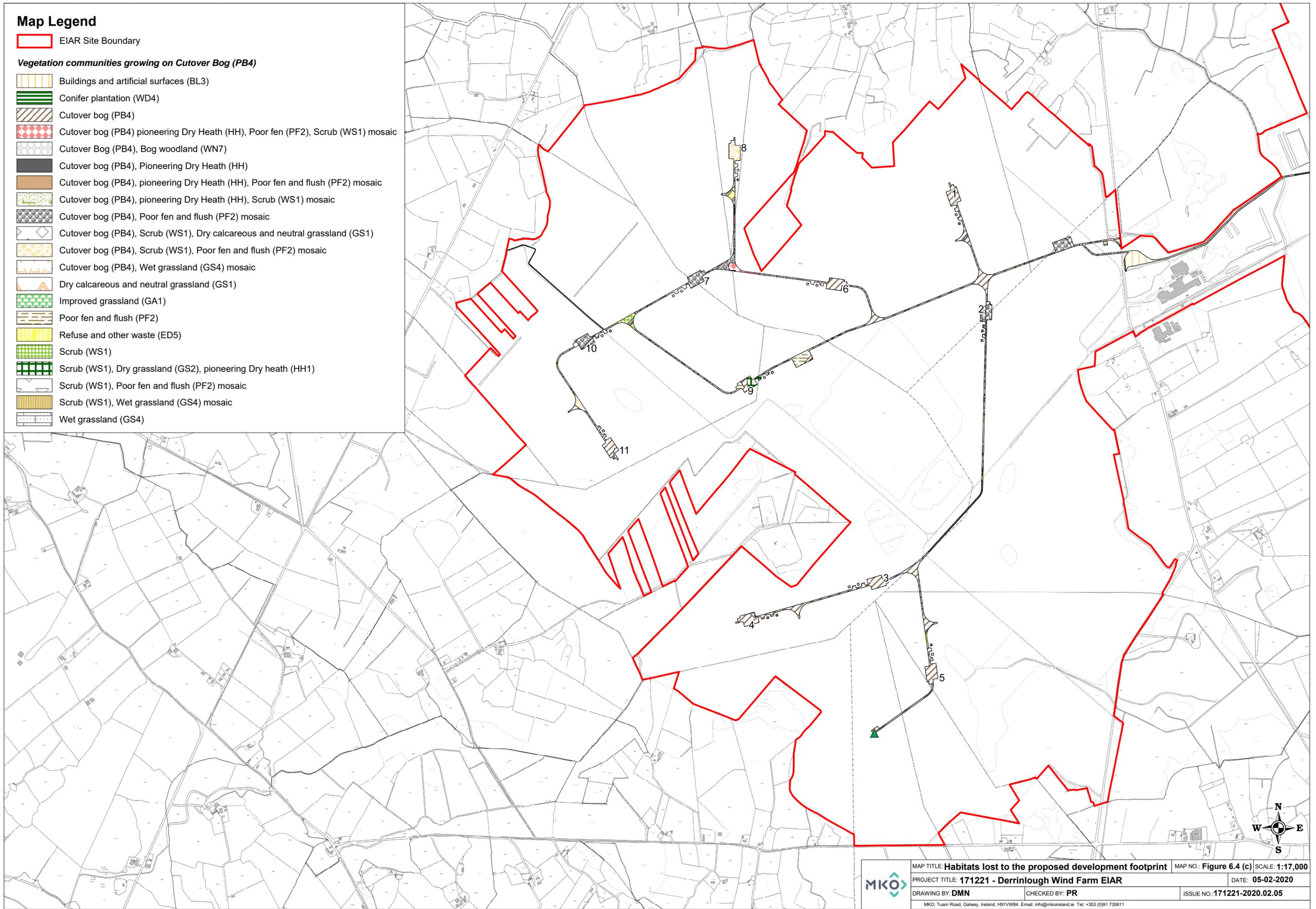
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**Map Legend**

 EIAR Site Boundary

**Vegetation communities growing on Cutover Bog (PB4)**

-  Buildings and artificial surfaces (BL3)
-  Conifer plantation (WD4)
-  Cutover bog (PB4)
-  Cutover bog (PB4) pioneering Dry Heath (HH), Poor fen (PF2), Scrub (WS1) mosaic
-  Cutover Bog (PB4), Bog woodland (WN7)
-  Cutover bog (PB4), Pioneering Dry Heath (HH)
-  Cutover bog (PB4), pioneering Dry Heath (HH), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), pioneering Dry Heath (HH), Scrub (WS1) mosaic
-  Cutover bog (PB4), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), Scrub (WS1), Dry calcareous and neutral grassland (GS1)
-  Cutover bog (PB4), Scrub (WS1), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), Wet grassland (GS4) mosaic
-  Dry calcareous and neutral grassland (GS1)
-  Improved grassland (GA1)
-  Poor fen and flush (PF2)
-  Refuse and other waste (ED5)
-  Scrub (WS1)
-  Scrub (WS1), Dry grassland (GS2), pioneering Dry heath (HH1)
-  Scrub (WS1), Poor fen and flush (PF2) mosaic
-  Scrub (WS1), Wet grassland (GS4) mosaic
-  Wet grassland (GS4)



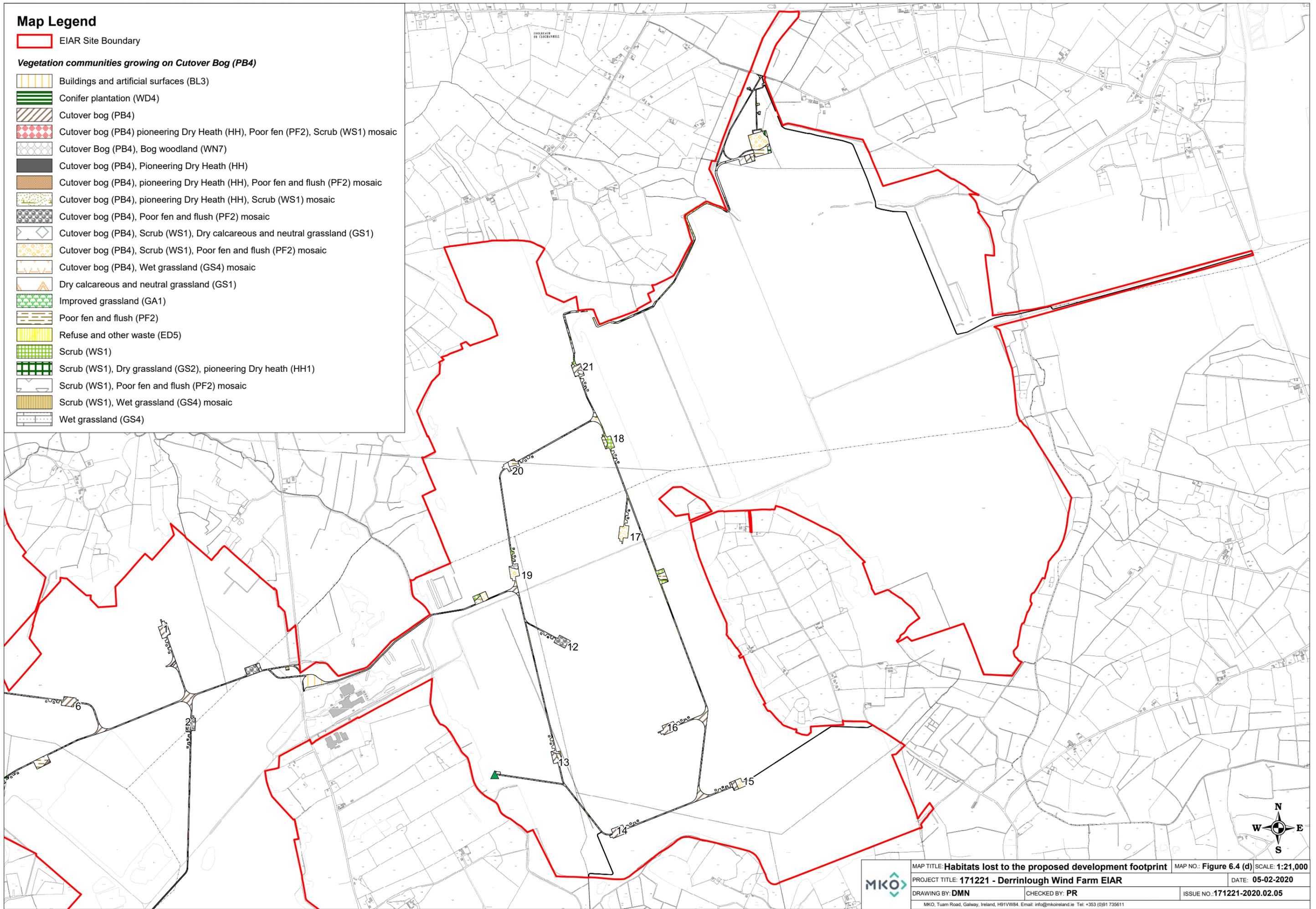
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### Map Legend

 EIAR Site Boundary

#### Vegetation communities growing on Cutover Bog (PB4)

-  Buildings and artificial surfaces (BL3)
-  Conifer plantation (WD4)
-  Cutover bog (PB4)
-  Cutover bog (PB4) pioneering Dry Heath (HH), Poor fen (PF2), Scrub (WS1) mosaic
-  Cutover Bog (PB4), Bog woodland (WN7)
-  Cutover bog (PB4), Pioneering Dry Heath (HH)
-  Cutover bog (PB4), pioneering Dry Heath (HH), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), pioneering Dry Heath (HH), Scrub (WS1) mosaic
-  Cutover bog (PB4), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), Scrub (WS1), Dry calcareous and neutral grassland (GS1)
-  Cutover bog (PB4), Scrub (WS1), Poor fen and flush (PF2) mosaic
-  Cutover bog (PB4), Wet grassland (GS4) mosaic
-  Dry calcareous and neutral grassland (GS1)
-  Improved grassland (GA1)
-  Poor fen and flush (PF2)
-  Refuse and other waste (ED5)
-  Scrub (WS1)
-  Scrub (WS1), Dry grassland (GS2), pioneering Dry heath (HH1)
-  Scrub (WS1), Poor fen and flush (PF2) mosaic
-  Scrub (WS1), Wet grassland (GS4) mosaic
-  Wet grassland (GS4)



	MAP TITLE: <b>Habitats lost to the proposed development footprint</b>	MAP NO.: <b>Figure 6.4 (d)</b>	SCALE: <b>1:21,000</b>
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Plate 6.1 Cutover bog with sparse vegetation

### Bog Woodland/Scrub (WN7/WS1)

The habitats on the site have developed as birch dominated scrub and woodland in the areas where the peat production has ceased for the longest periods, along unmaintained drainage channels and where the cutaway is relatively dry. A mosaic of these habitats dominates large sections of the study area. The woodlands and scrub are often well developed alongside the drains that run throughout the site. The woodlands and scrub have in many areas colonized outward from the drains and act as boundaries to the old peat cutting fields. They provide separation, cover and shelter throughout the site. In general, the woodlands and scrub are relatively recently colonized and have a poorly developed layer structure and ground flora. Typically, they are dominated by birch (*Betula pubescens*) with some willows (*Salix spp.*). Some Sitka spruce (*Picea sitchensis*) and Lodgepole pines (*Pinus contorta*) has started to establish as a result of natural seed dispersal from nearby conifer plantations. The ground flora was commonly dominated by brambles (*Rubus fruticosus agg.*). In more established areas, ivy (*Hedera helix*) dominate the understory with bracken (*Pteridium aquilinum*) and other fern species also a regular component of the ground flora. In some areas where the woodlands and scrub were colonizing the cutover bog, the ground flora was often dominated by ling (*Calluna vulgaris*) heather and in places purple moor grass (*Molinia caerulea*). Both birch scrub and birch dominated woodland occur throughout much of the site where peat production has ceased. Where scrub was greater than 4 metres in height, it was classified as Bog Woodland (as per Fossitt, 2000). The Annex I Bog Woodland habitat (91DO) was not recorded on the site during the Bord na Móna habitat surveys or the detailed habitat surveys undertaken by MKO. The woodlands were predominantly very dry and none of the woodland areas had developed on *Sphagnum* rich substrates.

Plate 6.2 shows a typical section of birch dominated bog woodland within the study area with small trees, low structural diversity and dry ground dominant bramble. Plate 6.3 shows the woodlands and scrub forming.



Plate 6.2 Typical Bog Woodland found throughout the study area



Plate 6.3 Example of bog woodland forming on cutover bog with the understory dominated by ling heather (*Calluna vulgaris*)

### Poor Fen (PF2)/Reedswamp (FS1)

Many sections of the study area supported cutaway bog that was dominated by common cottongrass and was wet underfoot (though with little open water except after prolonged wet weather) or dry. Species frequently recorded included purple moor grass, soft rush (*Juncus effuses*), marsh arrowgrass (*Triglochin palustris*) and hummocks of the moss *Polytrichum commune*. This habitat was quite variable but was widespread within the study area. It formed mosaics with heath and woodland habitats and was classified by as Poor Fen (Plate 6.4).

