APPENDIX 6-1

BASELINE HABITATS REPORT

Baseline Habitats Report - Appendix 6-1

Proposed Knockshanvo Wind Farm, Co. Clare

DOCUMENT DETAILS

Client:	**FuturEnergy Knockshanvo Designated Activity Company**
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Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	19/08/2024	RW	PR

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1. INTRODUCTION

1.1 Introduction

MKO was commissioned by FuturEnergy Ireland to undertake detailed botanical surveys to provide an evaluation and assessment of the habitats occurring on site at the proposed Knockshanvo Wind Farm, Co. Clare, to inform the EIAR for the Proposed Development.

A full description of the Proposed Development as well as development layouts and drawings are provided in Chapter 4 (Description) of the EIAR.

1.2 Site Description

The Proposed Development site is an upland site located in southeast County Clare, approx. 10km north of Limerick City, 2.3km south of Broadford Village (Co. Clare) and 3.7km southeast of Kilkishen (Co. Clare). The approximate centre grid reference of the site is R 55907 69638. The site is dominated by Coillte-owned plantation forestry with adjacent lands comprising blanket bog and agricultural fields.

1.3 Purpose of the Report

The purpose of this report is to set out the results of detailed habitat surveys undertaken to inform the ecological assessment of the Proposed Development as presented within chapter 6 of the EIAR, and provide detail with regard to habitats which occur within the proposed infrastructure footprint, and the location and status of high conservation value habitats within the Proposed Development site.

1.4 Statement of Authority

Habitat surveys were conducted by Rachel Walsh (BSc. Env), Kailan Mitchell (BSc.) and Neansaí O' Donovan (BSc.) between 2021 and 2024. Surveyors were trained in habitat surveying and competent in the botanical surveys undertaken.

This report has been written by Rachel Walsh (BSc.) who has over 4 years' experience in habitat surveying (including peatland, grassland and woodland habitats) and surveying for fauna, and has undertaken ecological impact assessment for a wide range of projects including renewable energy developments. This report was reviewed by Pat Roberts (BSc., MCIEEM), who has over 18 years' experience in ecological management and assessment.

2. SURVEY METHODS

2.1 Scope

The habitat surveys encompassed the entire EIAR Site Boundary/Study Area Boundary, as depicted in green on Figure 6-1 and 6-2 of Chapter 6. Habitats throughout the Study Area Boundary were surveyed with a particular focus on habitats of high conservation importance, such as areas mapped under Article 17 reporting, as described in the Desk Study section of Chapter 6 of the EIAR, and other habitat types listed under Annex I of the Habitats Directive present within the Study Area Boundary. Habitat surveys were also focussed on habitats within the footprint of the Proposed Development and habitats likely to be impacted by the construction footprint.

2.2 Field Surveys

Habitat surveys were undertaken within the Study Area Boundary on the following dates:

- 22nd May 2024
- 11th of January 2024
- 7th of November 2023
- 24th of October 2023
- 24th of August 2023
- 7th of June 2023
- 26th of April 2023
- 14th of September 2021
- 19th of August 2021
- 6th of July 2021

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). All habitats recorded on site and described in this report have been classified in accordance with Fossitt (2000). The habitat assessment surveys 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.
- Perrin, P.M, Martin, J.R., Barron, S., O'Neill, F., McNutt, K., & Delaney, A. (2008) *National Survey of Native Woodlands 2003-2008.* National Parks and Wildlife Service.
- Commission of the European Communities (2013) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.
- 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.

The entire Study Area Boundary was subject to a walkover survey. Certain areas were subject to a more detailed assessment, including areas within and adjacent to the proposed infrastructure footprint. A total of 31 relevés were undertaken within the Study Area Boundary. Surveys on peatland habitats utilised a 2m x 2m relevé size as per Perrin et al. (2014). Surveys of woodland utilised a 10m x 10m relevé size as per Perrin et al (2008). The locations of all relevés are shown in Figure 2-1.

2.2.1 Vegetation composition assessment

Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the development footprint, with relevés undertaken in 2023 within the proposed footprint of each turbine base, borrow pits, construction compounds, substation, and met mast. 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.

The survey results were then analysed in accordance with the Irish Vegetation Classification (IVC) system. The IVC is a project with aims to classify, describe, and map in detail all aspects of natural and semi-natural vegetation in Ireland within a single, unified framework. The National Vegetation Database (NVD), upon which the IVC is based, holds data for over 30,000 relevés and is the core resource upon which the classification system is based.