There are also small areas with Poor fen vegetation associated with open water pools within the study area. These areas are dominated by common cottongrass, although also containing species such as marsh arrowgrass, reedmace (*Typha latifolia*) and common reed (*Phragmites australis*).

In addition, there were some areas of open water within the study area and were fringed by Poor Fen and Reedbeds (Plate 6.6).



Plate 6.4 Poor Fen within the study area with encroaching birch scrub



Plate 6.5 Bog cotton dominated Poor Fen habitat



Plate 6.6 Poor Fen Habitat surrounding open water outside of the development footprint

### Rich fen (PF1)

A number of small areas of rich fen habitat have been mapped within the study area. These areas occur primarily on shallower peat where peat extraction has resulted in more subsoil being exposed and thus more calcareous conditions occurring locally. The habitat occurred in close association with willow scrub and revegetating bare peat which has resulted in a mix of species recorded. Species recorded within these areas include common cottongrass (*Eriophorum angustifolium*), devil's-bit scabious (*Succisa pratensis*), purple moor-grass (*Molinia caerulea*), bog asphodel (*Narthecium ossifragum*), bogbean (*Menyanthes trifoliata*), cross-leaved heath (*Erica tetralix*), heather (*Calluna vulgaris*), bulrush (*Typha latifolia*), round-leaved sundew (*Drosera rotundifolia*), bottle sedge (*Carex rostrata*), and other *Carex* species. The ground was predominantly bare beneath much of the taller vegetation and no *Sphagnum* mosses, or significant cover of other moss species was recorded.



Plate 6.7 Example of Rich fen (PF1) recorded within the study area.

### Cutover bog supporting Secondary heath type communities

Secondary heath type communities were dominated by tall ling heather (*Calluna vulgaris*), some cross-leaved heath (*Erica tetralix*), purple moor grass (*Molinia caerulea*) and common cottongrass (*Eriophorum angustifolium*) on dry peats with no *Sphagnum* present. It is likely that the dry heath areas would, if left undisturbed, colonize to form bog woodland (Dry Birch Woodland – Non-Annex I). The wetter heath communities supported higher abundance of purple moor grasses and common cottongrass. This habitat type covers a broad range of conditions from bare peat (Plate 6.8) and dry but vegetated (Plate 6.9 and Plate 6.11) to much wetter areas that grade into poor fen (Plate 6.10). In more vegetated areas, dominated by cotton grasses (see Plate 6.13), orchid species were present including; heath spotted orchid (*Dactylorhiza maculata*), twayblade (*Listera ovata*) and marsh helleborine (*Epipactis palustris*). This was mostly associated with the area of revegetated bare peat occurring within the north-western boundary of the Drinagh (eastern) parcel of the study area. Detailed botanical surveys were undertaken at a representative sample of secondary heath type habitats throughout the site and provide a comprehensive species composition and associated percentage cover, see Appendix

6.4. The species composition, hydrological and geomorphological characteristics of the heath type habitat on site was assessed with reference to best practice guidance<sup>2,5</sup> and professional judgement, and was found not to conform to the EU Habitats Directive Annex I listed habitat European Dry Heaths [4030].

The cutover bog habitats on the site do not correspond to either Active Raised Bog (7110) or Degraded Raised Bog still capable of Natural Regeneration (7120). The NPWS Article 17 Report from 2013, states:

*The actual definition of the habitat (still capable of regeneration), indicates that the habitat can be restored to Active Raised Bog habitat (7110). In the Irish context, the habitat does not include secondary degraded raised bog which relates to highly drained high bog devoid of vegetation, cutover, and cutover bog.*

The NPWS Article 17 Reporting for 2019 has been published and states:

*In an Irish context, ARB (which is currently defined as occurring only on the high bog) encompasses active peat --forming ecotopes (central and sub-central) as defined by Kelly (1993) and Kelly & Schouten (2002), and actively peat --forming flushes*

In addition, the definition of Degraded Raised Bog has also been changed in the 2019 Article 17 Reporting. Whilst previously (from the 2013 Reporting), the habitat previously pertained to all vegetated areas of uncut Raised Bog that did not meet the criteria to be classified as Active Raised Bog, it is now recognised that the extent is much narrower and dependant on specific hydrological conditions. This habitat still does not occur on cutover bog in the Irish context and is more limited in its extent on uncut bogs.

These habitats do not occur on the cutover habitats upon which the proposed development is located.

They do not conform to Annex I heath habitats. They are secondary, cutover raised bog habitats that are located on deep peat and level ground. They do not conform to Annex I Wet Heath habitat as defined by the Irish Wildlife Manual (Perrin et.al. 2014). Neither do they conform to Annex I Raised Bog habitats or any other Annex I habitat.

Further details of the evaluation of the peatland habitats on the site are provided in Appendix 6.4.

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<sup>5</sup> Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014). Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland



*Plate 6.8 Pioneering heath vegetation forming on areas of dry milled peat*



*Plate 6.9 Heath vegetation forming in areas of pioneering birch woodland within the development footprint*



Plate 6.10 Pioneering Dry Heath with bare Peat in low-lying area adjacent to drainage ditch



Plate 6.11 Larger area of heath vegetation within the east of the site, within the Drinagh study area. This habitat occurs outside of the proposed development footprint.

### Grasslands (GS2 and GS1)

The grasslands that are present within the study area are primarily limited to the sides of old trackways and railway lines. Many of the verge areas are classified as Dry Meadows and Grassy Verges with rank grasses including false oat grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*), cocks foot (*Dactylis glomerata*) and encroaching scrub with nettle (*Urtica dioica*), bramble and rosebay (*Epilobium angustifolium*). Other areas are less rank and support more calcareous grasslands with species such as knapweed (*Centaurea nigra*), sweet vernal grass (*Anthoxanthum odoratum*), lady's bedstraw (*Galium verum*), dandelion (*Taraxicum officinalis agg.*) and bird's foot trefoil (*Lotus corniculatus*). Many of the tracks and grasslands were surrounded by willow scrub and woodlands making them sheltered. Other areas grassland habitats comprised of a mix of species typical of both calcareous and peatland habitats. This diversity in species recorded has resulted from the importing of stone for the construction of railway tracks throughout the peatland.



Plate 6.12 Example of rank grassland habitat within of the study area

### Open waterbodies

The large open waterbodies occurring within the study area have formed following the use of these areas for active peat extraction. The large waterbodies occurring within the eastern portion of the study area (Drinagh) have been created by drain blocking (Bord na Móna, 2015) and have been assessed as artificially created Acid oligotrophic lake (FL2). The waterbodies are generally shallow and fringed by reedbeds, poor fen and birch dominated woodland. Plate 6.13 provides an example of the large waterbody occurring within the northeast of the study area.



Plate 6.13. Example of open water Acid oligotrophic lake occurring within the eastern portion of the study area (Drinagh)

#### Drainage Channels (FW4)

The study area is extensively drained with deep channels that run through the site. The majority of the drains within the site, subject to the most recent industrial harvesting, are devoid of vegetation and have a poor structure (Plate 6.14). In the areas where the drains are surrounded by dense woodland and scrub, the vegetation within them is sparse and the substrate comprises of bare silt. In the areas where there is less cover of trees, many of the drains support dense macrophytes including reedmace, horsetails (*Equisetum spp.*) and common reed (*Phragmites australis*) (Plate 6.15). In other areas, the drains are large and hold deep water with floating vegetation such as Pondweeds (*Potamogeton spp.*) (Plate 6.15).



Plate 6.14 Example of artificial drainage ditches that occur throughout the site, with little vegetation, dominated mainly by marsh arrowgrass and bog cottongrass.



Plate 6.15 Derelict drain vegetated with reedmace (*Typha latifolia*). Areas of revegetating bare peat occur in the background, dominated by cottongrasses, as well as birch dominated scrub and woodland.

#### 6.5.2.1.2 Lowland depositing streams (FW2)

The site is drained by a number of watercourses that surround the study area. As described in Chapter 9: Hydrology and Hydrogeology, the majority of the site is located in the Brosna River sub-catchment (Brosna\_SC\_080). The Little River flows in a northwesterly direction through the centre of the site. The eastern side of the Drinagh bog is mapped within the Brosna\_SC\_070 sub-catchment. The Silver River flows north through this catchment, along the eastern boundary of the site. The western edge of the site, within the Clongawny bog, is drained by the Shannon lower sub-catchment (Shannon

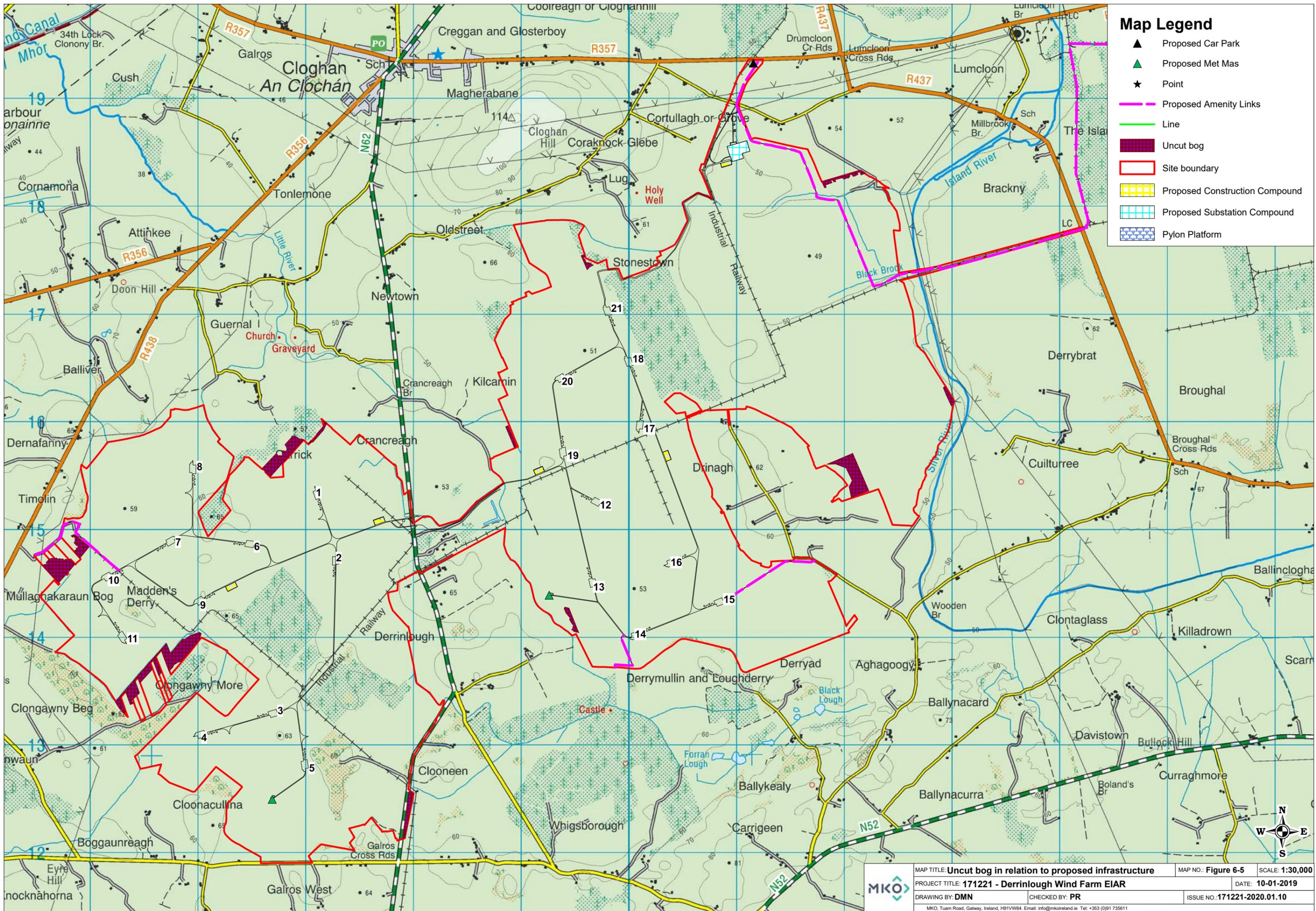
[Lower]\_SC\_040). A number of small tributaries flow west/southwest before joining the Rapemills River, which drains the sub-catchment. The Rapemills River then flows north for ~5.5km before entering the Shannon River just west of Banagher.



Plate 6.16 – Example of Lowland depositing stream (FW2), the upper reaches of the Silver River, occurring along the northeast boundary of the study area.

### 6.5.2.1.3 Uncut raised bog

There are some remnant uncut raised bog habitats at the site of the proposed development, see Figure 6.5 and have been avoided in the design of the proposed development. The areas of raised bog recorded within the site are typically small in area, have been historically drained, are relatively dry and in some areas, subject to ongoing peat extraction at the facebank, see Plate 6.17. The vegetation comprises predominantly of tall ling heather with some purple moor grass and cottongrasses. Some wetter areas were also found to contain cross-leaved heath (*Eriac tetralix*) and bog asphodel (*Narthecium ossifragum*). In general, the bog remnants did not contain significant areas of Sphagnum mosses. This is possibly due to the historic draining of these small fragmented remnant areas of raised bog.



### Map Legend

- ▲ Proposed Car Park
- ▲ Proposed Met Mas
- ★ Point
- Proposed Amenity Links
- Line
- Uncut bog
- Site boundary
- Proposed Construction Compound
- Proposed Substation Compound
- Pylon Platform

	MAP TITLE: <b>Uncut bog in relation to proposed infrastructure</b>	MAP NO.: <b>Figure 6-5</b>	SCALE: <b>1:30,000</b>	
	PROJECT TITLE: <b>171221 - Derrinlough Wind Farm EIAR</b>	DATE: <b>10-01-2019</b>		
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Plate 6.17 Example of intact raised bog recorded within the study area. Some areas are subject to ongoing peat extraction to the northwest.

#### 6.5.2.1.4 **Plantation forestry (WD4)**

Areas of coniferous plantation forestry (WD4) were recorded within the study area. These plantations predominantly comprise of Sitka spruce and lodgepole pine. An example of the coniferous plantation forestry is provided in Plate 6.18.

#### 6.5.2.1.5 **Plantation broadleaved woodland**

A small section of the study area has been planted with ash trees alongside coniferous plantation forestry. All trees are of the same growth stage and the area lacks structural diversity. This area of woodland has therefore been assessed as Mixed broadleaved/conifer (WD2). There was also a poor ground flora diversity within this area of ash woodland. An example of the plantation ash woodland is provided in Plate 6.18.



Plate 6.18 Example of coniferous plantation forestry (WD4) in the background and plantation ash forestry in the foreground.

#### 6.5.2.1.6 **Oak-ash-hazel woodland**

Small mineral islands/‘derries’ occur within the study area and are dominated by native oak and ash woodlands. These areas have also been avoided as part of the proposed development design.



Plate 6.19 Example of oak-ash-hazel woodland (in background of photo), occurring on mineral islands, within the study area

### 6.5.2.1.7 Habitats within proposed junction modification (Kennedy's cross)

In order to facilitate turbine delivery, it is proposed to modify an existing road junction at Kennedy's cross. The junction is between the N62 and the N52 located approximately 4.7km to the south of the site. The proposed junction modifications will occur completely within an area of improved agricultural grassland (GA1) dominated by perennial ryegrass (*Lolium perenne*), see Plate 6.20. The agricultural grassland is surrounded by a highly-managed hawthorn dominated hedgerow with an understory dominated by brambles and nettle. Although an area of wet woodland occurs adjacent to the south of the proposed junction modification, the works will completely avoid this habitat.



Plate 6.20 Example of improved agricultural grassland through which the proposed junction modification.

### 6.5.2.1.8 Habitats within the proposed grid connection route and substation infrastructure

The proposed grid connection route, substation and associated infrastructure is located fully within the proposed development boundary and study area. The habitats within the proposed infrastructure footprint is dominated by cutover bog and associated secondary habitats, including birch/willow scrub and recolonising bare ground, see Plate 6.21.



*Plate 6.21 Example of re-colonised bare peat and scrub occurring within the proposed substation and grid connection infrastructure footprint*

#### 6.5.2.1.9 **Habitats within the proposed amenity links**

The proposed amenity pathways will predominantly use the new internal site roads. Additional links are proposed to provide connectivity between the internal roads and local/regional roads around the site. These links will primarily use existing machinery passes, see Plate 6.22.



Plate 6.22 Example of machinery pass through birch dominated scrub and woodland.



Plate 6.23 Example of location of proposed amenity link occurring along the existing railway infrastructure to the east of the site

## 6.5.2.1.10

**Buildings and artificial surfaces within the study area**

There are some areas of buildings and artificial surfaces (BL3). The majority of the artificial surfaces are associated with existing briquette factory and the railway infrastructure, see Plate 6.23 above. Other small areas of hardcore occur within the study area that are used for informal parking in close proximity to main roads as shown in Plate 6.24.



Plate 6.24 Example of areas of hardcore within the study area used as informal parking areas.

6.5.2.1.11 **Invasive species**

No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the study area. The only non-native invasive species recorded on site include butterfly bush (*Buddleja davidii*) and bearberry (*Cotoneaster dammeri*). Although invasive species, these are not listed on the Third Schedule.

No botanical species protected under the Flora (protection) Order (1999, as amended 2015) were recorded during the survey.

6.5.2.2 **Significance of Habitats**

Ecological evaluation follows a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). The habitats within and adjacent to the development site were evaluated in accordance with the criteria developed by the NRA (2009b), which classifies sites in terms of their ecological importance, *i.e.* 'international importance', 'national importance', 'county importance', 'local importance (higher value)' or 'local importance (lower value)'.

Following the extensive surveys that were undertaken, it is concluded that the habitats of highest ecological significance within the study are those that are most closely associated with the remnant fragmented areas of Raised Bog habitat. This habitat would have dominated the entire site prior to the commencement of the industrial peat cutting operations. As such, the remnant Raised Bog habitat, as shown in Figure 6.5 located outside the development footprint, have been assigned **County** significance as they contain the only remaining examples of Raised Bog habitat in the area. These areas are only a small remnant of the raised bog that would have dominated the site. They are avoided by the proposed development footprint and are highly degraded but are nonetheless of high ecological significance.

The secondary habitats recorded on the cutaway sections of the site vary in their ecological significance with large areas of broadleaved woodland and scrub present along with a diverse mosaic of Dry Heath type vegetation and Poor Fen with some open water habitats. The habitats listed above are assigned **Local importance (Higher Value)**. This is on the basis that they consist of a large area of semi-natural habitats with a high biodiversity value in the local context but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive (See Appendix 6.4).

The Cutover Bog and bare peat habitats are of low ecological significance in their current state and have been assigned **Local Importance (Lower Value)**. However, it is noted that if peat extraction ceased, these habitats would inevitably revegetate in a similar manner to the rest of the site.

Following the detailed studies undertaken and provided in Appendix 6.4, it is concluded that there are no Annex I habitats listed under the EU Habitats Directive present within the Proposed Development footprint.

No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site and no suitable habitat occurs within the site. All species recorded are common in the Irish landscape.

### 6.5.2.3 Fauna

Dedicated faunal walkover surveys were undertaken at the site on the following dates:

- 21<sup>st</sup> June 2018
- 28<sup>th</sup> September 2018
- 15<sup>th</sup> March 2019
- 21<sup>st</sup> August 2019
- 18<sup>th</sup> September 2019
- 19<sup>th</sup> September 2019
- 5<sup>th</sup> December 2019

In addition to the above targeted surveys, additional faunal signs/sightings were also recorded during other surveys including habitat assessments, bat surveys and bird surveys. The site was also visited on numerous additional occasions during the undertaking of bat surveys throughout 2018 and 2019. Details of these survey dates are provided in Appendix 6.2.

#### 6.5.2.3.1 Badger

Dedicated surveys for this species were undertaken on the above dates between 2018 and 2019, in addition to incidental records recorded during other species-specific surveys. A total of 4 main setts and 4 outlier setts (comprising numerous entrances) were recorded within and adjacent to the study area. The location of all badger setts (including each annex, subsidiary or outlier sett entrance) are shown on Figures 6.6 and 6.6a to 6.6c, Confidential Appendix 6.5<sup>6</sup> of this EIAR. During dedicated badger surveys of the site, signs of badger i.e. badger foraging signs, latrines etc. were predominantly restricted to the margins of the site. Due to the nature of the cutover peatland habitats recorded within the site, these habitats do not provide optimal foraging habitat or badger. The setts recorded on the peripheries showed signs of commuting trails to the agricultural grasslands that surround the site. Such habitat provides suitable foraging habitat for the species surrounding the site. All badger setts were located entirely outside of the proposed development footprint. However, one main sett, containing 7 entrances, does occur within approximately 35 metres of the proposed grid connection route and associated access track, see Figure 6.6b.

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<sup>6</sup> Following standard best practice, the location of breeding or resting places of protected species should be provided as a confidential appendix for review by the competent authority and not made available to the public in order to avoid potential for persecution.



Plate 6.25 Example of badger sett entrance recorded within the study area.

#### 6.5.2.3.2 Otter

Signs, predominantly sightings of individual animals, of otter were recorded within the study area and downstream of the site of the proposed development. The location of all otter records is provided on Figure 6.7. The main watercourse/larger artificial drainage channels were assessed as providing suitable commuting and foraging habitat for the species. The majority of the drainage ditches within the study area are small and are thus not suitable for otter, see Plate 6.14. These peat drainage ditches were assessed as having no - low suitability for commuting or foraging otter as they are small, highly modified channels of low fisheries value. Some of the larger waterbodies recorded within the site were identified as providing suitable habitat for the species. No signs of otter were recorded during the dedicated fisheries assessment or kick sampling of the watercourses surrounding the study area (Triturus Environmental Ltd, 2019).

#### 6.5.2.3.3 Bats

Bat surveys undertaken in 2019, in accordance with Scottish Natural Heritage Guidance (SNH 2019), form the core dataset for the assessment of effects on bats at the proposed development site. It is supplemented by additional data derived from surveys undertaken on the site in 2018 which were designed in accordance with the Bat Conservation Trust's guidelines for wind turbine developments (Hundt, 2012). Bat surveys included roost survey, manual transect surveys and ground-level static surveys.

##### Roost surveys

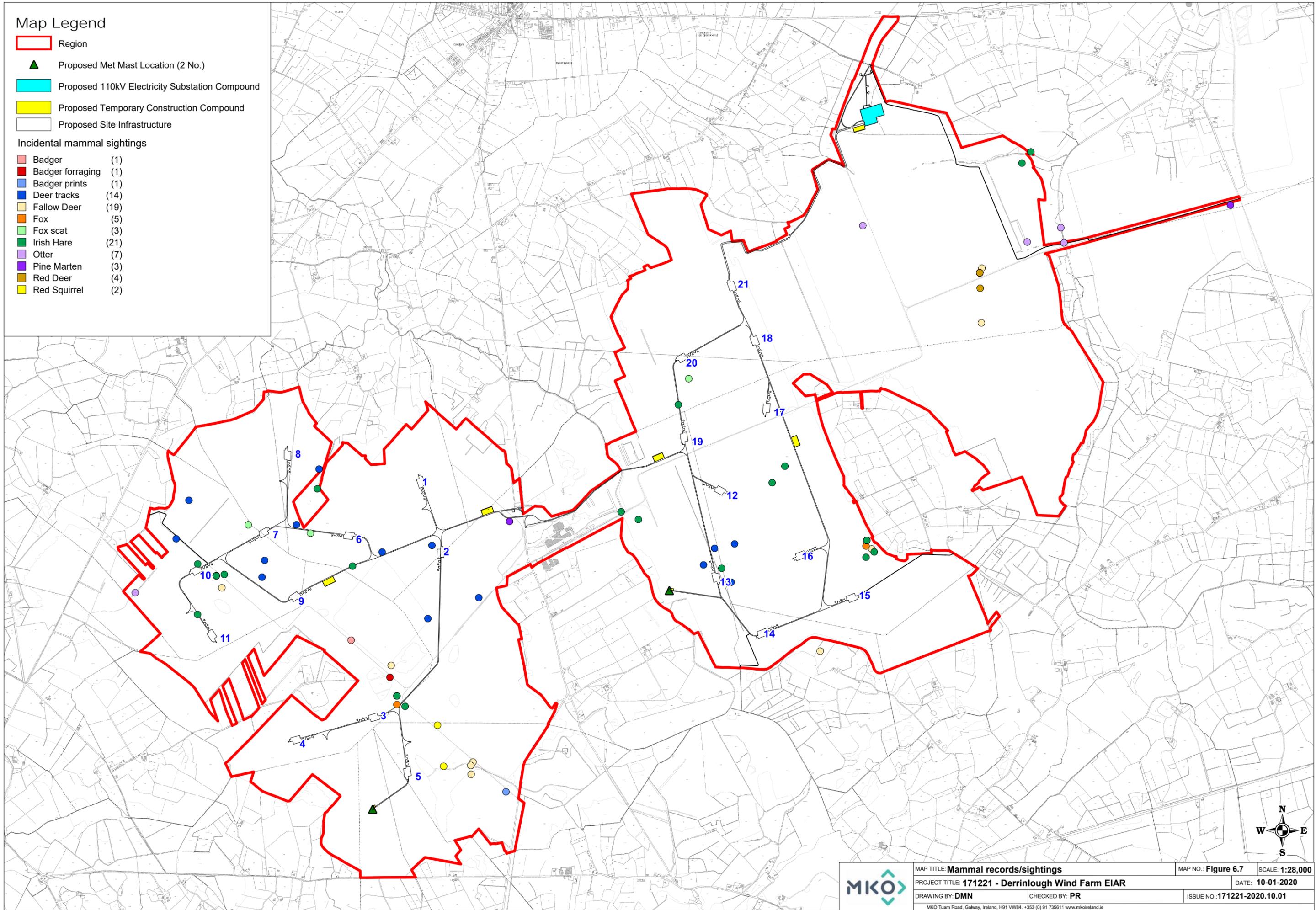
One structure, (IG Ref: N 08042 14688) first identified in 2018, was resurveyed in 2019 and was subject to a roost assessment, including a detailed inspection of the exterior to assess for evidence of bat use (Table 6.12). The building is being retained, therefore no likely significant effects on bats are predicted.