A fundamental requirement of the IVC is to *"aid in definition and **identification** of EU Habitat Directive (92/43/EEC) Annex I habitats*" and to '*inform the planning process, for example through environmental impact assessments*'. The Engine for Relevés to Irish Communities Assignment (ERICA)[1] is a web application for assigning vegetation data to communities defined by the Irish Vegetation Classification (IVC). Data can be uploaded, checked for errors and analysed and the results can then be downloaded. ERICA works with both quantitative vegetation cover data (such as are recorded in relevés and other types of botanical recording plots) and presence/absence data, such as species lists. ERICA covers grasslands, woodland, duneland, heaths, bogs, fens, mires, freshwater, saline waters, rocky habitats, scrub, strandline, saltmarsh and weed communities (Perrin, 2019).

The data collected from the botanical assessments were uploaded to ERICA, analysed and the results data downloaded. The analysis procedure uses a clustering process to assign classification affinity to vegetation plots based on a degree of membership to each of the communities defined by the IVC. The table below details the categorizing types of plots utilizing the clustering analysis. This categorizing procedure was utilized to determine if relevés within the Study Area Boundary had any affinity to Annex I habitats.

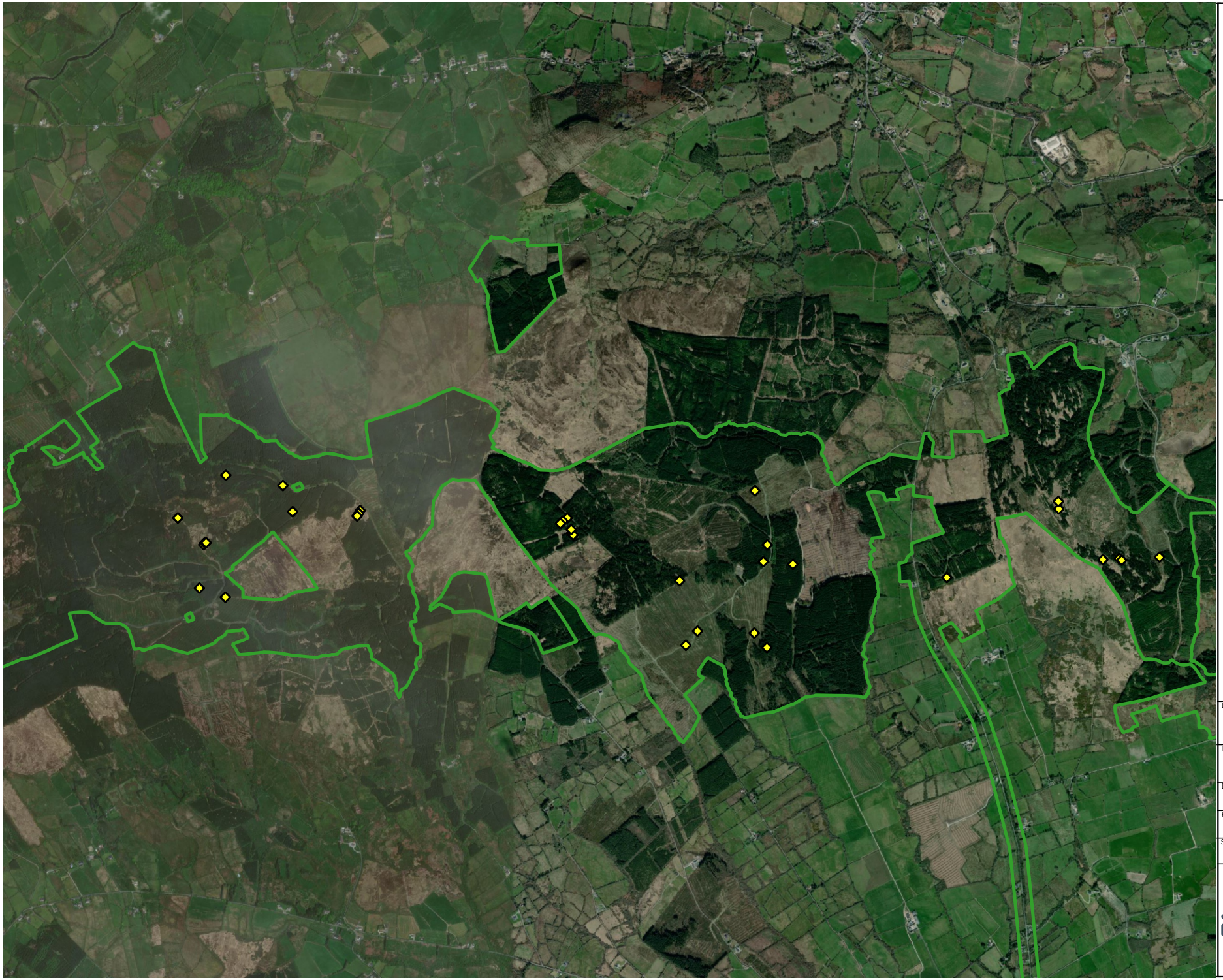
Table 2-1 Categorising types of plots using clustering analysis (after Wiser & de Cáceres, 2013).