# Map Legend

- Region
- ▲ Proposed Met Mast Location (2 No.)
- Proposed 110kV Electricity Substation Compound
- Proposed Temporary Construction Compound
- Proposed Site Infrastructure

## Incidental mammal sightings

- Badger (1)
- Badger foraging (1)
- Badger prints (1)
- Deer tracks (14)
- Fallow Deer (19)
- Fox (5)
- Fox scat (3)
- Irish Hare (21)
- Otter (7)
- Pine Marten (3)
- Red Deer (4)
- Red Squirrel (2)



	MAP TITLE: <b>Mammal records/sightings</b>		MAP NO.: <b>Figure 6.7</b>	SCALE: <b>1:28,000</b>
	PROJECT TITLE: <b>171221 - Derrinlough Wind Farm EIAR</b>		DATE: <b>10-01-2020</b>	
	DRAWING BY: <b>DMN</b>	CHECKED BY: <b>PR</b>		ISSUE NO.: <b>171221-2020.10.01</b>
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Table 6.12: Bat Survey Effort 2018 and 2019

Description	Survey	Date	Results
Unoccupied Cottage	Dawn	29/05/2018	6 Soprano pipistrelles
Unoccupied Cottage	Dusk and Dawn	23/08/2018 - 24/08/2018	Soprano pipistrelle; 5 emerging, 2 re-entering
Unoccupied Cottage	Dusk	06/06/2019	7 Common pipistrelle, 1 Soprano pipistrelle
Unoccupied Cottage	Dusk	22/07/2019	4 Soprano pipistrelle

No potential tree roosts were identified during the roost surveys and no evidence of bat use was recorded elsewhere during the roost assessment.

### Manual transects 2019

Manual transects were undertaken in spring, summer and autumn 2019. Bat activity was recorded on all surveys. A total of 482 bat passes were recorded during the manual transects. In general, Soprano pipistrelle was recorded most frequently, followed by common pipistrelle, Leisler's bat and *Myotis* sp. Instances of brown long-eared bat were rare. However, species composition and activity levels varied significantly between surveys. Plate 4.3, Appendix 2 of the EIAR 'bat report' presents results for individual species per survey period. Bat activity was concentrated along the track beside the briquette factory (linear, mature forestry edge habitats).

### Ground-level Static Surveys 2019

In total, 34,557 bat passes were recorded across all deployments. In general, common pipistrelle, Leisler's bat and soprano pipistrelle occurred most frequently, while instances of *Myotis* sp. and brown long-eared bat were significantly less.

Bat activity was dominated by common pipistrelle and Leisler's bat in spring. In addition, Leisler's bat, common and soprano pipistrelle occurred frequently in summer. Activity was variable between survey nights. Therefore, the median Nightly Pass Rate including absences was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). Results for each species can be found in Section 4.6 of the bat report, Appendix 6.2 of the EIAR.

#### 6.5.2.3.4 Marsh Fritillary

The desk study identified that marsh fritillary is known to occur in the wider area surrounding the proposed development.

Dedicated surveys were undertaken within the study area to identify areas of suitable marsh fritillary habitat. Suitable habitat was recorded in small areas scattered throughout the study area as shown in Figure 6.8. There is little suitable habitat on the Drinagh side due to the wetter and scrubbiest habitats. The suitable habitat was mainly associated with areas where stone material has been brought into the site for the construction of railway tracks, construction of access roads etc.

During dedicated larval web surveys of the study area, a total of 24 webs were recorded within the study area during targeted marsh fritillary surveys undertaken in 2018. Follow-up surveys undertaken in 2019 located a total of 80 webs within the study area, see Figure 6.8. Marsh fritillary populations often vary from year to year and the reproductive success of the species can be highly dependent on weather

**Map Legend**

- Marsh fritillary larval webs - 2019
- Marsh fritillary larval webs - 2018
- Marsh Fritillary Habitat Survey Areas
- ▲ Proposed Met Mas
- Proposed Car Park
- Proposed Amenity Pathways
- Proposed site infrastructure
- EIAR Site Boundary
- Suitable marsh fritillary habitat extent
- Marsh fritillary targeted study area



MAP TITLE: Marsh fritillary webs in relation to proposed infrastructure	MAP NO.: Figure 6.8	SCALE: 1:20,000
PROJECT TITLE: 171221 Derrinlough Windfarm, Co. Offaly	DATE: 10-12-2020	
DRAWING BY: DMN	CHECKED BY: PR	ISSUE NO. 171221-2020.02.05-D1
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conditions. Adult marsh fritillary were also recorded within the site on the 6th June 2019. The adults were recorded within the southwestern section of the site in areas identified as providing suitable supporting habitat for the species.

None of the marsh fritillary colonies recorded within the proposed development site occur within the infrastructure footprint. An example of the linear strips of suitable marsh fritillary habitat recorded at the site, in relation to the proposed site access track, is shown in Plate 6.27.

In addition, habitat suitability assessments were undertaken during larval web searches within areas of suitable habitat for the species. This followed methods set out in National Biodiversity Data Centre (NBDC) best practice guidance. The results of the condition assessment are provided in Appendix 6.6 'Lepidoptera Management Plan' and were focused on assessing the quality of the marsh fritillary habitat where webs were recorded on site only<sup>7</sup>. The condition assessment indicates that the habitat where the most marsh fritillary colonies were recorded was primarily 'Good Condition'. However, in some areas, the narrow strips of this suitable habitat are becoming encroached by scrub (generally birch and some birch). Where the species was more sparsely distributed, due to the fragmented and small size nature of the habitat, the suitability assessments indicated that the habitat was 'unsuitable'. This was largely due to the low occurrence of devils-bit scabious.



Plate 6.26 Marsh fritillary larval web recorded within the study area

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<sup>7</sup> This was due to its limited recorded distribution of suitable habitat within the study area and will allow for a long-term comparison in habitat monitoring and management.



Plate 6.27 Example of narrow strip of suitable marsh fritillary habitat (outlined in red)

### 6.5.2.3.5 Aquatic Fauna

In addition to the multidisciplinary walkover surveys and targeted species surveys, additional targeted surveys were also undertaken for a number of target species including fish and aquatic invertebrates. A detailed aquatic survey was undertaken in 2019 and is provided in Appendix 6.3 (Triturus Environmental Ltd, 2019). The location of all survey sites is provided in Figure 2.1, Appendix 6.3. The below subsections provide an assessment of the targeted surveys of aquatic species within the study area.

#### Salmonid habitat assessment

Salmonid habitat ranged from poor to moderate value across the majority of survey sites surveyed. This largely reflected the peat-based nature and heavily silted substrata of many sites. Only the Silver River offered good salmonid habitat according to life Cycle Unit scores. The Whigsborough Stream, Derrinlough Stream and the Madden's Derry Stream offered poor quality habitat overall. Unnamed wetlands at Clooneen and Stonestown were lacustrine habitats but nevertheless provided some moderate nursery value for brown trout, as did a settlement pond with outflow at Derrinlough. The Grants Island Stream was dry at the time of survey and did not support fish (Triturus Environmental Ltd, 2019).

#### Lamprey habitat assessment

Lamprey habitat was poor across the majority of survey sites, with poor spawning and poor nursery habitat present throughout all but one site. Primarily this was due to limited (or absent) clean, unbedded gravel substrata and the predominance of humic, flocculent sediment. The Silver River at Millbrook Bridge offered moderate quality spawning and nursery habitat. Unnamed wetlands at Clooneen and Stonestown, being lacustrine habitats with no flow, were not considered suitable for lamprey. A settlement pond with outflow at Derrinlough, although more representative of a lacustrine habitat, featured some flowing water at the outflow but this offered poor quality lamprey habitat (Triturus Environmental Ltd, 2019).

### White-clawed crayfish habitat assessment

White-clawed crayfish were recorded from a single site during the survey; sweep netting resulted in the capture of a single crayfish on the Feeghroe Stream (immediately below the R468 road culvert). Despite some moderate to good suitability for the species at certain sites (e.g. the Little Cloghan River, a settlement pond at Derrinlough and the Silver River), no live crayfish were recorded from any other site via sweep netting or hand searching. However, crayfish are known locally (Bord na Móna pers. comm.) from the Little Cloghan River and the connected settlement pond at Derrinlough, both in the vicinity of the Derrinlough briquette factory. Walkover surveys failed to identify remains of crayfish in mustelid spraint.

#### 6.5.2.3.6 Other Fauna

During the walkover survey, signs of the following mammal species were recorded:

- Fox (*Vulpes vulpes*) scat was recorded at various locations throughout the study area. However, no dens or other signs of the species were recorded during the survey and no dedicated survey for the species was required. As signs of fox were regularly recorded throughout the site, the distribution of the species has not been mapped.
- Hare (*Lepus timidus hibernicus*) was frequently recorded throughout the study area along with its droppings and footprints. The species is widespread throughout the habitats present and no dedicated survey for the species was required. The distribution of Irish hare records is provided in Figure 6.7.
- Scat that was likely to be that of pine marten (*Martes martes*) was recorded infrequently throughout the site. The scats were primarily located on fallen trees in areas of coniferous plantation woodland, which is typical of the species. No dens were recorded and no requirement for additional survey was identified.
- Deer prints were recorded throughout the site and Fallow Deer (*Dama dama*) were seen on occasion during the surveys. This is an invasive species listed on the Third Schedule of the Birds and Natural Habitats Regulations and no significant populations were recorded. No dedicated survey for this species was considered necessary on the basis that this is an invasive species and it was recorded infrequently.
- Two squirrel dreys were recorded within a small area of willow carr woodland located outside the south of the site. The small area of woodland is located to the east of the proposed junction modification at Kennedy's cross. Despite dedicated surveys for squirrel species, no dreys were recorded within the site. A small number of red squirrel records were recorded within the study area. However, these were predominantly record in association with plantation forestry which will not be affected. The surveys concluded that the site of the proposed development does not provide significant areas of suitable habitat for the species.

In addition to the above mammal species (or signs thereof) that were recorded, it is likely that other species also occur on or around the site but were not recorded during the site surveys that were undertaken. These include small mammal species such as pygmy shrew (*Sorex minutus*) and wood mouse (*Apodemus sylvaticus*) but also larger mammals such as stoat (*Mustela erminea*) and mink (*Mustela vison*). No signs of any of these species were recorded during the walkover surveys and no requirement for dedicated surveys was identified.

In general, given the highly modified and bare nature of the exposed peat, limited suitable habitat occurs on site for protected faunal species. No signs of any additional protected fauna were recorded within the study area during the field survey.

The study area provides habitat for a range of other faunal species as described in the preceding sections. No records of common lizard were recorded within the site. However, the species is likely to occur in the area. No evidence of populations of species such as common frog, Irish hare, pine marten

or deer species being significant at more than a local level was recorded. These species have been assessed as of local importance (higher value). However, due to the small footprint and nature of the proposed development, they are unlikely to be significantly affected by the proposed development. For this reason, these species are not considered further in this EIAR.

Incidental records of invertebrate were recorded during the walkover surveys of the site. In addition to the aquatic invertebrates identified during kick samples of the watercourses on site, the following include the species commonly recorded within the study area:

- > Common hawker dragonfly (*Aeshna juncea*)
- > Common darter damselfly (*Sympetrum striolatum*)
- > Ruddy darter damselfly (*Sympetrum sanguineum*)
- > Peacock butterfly (*Inachis io*)
- > Speckled wood butterfly (*Pararge aegeria*)
- > Green veined white (*Pieris napi*)
- > Common blue damselfly (*Polyommatus icarus*)
- > Small copper butterfly (*Lycaena phlaeas*)
- > Painted lady butterfly (*Cynthia cardui*)
- > Brimstone butterfly (*Gonepteryx rhamni*)
- > Small tortoiseshell butterfly (*Aglais urticae*)
- > Dingy Skipper Butterfly (*Erynnis tages*)
- > Emperor moth (*Saturnia pavonia*)
- > Cinnabar moth (*Tyria jacobaeae*)
- > Garden tiger moth (*Arctia caja*)
- > Common carder bee (*Bombus pascuorum*)
- > Buff-tailed bumblebee (*Bombus terrestris*)
- > Garden spider (*Araneus diadematus*)
- > Crane fly (*Tipulidae sp*)
- > Field grasshopper (*Chorthippus brunneus*)
- > Common green grasshopper (*Omocestus viridulus*)

In addition to the above, the following species were recorded during kick sampling undertaken at five sample locations as shown in Figure 2.1, Appendix 6.3 (Triturus Environmental Ltd, 2019):

- > Large dark olive (*Baetis rhodani*)
- > Cassidflies (*Limnephilus sp.*)
- > *Seracostoma personatum*
- > *Agapetus fuscipes*
- > *Hydropsyche angustipennis*
- > Blue-tailed damselfly (*Ischnura elegans*)
- > Common backswimmer (*Notonecta glauca*)
- > Great diving beetle (*Dytiscus marginalis*)
- > *Halipus confinus*
- > *Limnius volckmari*
- > *Elmis aenea*
- > Wandering snail (*Radix balthica*)
- > Jenkins' spire snail (*Potamopyrgus antipodarum*)
- > Waterlouse (*Asellus aquaticus*)
- > *Gammarus duebenii*
- > White-clawed crayfish *Austropotamobius pallipes*
- > *Dicranota sp.*
- > Chironomini tribe
- > *Chironomus sp.*
- > *Simulium sp.*
- > *Glossiphonia complanata*

## 6.5.2.4 Significance of Fauna

### 6.5.2.4.1 Badger

Badger as an ecological receptor has been assigned Local Importance (Higher value) on the basis that the habitats within and adjacent to the study area are likely to be utilised by a locally occurring badger population of Local Importance. As an active sett has been identified in close proximity to the proposed internal cable and access road route, further assessment of impact is required.

### 6.5.2.4.2 Otter

Although otter were recorded within the study area on a number of occasions, no evidence of populations of otter being significant at more than a local level was recorded. Based on the low number of otter records for the site and the low suitability of the aquatic habitats to support fish species, otter has been assessed as of Local Importance (Higher value).

### 6.5.2.4.3 Bats

The habitats surrounding the proposed works location are likely to be utilised by a bat population of Local Importance (higher value). All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976, as amended in 2017) and European legislation – (Habitats Directive (92/43/EEC)). Bats are likely to forage and commute within the vicinity of the proposed development. No potential bat roosting features were identified within or adjacent to the development footprint.

### 6.5.2.4.4 Marsh fritillary

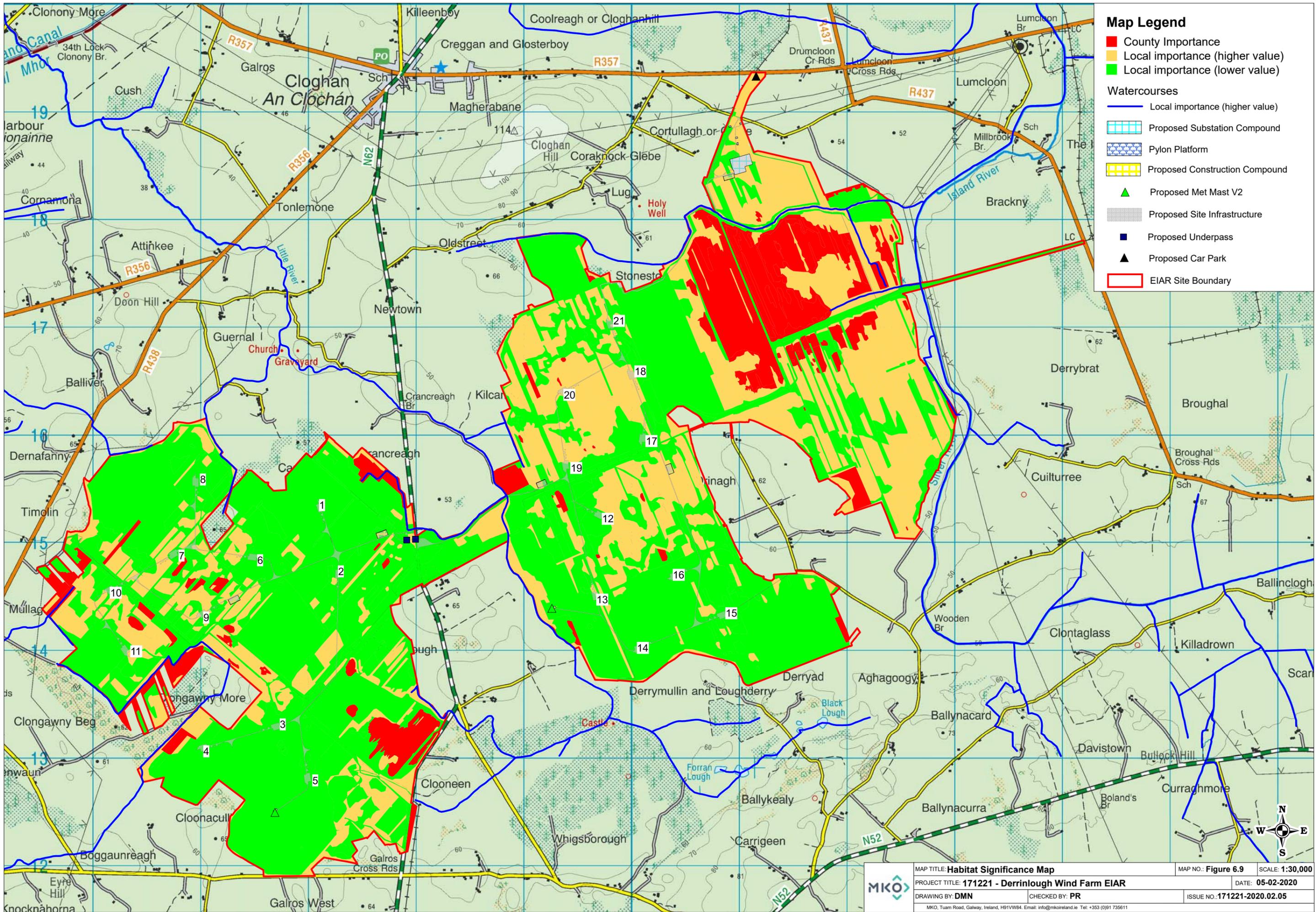
Marsh fritillary have been recorded within the site (but outside the construction footprint) during dedicated field surveys undertaken in 2018 and 2019. The species was recorded within discontinuous areas of suitable habitat along an existing railway line/site access track and within areas of poor fen/wet grassland. Although some of the areas of suitable habitat are small and fragmented, the species was widely distributed across the western half of the site. Due to the distribution of the suitable habitat occurring within the study area as well as the wide distribution of the species within the western part of the site, the species has been assessed as of Local importance (higher value).

### 6.5.2.4.5 Fisheries and Aquatic fauna

The aquatic fauna within the study area is assigned Local Importance (Lower Value) due to the highly modified and silty aquatic habitats that are present. The downstream watercourses and fauna within them is assigned Local Importance (Higher Value) due to the known populations of salmon, trout and lamprey species along with otter.

## 6.5.2.5 Identification of Key Ecological Receptors

Table 6.13 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors. These ecological receptors are considered in Section 6.7 of this report and mitigation/ measures will be incorporated into the proposed development where required, to avoid potential significant impacts on the features. The significance attributed to each of the habitats on site is provided in Figure 6.9 and includes the proposed infrastructure overlain.



### Map Legend

- County Importance
- Local importance (higher value)
- Local importance (lower value)

#### Watercourses

- Local importance (higher value)
- Proposed Substation Compound
- Pylon Platform
- Proposed Construction Compound
- ▲ Proposed Met Mast V2
- Proposed Site Infrastructure
- Proposed Underpass
- ▲ Proposed Car Park
- EIAR Site Boundary

	MAP TITLE: <b>Habitat Significance Map</b>		MAP NO.: <b>Figure 6.9</b>	SCALE: <b>1:30,000</b>
	PROJECT TITLE: <b>171221 - Derrinlough Wind Farm EIAR</b>		DATE: <b>05-02-2020</b>	
DRAWING BY: <b>DMN</b>		CHECKED BY: <b>PR</b>		ISSUE NO.: <b>171221-2020.02.05</b>
MKO, Tuam Road, Galway, Ireland, H91VW84. Email: info@mkofireland.ie Tel: +353 (0)91 735611				

Table 6.13 Key Ecological Receptors identified during the assessment

Ecological feature or species	Reason for inclusion as a KER	KER
Designated sites	<p><b>Nationally Designated Sites</b></p> <p>The following Nationally designated site is located downstream of the proposed development and has been identified as being within the likely Zone of Impact:</p> <ul style="list-style-type: none"> <li>➤ River Shannon Callows pNHA</li> <li>➤ Lough Coura pNHA</li> </ul>	Yes
	<p><b>European Designated Sites</b></p> <p>The following SACs are identified in the AA Screening as being within the Likely Zone of Impact and are assessed fully in the NIS that accompanies this application:</p> <ul style="list-style-type: none"> <li>➤ River Shannon Callows SAC.</li> <li>➤ Lough Derg North East Shore SAC.</li> </ul> <p>These sites are assigned <b>International</b> importance and included as a KER as there is potential for indirect effects on them via water pollution.</p> <p><b>Note: SPAs within the Likely Zone of Impact are considered in Chapter 7, Ornithology and in the NIS.</b></p>	Yes
Aquatic Habitats and related species	<p><b>Drainage Ditches</b></p> <p>The site of the proposed development is drained by numerous drainage ditches. These are small man-made channels that are often devoid of vegetation and regularly maintained or choked with vegetation and are slow flowing.</p> <p>These drains are assigned <b>Local Importance (Lower Value)</b>.</p>	No
	<p><b>Rivers and Streams</b></p> <p>A number of larger natural or slightly modified watercourses are located either within or at the perimeter of the site. These watercourses include:</p> <ul style="list-style-type: none"> <li>➤ The Stonestown Stream, Silver River Little Cloghan River, Madden's Derry Stream and Derrinlough Stream that primarily drain the eastern section of the site and ultimately discharge to the River Brosna.</li> <li>➤ The Grant's Island Stream, the Feeghroe Stream and the Mullaghkaraun Stream, which drain the western section of the site and ultimately discharge to the River Shannon.</li> </ul> <p>These Rivers and Streams have been assigned <b>Local importance (Higher Value)</b> in that whilst many are highly modified where they adjoin the site, they are conduits to waterbodies with a high biodiversity value in the local area. They also provide a conduit to downstream SACs of international importance.</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p><b>Open Waterbodies and Wetlands</b></p> <p>The site of the proposed development includes large areas of open water in the form of Acid Oligotrophic Lakes and associated wetlands and reedswamps. There is a small area of Rich Fen and Flush, which is included as a wetland for the purposes of this assessment. These areas have been assigned <b>County Importance</b> in that they support semi-natural (although artificial) habitats that are of high biodiversity in the County context.</p>	Yes
	<p><b>Aquatic and Fisheries Species</b></p> <p>The aquatic species that are associated with the rivers, streams and wetlands that are located within and surrounding the site assigned <b>Local Importance (Higher Value)</b> in that they have a high biodiversity value in the local context. There is potential for indirect effect on these features. These species include salmonid and coarse fish, lamprey species, white clawed crayfish (<i>Austropotamobius pallipes</i>), European eel (<i>Anguilla anguilla</i>), aquatic invertebrates and other aquatic species.</p>	Yes
Uncut Raised Bog	<p>The small areas of uncut raised bog that are located in fragmented locations at the edges of the site are assigned <b>County Importance</b> on a highly precautionary basis. This is because they could potentially contain some highly degraded and non-viable areas of the Annex I Habitat 'Degraded Raised Bog still Capable of Natural Regeneration (7120)'. These areas have been entirely avoided in the design of the proposed development and the proposed wind farm infrastructure does not come within 240 m of them. While a proposed amenity trail occurs adjacent to this habitat, it is located on an existing railway track and will thus not impact upon this habitat. In addition, the nature and scale of the works associated with the amenity pathways are such that there is no potential for significant effect.</p>	No
Natural Oak Ash Hazel Woodland	<p>The natural woodlands within the site that are located on the mineral islands within the bog are assigned <b>County importance</b> on the basis that they represent semi-natural habitats of a size and type such that they provide high biodiversity and are unusual and important in a County context. However, these features have been entirely avoided in the design of the proposed development and no potential for any direct or indirect effect on them is identified.</p>	Yes
Cutover bog and associated secondary habitats	<p><b>Bare peat habitats</b></p> <p>The cutover bog and bare peat habitats are of low ecological importance in their current state and have been assigned <b>Local Importance (Lower Value)</b>.</p>	No
	<p><b>Bog Woodland and pioneering Scrub</b></p> <p>The habitats listed above are assigned <b>Local Importance (Higher Value)</b>. This is on the basis that they consist of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive (see appendix 6.4).</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p><b>Note: The bog woodland does not correspond to the Annex I Habitat Bog Woodland 91D0. See classification in Appendix 6.4</b></p>	
	<p><b>Poor fen</b></p> <p>This habitat is assigned <b>Local Importance (Higher Value)</b>. This is on the basis that it consists of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive.</p>	Yes
	<p><b>Heath type Communities</b></p> <p>This habitat is assigned <b>Local Importance (Higher Value)</b>. This is on the basis that it consists of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive (See Appendix 6.4).</p>	Yes
	<p><b>Wet grassland</b></p> <p>The habitat is common and widespread in the wider area. However, the habitat that is of some local importance to local wildlife (NRA, 2009). The small area of this habitat occurring within the proposed development area is small in area and is assigned <b>Local Importance (Lower Value)</b>.</p>	No
Plantation forestry (WD4) and plantation broadleaved woodland (WD2)	Plantation forestry is of low ecological importance due to the dominance by coniferous species (Sitka spruce and lodgepole pine). A small area within the study area has also been planted by ash and corresponds to Mixed broadleaved/conifer (WD2). Plantation forestry/woodland has been assigned <b>Local Importance (lower value)</b> as it provides cover for some local wildlife. The proposed development footprint will not result in any loss of this habitat.	No
Otter	Otter is assigned <b>Local Importance (Higher Value)</b> as there is likely to be a regularly occurring population of local importance in the wetlands within the site and the watercourses at its periphery and in the surrounding area. No evidence of a more ecologically important population was recorded during any of the site surveys undertaken.	Yes
Marsh fritillary	The species has been assessed as of <b>County</b> importance as they are listed in Annex II of the EU Habitats Directive and it is likely that the population on site may represent 1% of the County population of the species.	Yes
Bats	Bat species has been assessed as of <b>Local Importance (Higher Value)</b> as they represent a resident or regularly occurring populations assessed to be important at the Local level and are listed in Annex IV of the EU Habitats Directive.	Yes
Badger	Due to the occurrence of a number of badger setts within and adjacent to the site, the species has been assessed as of <b>Local Importance (Higher Value)</b> as there is a regularly occurring populations assessed to be important at the local level.	Yes
Additional protected fauna	The site surveys did not identify any other protected faunal species with the potential to be significantly affected by the proposed development at the population level	No