Plot Type	Definition
Assigned	The plot has membership ≥ 0.5 for one of the vegetation communities and therefore relates to the core definition of that vegetation community.
Unassigned	The plot has membership ≥ 0.5 for the noise class and is poorly represented by the current classification scheme
Transitional	The plot has membership < 0.5 for all vegetation communities and for the noise class. It falls within the scope of the current classification scheme but does not relate to the core definition of any of the vegetation communities.

2.2.2 Wet heath condition assessment

Areas of wet heath (HH3) found within the footprint of Proposed Development infrastructure were categorised further into wet heath community types and were assessed as per the condition assessment criteria provided by Perrin et al (2014). A condition assessment of siliceous dry heath (HH1) areas was not undertaken as the Proposed Development footprint is not proposed within this habitat, with the exception of a small amenity viewing area along an existing trail adjacent to degraded dry heath habitat, described in Section 3.2.20.1.

[1] *Perrin, 2019, ERICA – Engine for Relevés to Irish Communities Assignment V5.0 User's Manual, Online, Available at: https://biodiversityireland.shinyapps.io/vegetation-classification/_w_9cd4889a/manual.pdf, Accessed: 19.10.2023*



Map Legend

- Relevé locations
- EIAR Site Boundary (Study Area Boundary)

N

Microsoft product screen shots reprinted with permission from Microsoft Corporation

Drawing Title

Relevé Locations

Project Title

Knockshanvo Wind Farm

Drawn By	Checked By
RW	RW
Project No.	Drawing No.
200513	Fig 2-1
Scale	Date
1:30,000	22.08.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

3. RESULTS

3.1 Habitats within the site

The site is dominated by conifer plantation forestry (WD4). These plantations are dominated by sitka spruce (*Picea sitchensis)* with lodgepole pine (*Pinus contorta)* and European larch (*Larix decidua)* also present in areas. Other areas within the Study Area Boundary comprise wet heath (HH3) and upland blanket bog (PB2), with smaller areas of dry siliceous heath (HH1) and cutover bog (PB4) also present. Eroding/upland watercourses (FW1) are found throughout the site which include EPA mapped rivers as well as smaller unmapped streams. Other smaller areas of the site comprise scrub (WS1), small areas of semi-native woodland types, wet grasslands (GS4), improved agricultural grasslands (GA1) with associated treelines (WL2) and hedgerow (WL1). There are also forestry tracks, roads and quarried areas categorised as building and artificial surfaces (BL3), spoil and bare ground (ED2) and recolonising bare ground (ED3). Further detail on each habitat is provided below.

A habitat map is provided as Figure 3-1. A habitat map with the Proposed Development overlain is shown in Figure 3-2.

3.1.1 Woodland Habitats

3.1.1.1 Conifer plantation (WD4) and Clearfell (WS5)

Most of the site comprises different stages of coniferous plantation forestry including recent clear-fell, second rotation, immature, semi-mature and mature forestry. The species comprise mainly of sitka spruce (*Picea sitchensis*) with some areas also containing lodgepole pine (*Pinus contorta*) and European Larch (*Larix decidua)*. Given the nature of such densely planted coniferous plantations, few other woody plant species occur. The ground and field layers within these areas are typically dominated by bare leaf litter and tamarisk moss (*Thuidium tamariscinum)* with broad buckler fern (*Dryopteris dilatata)* and bramble (*Rubus fruticosus agg.)* also present in places. Some areas of recently replanted conifer plantation also consist of vegetation typical of wet heath (HH3) habitat and wet grassland (GS4) habitat.