## 6.6 Ecological Impact Assessment

### 6.6.1 Do-Nothing Effect

If the proposed development were not to proceed, the site would continue to be managed under the requirements of the relevant IPC licence, and existing commercial forestry, telecommunications and wind measurement would continue. The rail lines that supply peat to Derrinlough Briquette Factory would continue to be used until the manufacture of peat briquettes ceases. The biodiversity on the site would likely remain similar to its current state as activity levels and land use would not change significantly.

When peat extraction activity ceases, a Rehabilitation Plan will be implemented in accordance with the IPC licence requirements, to environmentally stabilise the site through encouragement of re-vegetation of bare peat areas. This rehabilitation plan is designed to result in an overall increase in biodiversity on the site when compared to the existing situation, following cessation of peat extraction.

### 6.6.2 Effects on Designated Sites

None of the elements of the proposed development are located within the boundaries of any Nationally or European designated sites important for nature conservation (Figure 6.1a and Figure 6.1b). There will be no direct effects on any designated site as a result of the construction, operation and decommissioning of the wind farm project or the Substation and Grid Connection.

Two nationally designated sites were identified as being within the zone of influence and as KERs. These are listed below:

- Lough Coura pNHA is located adjacent to the southern boundary of the proposed development site but is over 310m from the construction footprint at closest. It is a site that contains peatland and fen habitats and the potential for hydrological connection was considered as a pathway for effect. This potential was fully assessed in Chapter 9 of this EIAR, which concluded in Table 9.12 of the hydrological assessment that there is no potential for impact on this pNHA.
- The River Shannon Callows pNHA is also designated as an SAC and SPA and any potential effects on this nationally designated site are fully considered in the AA Screening and NIS in relation to the European designation. There are no additional features in the pNHA, which are not also considered in relation to the SAC or SPA.

No NHAs or pNHAs that are not also designated as European Sites were identified as KERs. In situations where pNHAs are contiguous with SACs or SPAs, they have been assessed as those designations within the AA Screening Report and NIS, and the relevant conclusions are recorded and referenced in this chapter.

In relation to European sites, an Appropriate Assessment Screening Report and Natura Impact Statement (NIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed development in compliance with Article 6(3) of the Habitats Directive.

As per the aforementioned EPA draft Guidance (2017), “a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”. This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

*“It cannot be concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, individually or in combination with other plans and projects, would not be likely to have a significant effect on the following sites:*

- River Shannon Callows SAC
- Lough Derg, North-east Shore SAC
- Middle Shannon Callows SPA
- River Little Brosna Callows SPA
- Lough Derg (Shannon) SPA

*As a result, an Appropriate Assessment is required, and a Natura Impact Statement shall be prepared in respect of the proposed development’.*

The findings presented in the NIS are that, *it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.*

## 6.6.3 Likely Significant Effects During Construction Phase

### 6.6.3.1 Effects on Habitats During Construction

Table 6.14 below provides details of the extent of the recorded habitats on the site, the extent of the habitat that will be lost to facilitate the proposed development and the percentage of the total area of that habitat on the site that it represents.

Table 6.14 Extent of habitat lost to the proposed development and the percentage of the total area of that habitat on site

Habitat	Total area on the site	Area to be lost	Percentage of total to be lost
Cutover bog (PB4)	822.9	14.89	1.81
Cutover bog (PB4), Poor fen and flush (PF2) mosaic	145.63	3.79	2.60
Buildings and artificial surfaces (BL3)	67.62	3.09	4.57
Scrub (WS1), Poor fen and flush (PF2) mosaic	16.4	2.94	17.93
Scrub (WS1)	182.6	2.55	1.40
Poor fen and flush (PF2)	97.9	2.27	2.32
Scrub (WS1), Dry calcareous and neutral grassland (GS2), Poor fen and flush (PF2) mosaic	8.22	0.75	9.12
Dry Heath (HH), Scrub (WS1) mosaic	40.21	0.5	1.24
Dry Heath (HH), Poor fen and flush (PF2), Scrub (WS1) mosaic	9.44	0.4	4.24
Cutover bog (PB4), Dry Heath (HH) mosaic	28.72	0.26	0.91
Wet grassland (GS4)	16.12	0.26	1.61
Conifer plantation (WD4)	171.45	0.2	0.12
Refuse and other waste (ED5)	4.72	0.2	4.24
Cutover bog (PB4), Dry Heath (HH), Wet grassland (GS4) mosaic	0.8	0.08	10.00
Dry calcareous and neutral grassland (GS1)	2.26	0.07	3.10

Scrub (WS1), Wet grassland (GS4) mosaic	16.4	0.07	0.43
Bog woodland (WN7)	19.68	0.03	0.15
Dry Heath (HH)	10.23	0.03	0.29
<b>Total</b>	<b>1,661.3</b>	<b>32.38</b>	<b>1.95%</b>

The proposed development will result in the loss of areas of habitat that are of Local Importance (Lower Value) and are not identified as KERs. This mainly involves the loss of bare peat that was in active production until recently and is of very low ecological value. Any direct or indirect impacts on these habitats are not significant.

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

### 6.6.3.1.1 Assessment of Potential Effects on Rivers and Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

Table 6.15 Potential for impact on rivers, streams, Open Waterbodies and Sensitive Aquatic Species

<b>Description of Effect</b>	<p>The footprint of the Proposed development has been specifically designed to avoid the large waterbodies and watercourses within the study area. The proposed internal road network only crosses one large watercourse and will utilise an existing bridge with no instream works proposed. Similarly, the proposed amenity trail to the east of the site will cross the Island River, using an existing railway track and associated crossing. There will be no direct effects on these habitats or the species that are associated with them. There is no potential for the proposed development to result in any barrier to the movement of aquatic species.</p> <p>There is potential for the construction activity to result in the run off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into these watercourses. This could result from the removal of scrub and woodland, culverting of drainage ditches, large-scale movement of peat or the use of concrete and other construction materials. The proposed development will cross numerous small drainage ditches, which are not themselves ecologically sensitive but do provide connectivity to the larger watercourses that surround the site.</p> <p>This represents a potential indirect effect on the identified aquatic receptors in the form of habitat degradation through water pollution.</p> <p>These effects on water quality are fully described in Chapter 9 of this EIAR and are described here in relation specifically to ecology.</p> <p><b>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the proposed development on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The proposed development will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.</b></p>
<b>Characterisation of unmitigated effect</b>	<p>In the absence of mitigation, the indirect effect of water pollution on aquatic receptors during construction has the potential be a short-term reversible impact on watercourses which act as a conduit to downstream habitats. The magnitude of any such impact is likely to be at worst moderate, given that the all major infrastructure such as turbine bases and substation etc. are located over 50 metres from any significant watercourse.</p>
<b>Assessment of Significance prior to mitigation</b>	<p>In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase of the proposed development.</p>

<b>Mitigation</b>	A detailed drainage maintenance plan for the proposed development is provided in Section 4.7 of this EIAR. This plan provides details of how water quality will be protected during the construction of the proposed development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: Hydrology and Hydrogeology of this EIAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4.3 provides the details of exactly how the measures will be implemented during construction.
<b>Residual Effect following Mitigation</b>	Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the proposed development.
<b>Potential for Cumulative Effect</b>	The proposed development will not result in any significant effect on aquatic habitats or species of biodiversity value. It therefore cannot contribute to any cumulative effect in this regard.

### 6.6.3.1.2 Assessment of Potential Effects on Revegetated Cutover Bog Habitats and Woodlands

Table 6.16 Loss of Revegetated Cutover Bog Habitats

<b>Description of Effect</b>	<p>The construction of the proposed windfarm and associated infrastructure will result in the direct loss of approximately 32.38 hectares (1.95% of the total study area) of revegetated cutover bog which is developing as pioneer poor fen, heath type habitats, bog woodlands and scrub. The areas of uncut raised bog and natural oak ash hazel woodland habitats have been entirely avoided in the design of the project with no potential for any effect thereon.</p> <p>There is the potential to result in indirect effects on the habitat immediately adjoining the footprint through drainage.</p>
<b>Characterisation of unmitigated effect</b>	This is a permanent and irreversible impact on habitats of Local Importance (Higher Value). The magnitude of this impact is Slight as it only affects a tiny percentage of the overall habitat type, which is widespread throughout the site.
<b>Assessment of Significance prior to mitigation</b>	The loss or degradation of these Cutover Bog habitats is not a significant effect as it covers a very small percentage of the overall habitat mosaic on the site and has deliberately avoided the most natural and sensitive habitats on the site such as natural woodland and uncut raised bog.
<b>Mitigation</b>	<p>The Proposed development has been deliberately designed to avoid loss of uncut raised bog and natural woodlands. In addition, the proposed development provides for the replacement of the bog woodland and scrub habitat that will be lost in other parts of the site to ensure that there will be no net loss of woodland/Scrub. It also provides for the ecological enhancement of areas of cutover bog through rewetting to promote the development of wetland vegetation.</p> <p>These measures are fully described in the Biodiversity Management Plan that is provided as Appendix 6.7 to this EIAR. The habitat replacement and enhancement areas are also mapped in this management plan.</p>
<b>Residual Effect following Mitigation</b>	Following the implementation of mitigation and the arising effect of the mitigation measures, there will be no significant residual effect on these cutover bog habitats. There may be a short-term slight negative effect in the early stages of implementation of the Biodiversity Management Plan in the form of habitat loss but as the woodland and wetland habitats develop as a result of the proposed enhancement measures, there is potential for the proposed development to result in an overall long-term positive effect on the habitats within the study area.

<b>Potential for Cumulative Effect</b>	The proposed development will not result in any significant negative effect on the cutover bog habitats on the site. It therefore cannot contribute to any cumulative effect in this regard.
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### 6.6.3.2 Effects on Protected Fauna During Construction

The proposed development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site but were not included as KERs. Given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (wetlands, natural woodlands and watercourses), no significant effects on non-KER faunal biodiversity is anticipated as a result of the proposed development.

It should be noted that no significant habitat for salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the proposed development and all major infrastructure is located over 50 metres from the watercourses and wetlands within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.6.3.1.1 above and is not repeated below.

#### 6.6.3.2.1 Assessment of Potential Effects on Otter

Table 6.17 Assessment of Potential Impacts on Otter

<b>Description of Effect</b>	<p>As described above in relation to aquatic habitats and species, the proposed development has been deliberately designed such that all major infrastructure avoids significant watercourses and wetland habitats with no instream works in these habitats proposed. There is no potential for direct effect on habitat that is significant for otter.</p> <p>Minor infrastructure such as roads are proposed in close proximity to some of the watercourses and wetlands on the site and this has the potential for indirect effects in the form of disturbance to otter.</p> <p>The proposed development also has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from construction activity as described above</p>
<b>Characterisation of unmitigated effect</b>	<p>There is no potential for direct loss or fragmentation of significant otter habitat</p> <p>Given that the site is at present in active peat production and all major infrastructure is located over 50 metres from any significant watercourse or wetland, any potential disturbance to otter will be a short-term, slight negative effect.</p> <p>In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential be a short-term reversible impact. The magnitude of any such impact is likely to be at worst moderate, given that the all major infrastructure such as turbine bases, substation and construction compounds are located over 50metres from any significant watercourse.</p>
<b>Assessment of Significance prior to mitigation</b>	<p>There is no potential for the construction phase of the proposed development to result in significant disturbance, displacement or habitat fragmentation for otter.</p> <p>In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on otter at a local geographic scale in the form of habitat deterioration resulting from pollution.</p>
<b>Mitigation</b>	<p>A detailed drainage maintenance plan for the proposed development is provided in Section 4.7 of this EIAR. This plan provides details of how water quality will be</p>

	protected during the construction of the proposed development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: Hydrology and Hydrogeology of this EIAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4.3 provides the details of exactly how the measures will be implemented during construction.
<b>Residual Effect following Mitigation</b>	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the proposed development.
<b>Potential for Cumulative Effect</b>	The proposed development will not result in any significant effect on otter. It therefore cannot contribute to any cumulative effect in this regard.

### 6.6.3.2.2 Assessment of Potential Effects on Marsh fritillary

Table 6.18 Assessment of Potential Impacts on Marsh fritillary

<b>Description of Effect</b>	<p><b>Habitat Loss/ Fragmentation</b></p> <p>Suitable habitat for the species within the site is restricted to a number of small areas within the study area boundary. These areas are shown in Figure 6.7 above. The proposed development has been deliberately designed to entirely avoid all recorded marsh fritillary colonies and all identified suitable habitat for the species within the study area boundary. There are however some works proposed close to identified marsh fritillary habitat. This creates the potential for some habitat loss if the works area is not suitably curtailed to ensure that there was no encroachment onto the areas of suitable habitat. There is also the potential for disturbance to the species if construction activity encroaches into their habitat.</p>
<b>Characterisation of unmitigated effect</b>	In the absence of mitigation/best practice, potential for Long-term Slight Negative Effect through the loss of potentially suitable supporting habitat for this receptor of County importance was identified where it occurs in close proximity to the proposed development. There could also be Short-Term Slight Negative Effects in the form of disturbance. The effects would be slight at worst as the entire development has been designed to avoid these areas and any encroachment would cover a very small percentage of the habitat within the study area.
<b>Assessment of Significance prior to mitigation</b>	Given the design of the scheme, there is no potential for the construction of the proposed development to result in significant effects on marsh fritillary as the permanent footprint of the development avoids all suitable habitat. However, mitigation will be employed to ensure that there is no temporary habitat loss and disturbance there are no negative effects on this species at all.
<b>Mitigation</b>	<p>Whilst it is highly unlikely that the onsite population of marsh fritillary will be impacted during construction, due to the avoidance of all recorded colonies on site, measures that have been put in place to protect the species and its supporting habitat locally and thereby avoiding any remote potential for effects on the population.</p> <p>Best practice measures for the protection and enhancement of the supporting habitat within the proposed development site are fully described in a Lepidoptera Management Plan (provided in Appendix 6.6). The measures have been prepared in consultation with Butterfly Conservation Ireland (BCI). These measures, in summary, include:</p> <ul style="list-style-type: none"> <li>➤ <b>Avoidance Measures:</b> The entire proposed development, including all proposed tree-planting, has been designed to avoid marsh fritillary and supporting habitat on site, see Figure 6.7.</li> <li>➤ <b>Pre-construction Measures:</b> Areas of suitable marsh fritillary habitat will be fenced off or clearly marked prior to the commencement of any site works</li> </ul>

	<p>under the guidance and supervision of a suitably qualified Ecological Clerk of Works (ECoW).</p> <ul style="list-style-type: none"> <li>➤ Pre-commencement surveys will be undertaken for marsh fritillary to determine long term trends of the population within the site.</li> <li>➤ Vegetation structure and suitability will be monitored following the NBDC survey methodology (NBDC, 2019).</li> <li>➤ Proposed tree-planting that is proposed as part of the Biodiversity Management Plan will avoid areas of suitable marsh fritillary habitat.</li> <li>➤ Pollinator enhancement measures through habitat creation.</li> <li>➤ Habitat condition monitoring will be undertaken to ensure that there are no negative effects on marsh fritillary habitat.</li> </ul>
<b>Residual Effect following Mitigation</b>	Following the incorporation of the above avoidance and mitigation measures, there is the potential for the proposed development to increase the extent of available habitat on the site for marsh fritillary and also to increase the quality of the habitat on the site.
<b>Potential for Cumulative Effect</b>	As there will be no negative residual effect on the species at any geographic scale as a result of the proposed development, it can be concluded that there is no potential for it to contribute in any cumulative negative effect in this regard. There is potential for the proposed development to result in a positive residual effect on marsh fritillary.

### 6.6.3.2.3 Assessment of Potential Effects on Badger

Table 6.19 Assessment of Potential Impacts on Badger

<b>Description of Effect</b>	<p>Whilst badger setts and foraging activity were recorded within the study area, the proposed development has been specifically designed to avoid all identified setts. There is some potential for small scale loss of foraging habitat to facilitate the construction footprint.</p> <p>In addition, the proposed internal underground cable route and site access track will pass close to an identified badger sett located within the north-eastern section of the study area (see Figure 6.6b, confidential Appendix 6.6). In the absence of mitigation/best practice, this has the potential to result in disturbance/displacement, and potentially mortality, during the construction phase of the proposed development. In addition, construction works in close proximity to the sett could prevent badgers from occupying the sett.</p>
<b>Characterisation of unmitigated effect</b>	<p>Given the small scale of the development footprint in comparison to the size of the study area, the loss of foraging habitat to the footprint of the proposed development constitutes a Permanent Slight Negative Effect. This would not be reversible as it is within the construction footprint. The proposed development will not result in any fragmentation of badger habitat, as there will be no barriers to movement throughout the site as a result of the proposed works</p> <p>Although the works that are proposed close to the badger sett involve only the construction of an access track and underground cabling, following the precautionary approach, there is potential for short term moderate negative effects on the local badger population in terms of disturbance, displacement and potentially mortality.</p>
<b>Assessment of Significance prior to mitigation</b>	<p>There is no potential for significant loss of badger habitat as a result of the proposed development.</p> <p>In the absence of mitigation, there is potential for significant disturbance/displacement and/or mortality on the local badger population as a result of the proposed development.</p> <p>There is no potential for significant effects the county, national or international scale.</p>

<b>Mitigation</b>	<p>The following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality will be implemented during the construction phase of the proposed development:</p> <ul style="list-style-type: none"> <li>➤ On a precautionary basis, prior to the commencement of any site works, a badger sett disturbance licence will be sought from the National Parks and Wildlife Service.</li> <li>➤ An exclusion zone around the sett will be maintained for the duration of the construction works. No works will be undertaken within 30m of the sett.</li> <li>➤ Following best practice, the proposed works within 50 metres of the sett will be undertaken outside of the badger breeding season (December to June) (NRA, 2005).</li> <li>➤ All of the above works will be undertaken or supervised by an appropriately qualified ecologist.</li> </ul> <p>In addition to the above, the proposed access track construction in close proximity to the sett will be constructed as a ‘floating road’ construction, see Section 4.9.2 of the Chapter 4: Description of the Proposed Development. This will avoid the requirements for the excavation of materials and therefore reduce both the construction time and intensity of the proposed construction works in this area.</p> <p>To protect individual badgers during the construction phase of the proposed development, all open excavations on site will be covered when not in use and backfilled as soon as possible. Excavations will also be covered at night and any deep excavations left open will have appropriate egress ramps in place to allow mammals to safely exit excavations should they fall in.</p>
<b>Residual Effect following Mitigation</b>	<p>Following the implementation of the mitigation as described above, there is no potential for any significant negative effect on badger at geographic scale.</p>
<b>Potential for Cumulative Effect</b>	<p>There will be no significant residual effect at any geographic scale, it can therefore be concluded that there is no potential for the proposed development to contribute in a cumulative effect in this regard.</p>

#### 6.6.3.2.4 Assessment of Potential Effects on Bats

Table 6.20 Assessment of Potential Impacts on Bats

<b>Description of Effect</b>	<p>Whilst the study area was utilised by foraging and commuting bats, the proposed development will not result in any significant reduction or loss of the available habitat on the site given the size of the site and nature and small scale of the habitats that will be lost.</p> <p>No bat roosts were identified in close proximity to the construction footprint of the proposed development and there is no potential for significant bat roosts to be disturbed by increased human presence and increased noise during construction.</p> <p>The potential for bats to be killed during removal of trees or structures was considered in this assessment. However, no buildings or other structures with the potential to support bat roosts will be demolished to facilitate the proposed development. In addition, the trees occurring within the development footprint were assessed as not providing suitable cavities to support any significant bat roosts. The woodland and scrub habitat occurring within the infrastructure footprint comprises largely of immature downy birch and willows. All structures within the study area were assessed for roosting potential. No roosts or potential roost features were recorded in close proximity to the proposed infrastructure.</p>
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<b>Characterisation of unmitigated effect</b>	The construction of the proposed development has the potential to result in Short-Term Imperceptible Negative effects on the local bat populations in the form of habitat loss, disturbance or direct mortality.
<b>Assessment of Significance prior to mitigation</b>	There is no potential for the construction of the proposed development to result in Significant effects on the local bat population at any geographic scale as no roosts were recorded close to the infrastructure, habitat loss and disturbance are only likely to result in imperceptible effects on the local population. The bat survey report, which is included in Appendix 6.2 provides further detail and analysis with regard to the effects on bat species.
<b>Mitigation</b>	<p>Whilst no significant effects on bat species have been identified, the following potential positive effects are noted. The felling of linear sections of birch dominated woodland within the site to facilitate site access roads will result in the creation of more woodland edge habitat and as such benefit feeding and commuting bat species locally. Any loss of woodland habitat will be mitigated through replacement planting. As such, there will be no net loss of woodland and an increase in woodland edge habitat.</p> <p>In addition, the following construction best practice will be employed to minimise general noise and disturbance potential. Plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).</p>
<b>Residual Effect following Mitigation</b>	There is no potential for the construction of the proposed development to result in Significant effects on the local bat population at any geographic scale.
<b>Potential for Cumulative Effect</b>	There is no significant effect on bats associated with the proposed development. It therefore cannot contribute to any cumulative effect in this regard.

## 6.6.4 Likely Significant Effects During Operational Phase

### 6.6.4.1 Effects on Habitats during Operation

The operation of the proposed development will not result in any additional land take or loss of revegetated peatland habitats and as such there is no potential for any significant effects in this regard. These habitats are not considered to be a KER in the context of the operation of the proposed development. However, the proposed development has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management that will be undertaken throughout the operational phase of the proposed development. Details of the management that will be undertaken are provided in the Biodiversity Management Plan in Appendix 6.7. Measures included within the plan are additional to those that are included within the draft Rehabilitation Plan that would be implemented following cessation of peat production and are linked specifically to the wind farm development. The Draft Rehabilitation Plans for both Clongawny and Drinagh bogs are provided in Appendix 6.8 of this EIAR

Potential for effects on rivers, streams, open waterbodies and sensitive aquatic species remains a KER during operation and is assessed in detail in the following subsections.

### 6.6.4.1.1 Effects on Rivers and Streams, open waterbodies and sensitive aquatic faunal species.

Table 6.21 Assessment of Potential Impacts on Rivers, Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

<p><b>Description of Effect</b></p>	<p>The increased amount of hard standing associated with the windfarm infrastructure has the potential to result in faster run off of water from the site to the surrounding watercourses. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality. Additionally, there is the potential for the faster run off of any pollutants that may be associated with vehicular usage on the site.</p> <p>These impacts on water quality are fully described in Chapter 9: Hydrology and Hydrogeology of this EIAR and are described here in relation specifically to biodiversity.</p> <p><b>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the proposed development on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The proposed development will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.</b></p>
<p><b>Characterisation of unmitigated effect</b></p>	<p>Impact on water quality during the operational phase of the proposed development has been assessed as a permanent negative effect in the absence of mitigation. The magnitude of this impact is slight because the all major infrastructure will be located over 50 metres from any significant watercourse and the footprint of the proposed development will be minimal when compared to the overall size of the site.</p>
<p><b>Assessment of Significance prior to mitigation</b></p>	<p>Significant effects on water quality are not anticipated at any geographic scale during the operation of the proposed development.</p>
<p><b>Mitigation</b></p>	<p>Whilst no significant effects on water quality are anticipated, potential for effects on water quality associated with the operational phase drainage of the site has been fully mitigated through appropriate design and mitigation as fully described in Section 9.4.4 of Chapter 9: Hydrology and Hydrogeology and Section 6 of the CEMP.</p>
<p><b>Residual Effect following Mitigation</b></p>	<p>Following the implementation of the mitigation measures outlined above, no potential for significant effect has been identified at any geographic scale as a result of the proposed development.</p>
<p><b>Potential for Cumulative Effect</b></p>	<p>There will be no significant residual effect at any geographic scale, it can therefore be concluded that there is no potential for the proposed development to contribute in a cumulative effect in this regard</p>

### 6.6.4.2 Effects on Fauna during Operation

The operation of the proposed development will not result in any additional habitat loss or deterioration and will involve a decrease in anthropogenic activity when compared to the currently ceased, peat production usage of the site.