Plate 3-1 Mature Conifer plantation (WD4) within the Proposed Development site

Plate 3-2 Mature conifer plantation (WD4) adjacent to recent clearfell (WS5) within the site

Plate 3-3 Recently planted conifer plantation (WD4) on peatland habitat (HH3/PB4)

3.1.1.2 Ash plantation (WD1)

A small area in the north of site consists of an ash plantation with ash (*Fraxinus excelsior)* of identical age structures, this plantation is categorised as broadleaved woodland (WD1) given that it does not conform to any of the semi-natural woodland classification types.

3.1.1.3 Oak-ash-hazel Woodland (WN2)

A small area of oak-ash-hazel woodland is found within the Study Area Boundary to the southeast, within the footprint of the proposed access road. This is a small woodland on the periphery of conifer plantations and recently felled areas. The woodland consists of mature hazel (*Corylus avellana),* willows (*Salix sp.)* and ash (*Fraxinus excelsior).* Ground flora consists of pignut (*Conopodium majus),* herb Robert (*Geranium robertianum),* wild strawberry (*Fragaria vesca),* wood sorrel (*Oxalis acetosella),* Lesser celandine (*Ficaria verna),* Bluebell (*Hyacinthoides non-scripta)* and *Rhytidiadelphus triquetrus.* A small stream (FW1) and old stone wall (BL1) also run through this woodland.

Plate 3-4 Oak-ash-hazel woodland and stone wall

Plate 3-5 Oak-ash-hazel woodland (WN2)

3.1.2 Peatland habitats

There are areas adjacent to the Study Area Boundary which comprise upland blanket bog (PB2), including Gortacullin Bog NHA which is adjacent to the northern boundary of the Study Area Boundary. A small area of upland blanket bog (PB2) is present within the Study Area Boundary towards the west of the site. There are also areas of upland blanket bog outside of but adjacent to the Study Area Boundary within central areas of the site.

As detailed in Chapter 6 (Biodiversity) of the EIAR, some areas within the Study Area Boundary have been mapped under NPWS Article 17 Reporting as Annex I Dry Heath habitat. Some of these areas occur as pockets of dry siliceous heath (HH1) between forestry and close to amenity trails towards the west of the site. Other mapped dry heath areas found within the site have been identified during surveys as corresponding to Wet Heath (HH3) and Cutover Bog (PB4) habitats which are described further below. The parcel of land to the east of the site consists of conifer plantations which have been planted on a mosaic of wet heath and upland blanket bog and the peatland habitats occur as very small and fragmented areas where trees have not taken root in this area.

3.1.2.1 Upland blanket bog (PB2)

Upland blanket bog (PB2) occurs adjacent to the Study Area Boundary to the north (Gortacullin Bog NHA), and within areas to the south of the Study Area Boundary. Large areas are also found within the west and mid-west of the site, most of which are also located outside of the Study Area Boundary. These bogs are typically dominated by purple moor grass (*Molinia caerulea)* with ling heather (*Calluna vulgaris),* cross-leaved heath (*Erica tetralix),* Deergrass (*Trichophorum germanicum)*, reindeer lichen (*Cladonia portentosa),* bog asphodel (*Narthecium ossifragum),* bog myrtle (*Myrica gale)* and *Sphagnum sp.* These habitats correspond to the Annex I habitat, 'blanket bogs (*if active bog) (7130)'.

Plate 3-6 Upland blanket bog (PB2) within the Study Area Boundary

3.1.2.2 Wet Heath (HH3)

Many areas which are currently mapped by NPWS within the Study Area Boundary as Annex I Dry Heath habitat have been confirmed as Wet Heath (HH3) habitat, corresponding to the Annex I habitat 'northern Atlantic wet heaths with *Erica tetralix* (4010)'. These areas are comprised of purple moor grass (*Molinia caerulea),* ling heather (*Calluna vulgaris),* cross-leaved heath (*Erica tetralix),* and reindeer lichen (*Cladonia portentosa).* Bryophytes present include *Sphagnum capillifolium, Sphagnum papillosum, Sphagnum magellanicum, Sphagnum palustre, Sphagnum fallax, Hypnum jutlandicum, Hylocomium splendens, Pleurozium schreberi, Breutelia chrysocoma* and *Racomitrium lanuginosum* as well as liverworts including *Odontoschisma sphagnii* and occasional *Pleurozia purpurea.* Most wet heath communities within the Study Area Boundary correspond to the WH3 community as per Irish Wildlife Manual no. 79[2]. Examples of relevés taken within this habitat are provided below. Please note that while some of the IVC communities assigned by ERICA are bog communities, ERICA does not take account of peat depth.