The implementation of the Biodiversity Management Plan will ensure that any woodland and scrub that is lost to facilitate the proposed infrastructure will be replaced within the site. It will also result in the revegetation of areas of bare peat through localised rewetting, as fully described in Appendix 6.7, and will result in the establishment of habitats of higher value for local faunal species. As such the operation of the proposed development has the potential to result in significant positive effects on the non-volant terrestrial fauna at the site of the proposed development. There is no potential for

significant negative effects on non-volant terrestrial fauna including badger and otter that were identified as KERs during the construction phase of the development.

Similarly, it is not anticipated that the operation of the proposed development will have any effect on marsh fritillary or habitat for the species during the operation of the proposed development. No elements of the infrastructure are located on suitable marsh fritillary habitat and no maintenance works associated with the operation of the project are proposed in any such habitat.

A Lepidoptera Management Plan (LMP) has been prepared as part of the proposed development and has been agreed in principle with Butterfly Conservation Ireland during pre-planning consultation. The management plan is provided in Appendix 6.6 and describes the measures required during the construction phase that will create a suitable substrate for the natural colonisation of devil's-bit scabious along site access tracks on site during the operational phase of the proposed development. This will ultimately allow for an increase in suitable available habitat for the species locally and thus a long-term net gain for the species. This will result in a positive impact for the species and no potential for significant negative effect has been identified at any geographic scale. This species is not identified as a KER during the operation of the proposed development.

It should be noted that no significant habitat for salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the proposed development and all major infrastructure such as turbine bases are located over 50 metres from the watercourses and wetlands within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.6.4.1.1 and is not repeated below.

Potential for significant effects on bat species resulting from the operation of the proposed development were identified and therefore, these taxa were identified as KERs during the operational phase.

#### 6.6.4.2.1 Assessment of Potential Effects on Bats during operation

Table 6.22 Assessment of Potential Impacts on Bats

<p><b>Description of Effect</b></p>	<p>There is no potential for loss or fragmentation of foraging or roosting habitat for bat species during the operational phase of the proposed windfarm as there will be no additional loss of any habitats following construction.</p> <p>The bat survey report that is provided in Appendix 6.2 following a precautionary approach, has identified that, based on activity levels on the site, there is moderate to high median level of bat activity throughout the site with high peak levels of activity for Common and soprano pipistrelle, Leisler's bat. These are species that are at a high risk of collision with operating wind turbines due to the ecology of the species.</p> <p>Moderate to high levels of activity of bats of <i>Myotis</i> species was also recorded but these species are at a lower risk of collision with operating wind turbines. Low to Moderate levels of activity of brown long eared bat were recorded – this species is at low risk of collision.</p>
<p><b>Characterisation of unmitigated effect</b></p>	<p>The operation of the proposed wind farm has the potential to result in a long-term effect on Pipistrelle and Leisler's bat species as a result of mortality due to collision. The magnitude of this effect in the absence of mitigation is moderate on the basis that no significant roosts were identified in the immediate vicinity of the turbines and the median level of activity is considered moderate (on a precautionary basis).</p> <p>It is noted in the SNH (2019) guidelines that bat activity on windfarm sites is highly liable to change following construction of a wind farm due to the changes in habitat that occur to facilitate construction. Therefore, continued monitoring of operational wind farms for three years' post construction is recommended in the guidelines and will be undertaken at this site, to determine the actual, post construction effects on the local bat populations.</p>

<b>Assessment of Significance prior to mitigation</b>	<p>Following the precautionary principle, there is potential for the operation of the proposed development to result in Significant effects on the local bat population.</p>
<b>Mitigation</b>	<p>In order to reduce the value of the habitat for bat species in the areas surrounding the turbines, a buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species will be implemented. Details of this mitigation and how it is calculated is provided in Appendix 6.2.</p> <p>In addition to this, ongoing monitoring of bat activity will be undertaken for at least three years' post construction of the wind farm. This will provide data and information on the actual recorded impact of the wind turbines on the local bat populations. Full details of the proposed monitoring programme are provided in Appendix 6.2 and include measurement of bat activity, weather conditions and any correlation between the two. The monitoring will also include corpse searching in the areas surrounding the turbines to gather data on any actual collisions.</p> <p>If, following monitoring, there are significant effects recorded, a range of measures are proposed to ensure that any such effects are fully mitigated. These measures include blade feathering, curtailment of turbines during certain conditions and increase of buffers surrounding the turbines. Any or all of the above measures may be employed following actual monitoring of the impact of the operating turbines on bats.</p>
<b>Residual Effect following Mitigation</b>	<p>Following the implementation of the monitoring and mitigation described above, there is no potential for significant residual effects on bat species.</p>
<b>Potential for Cumulative Effect</b>	<p>There is no significant residual effect on bats associated with the proposed development. It therefore cannot contribute to any cumulative effect in this regard.</p>

### 6.6.5 Likely Significant Effects During Decommissioning phase

There will be no additional habitat loss associated with the decommissioning of the proposed development and therefore there will be no significant effects in this regard. In addition, the removal of the infrastructure will involve similar operations to those involved in construction but without the large-scale earth moving or excavations as the turbine bases and roads etc. will be left in place. These works would therefore be of a smaller scale but would have similar impacts on ecology to those experienced during construction. There would be no additional or ancillary impacts associated with the decommissioning phase.

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna, marsh fritillary, and other terrestrial fauna during construction will be applicable to the decommissioning phase. Any measures to minimise or avoid disturbance will also be applicable. The CEMP for the project provides the details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the proposed wind farm.

## 6.7 Cumulative impact

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on European Sites, Nationally designated sites and protected species. This included a review of online Planning Registers and served to identify past and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Development.

### 6.7.1 Assessment of Plans

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

- Offaly County Development Plan 2014-2020

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of peatlands and sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6.23.

Table 6.23 Assessment of Plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Offaly County Development Plan 2014-2020</p>	<p><b>Core Strategy Policy</b></p> <p><u>CSP-07</u></p> <p>It is Council policy to ensure full compliance with the requirements of the EU Habitats Directive (92/43/EEC), SEA Directive (2001/42/EC) and EIA Directive 2011/92/EU and associated legislation/regulations, including the associated European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477 of 2011), European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004-2011, Planning and Development (Strategic Environmental Assessment) Regulations 2004-2011 and the European Communities (Environmental Impact Assessment) Regulations 1989-2011 (or any updated/superseding legislation). Planning applications for proposed developments within the plan area that may give rise to likely significant effects on the environment may need to be accompanied by one or more of the following: an Environmental Impact Statement, an Ecological Impact Assessment Report, a Habitats Directive Appropriate Assessment Report or a Natura Impact Statement, as appropriate.</p> <p><u>CSP-08</u></p> <p>Natural Heritage, Landscape and Environment</p> <p>It is the policy of Offaly County Council, to support the conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites, the protection of Natural Heritage Areas and proposed Natural Heritage Areas and the promotion of the development of a green/ecological network within the Plan Area, in order to support ecological functioning and connectivity, create opportunities in suitable locations for active and passive recreation and to structure and provide visual relief from the built environment. The protection of natural heritage and biodiversity, including European sites, will be implemented in accordance with relevant EU environmental directives and applicable national legislation, policies, plans and guidelines, including the following (and any updated/superseding documents):</p> <ul style="list-style-type: none"> <li>➤ EU Directives, including the Habitats Directive (92/43/EEC), the Birds Directive (2009/147/EC codified version of Directive), the Environmental Impact Assessment Directive (85/337/EEC), the Water Framework Directive (2000/60/EC) and the Strategic Environmental Assessment Directive (2001/42/EC).</li> </ul>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. There is no potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>In addition, the incorporation of the public amenity trail through the proposed development will also incorporate the requirements of Policy <u>NHP-05</u> which facilitates education and increased awareness of biodiversity. This has the potential to result in a positive effect.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<ul style="list-style-type: none"> <li>➤ National legislation, including the Wildlife Act 1976, the European Communities (Environmental Impact Assessment) Regulations 1989 (SI No. 349 of 1989) (as amended), the Wildlife (Amendment) Act 2000, the European Union (Water Policy) Regulations 2003 (as amended), the Planning and Development (Amendment) Act 2010 and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).</li> <li>➤ Catchment and water resource management plans, including the Shannon and Eastern River Basin District Management Plan 2009-2015.</li> <li>➤ Biodiversity plans and guidelines, including Actions for Biodiversity 2011-2016 and Ireland’s National Biodiversity Plan.</li> </ul> <p><b>Energy Policies</b></p> <p><u>EP-03</u></p> <p>It is Council policy to encourage the development of wind energy in suitable locations, on cutaway bogs within the wind energy development areas open for consideration identified in Map 3.2, in an environmentally sustainable manner and in accordance with Government policy, having particular regard to the Wind Energy Strategy for the County and Section 3.5.1, which states that appropriate buffers should be provided, which shall be a minimum of 2km from Town and Village Cores, European designated sites, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA), and national designations, Natural Heritage Areas (NHA). Wind Energy developments on cutaway bogs should generally be developed from the centre out.</p> <p><b>Natural Heritage Policies</b></p> <p><u>NHP-05</u></p> <p>It is Council policy to continue to promote education, knowledge and pride in the natural heritage and biodiversity of the county.</p>	

	<p><u>NHP-08</u></p> <p>It is Council policy to protect, conserve and enhance the county’s biodiversity and natural heritage including wildlife (flora and fauna), habitats, landscapes and/or landscape features of importance to wildlife or which play a key role in the conservation and management of natural resources such as water.</p> <p><u>NHP-11</u></p> <p>It is Council policy to conserve, protect and enhance where possible wildlife habitats such as rivers, streams, canals, lakes, and associated wetlands including reed-beds and swamps, ponds, springs, bogs, fens, trees, woodlands and scrub, hedgerows and other boundary types such as stone walls and ditches which occur outside of designated areas providing a network of habitats and corridors essential for wildlife to flourish.</p> <p><u>NHP-12</u></p> <p>It is Council policy to ensure that peatland areas, which are designated for protection under international and national legislation, are conserved and managed appropriately to conserve their ecological, archaeological, cultural and educational significance.</p> <p><b>Natural Heritage Objectives</b></p> <p><u>NHO-01</u></p> <p>It is an objective of the Council to ensure that any development proposal in the vicinity of, or affecting a designated site, complies with the provisions relating Appropriate Assessment and SEA requirements and the Council will consult with the appropriate statutory environmental authority in this regard.</p> <p><u>NHO-02</u></p> <p>It is an objective of the Council to conserve and protect the natural heritage of the county and to conserve and protect European and National designated sites within the county including Special Protection Areas (SPAs),</p>	
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Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSACs), Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Ramsar Sites, Statutory Nature Reserves, Biogenetic Reserves and Wildfowl Sanctuaries.</p> <p><u>NHO-03</u></p> <p>It is an objective of the Council to protect, conserve and enhance the county’s biodiversity and natural heritage and the principle of enhancement will be taken into account in the Development Management process. It is a particular objective to protect plants, animal species and habitats which have been identified by the Habitats Directive, Birds Directive, Wildlife Act and the Flora Protection Order.</p>	

## 6.7.2 Assessment of Projects

As described in Section 2.2 of the EIAR, relevant projects have been assessed in-combination with the proposed wind farm development and include planning applications in the vicinity of the site and other wind energy applications within the wider area. These have not been repeated here to reduce the duplication of information within this EIAR. However, they have been fully considered in this assessment in terms of their potential for impact on biodiversity.

## 6.7.3 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the proposed development are considered cumulatively with other plans and projects as described above. Particular focus has been placed on those plans and projects that are in closest proximity to the proposed development and those that could be potentially affected via downstream surface water.

The proposed development will result in a loss of approximately 32.38 ha of cutover peatland and colonising woodland/scrub, equivalent to 1.95% of these habitats recorded within the study area. This is a very small percentage of the overall quantum of habitats within the site of the proposed development, equating to 3.4%. This does not represent a significant loss of peatland or woodland. In addition, the proposed development includes mitigation in the form of habitat management and rehabilitation that will protect and enhance a far greater area than that which will be lost. This is fully described in Appended 6.7. As such, there is no potential for the proposed development to contribute to any significant cumulative habitat loss when considered in combination with any other plans and projects.

The potential for the proposed development to contribute to a cumulative effect on water quality in the Shannon catchment was considered in this chapter and also in Chapter 9 of this EIAR. Following detailed surveys, the watercourses on the site were assessed to be of low ecological significance, with the watercourses becoming increasingly more ecologically sensitive further downstream. The proposed development includes a range of measures that are in place to prevent any water pollution or hydrological effects outside the development footprint. The implementation of these measures ensures that there is no potential for significant cumulative effects on any downstream receptors, whether the proposed development is considered on its own or in combination with other plans or projects.

No significant effects as a result of the proposed development in relation to disturbance, displacement or mortality of faunal species has been identified. Therefore, there is no potential for the proposed development to contribute to any cumulative effect in this regard.

The proposed development will not result in any significant residual effects on biodiversity and will not contribute to any cumulative effect when considered in combination with other plans and projects.

In the review of the projects that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development.