Plate 3-7 Wet heath (HH3) within the Study Area Boundary

[2] *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.*

Table 3-1 Example of Wet heath (HH3) relevé taken within the Study Area Boundary

Relevé 1	**Grid reference: ITM 554257 669875**	**Date 24/08/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Trichophorum germanicum	Deer grass	30
Calluna vulgaris	Ling heather	40
Erica tetralix	Cross leaved heath	25
Narthecium ossifragum	Bog asphodel	1
Molinia caerulea	Purple moor grass	3
Non-vascular Plants/lichens		
Cladonia sp.		50
Sphagnum capillifolium		90
Hypnum jutlandicum	Heath plait moss	5
Fossitt (2000) Habitat Classification		Wet heath (HH3)
IVC community classification		BG2C *Erica tetralix - Molinia caerulea - Cladonia portentosa*

Table 3-2 Example of Wet heath (HH3) relevé taken within the Study Area Boundary

Relevé 2	**Grid reference: ITM 554248 669858**	**Date 24/08/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Trichophorum germanicum	Deer grass	30
Vaccinium myrtilis	Bilberry	15
Calluna vulgaris	Ling heather	25
Erica tetralix	Cross leaved heath	25
Potentilla erecta	Tormentil	5
Non-vascular Plants/lichens		

Cladonia sp.		30
Sphagnum capillifolium		90
Sphagnum palustre		10
Hypnum jutlandicum	Heath plait moss	15
Pleurozium_schreberi		1
Fossitt (2000) Habitat Classification		Wet heath (HH3)
IVC community classification		BG2C *Erica tetralix - Molinia caerulea - Cladonia portentosa*

Table 3-3 Example of Wet heath (HH3) relevé taken within the Study Area Boundary

Relevé 2	**Grid reference: ITM 554238 669842**	**Date 24/08/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Molinia caerulea	Purple moor grass	50
Erica cinerea	Bell heather	25
Calluna vulgaris	Ling heather	30
Erica tetralix	Cross leaved heath	10
Potentilla erecta	Tormentil	3
Non-vascular Plants/lichens		
Cladonia sp.		20
Sphagnum capillifolium		80
Fossitt (2000) Habitat Classification		Wet heath (HH3)
IVC community classification		BG2C *Erica tetralix - Molinia caerulea - Cladonia portentosa*

3.1.2.3 Dry Siliceous Heath (HH1)

Areas of dry siliceous heath (HH1) are found close to existing amenity trail areas within the west of the Study Area Boundary. These areas correspond to the Annex I habitat 'European dry heaths (4030)'. These areas are comprised of purple moor grass (*Molinia caerulea),* ling heather (*Calluna vulgaris),* bell heather (*Erica cinerea),* bilberry (*Vaccinium myrtilis),* tormentil (*Potentilla erecta),* heath bedstraw (*Galium saxatile)* and the bryophytes *Hylocomium splendens, Rhytidiadelphus loreus, Polytrichum commune, Sphagnum fallax* and *Pleurozium schreberi.* Dry siliceous heath communities within the Study Area Boundary typically conform to the DH6 community as per Irish Wildlife Manual no. 79[2]. Details of relevés taken within this habitat are provided below. A condition assessment of Dry heath areas was not carried out as described in the Irish Wildlife Manual as Proposed Development infrastructure is not proposed within these areas, with the exception of a small amenity viewing area. The condition of this habitat is discussed in Section 3.2.20.1.

Plate 3-8 Siliceous dry heath (HH2) within the Study Area Boundary

Table 3-4 Example of relevé of dry siliceous heath (HH1) within the Study Area Boundary

Relevé 1	Grid reference: ITM 553306 669667	Date 24/08/2023
Species	**Common Name**	**% Cover**
Vascular Plants		
Vaccinium myrtilis	Bilberry	40
Molinia caerulea	Purple moor grass	20
Calluna vulgaris	Ling heather	20
Potentilla erecta	Tormentil	10
Juncus effusus	Soft rush	5
Galium saxatile	Heath bedstraw	3
Non-vascular Plants/lichens		
Hylocomium splendens		60
Rhytidiadelphus loreus		5
Polytrichum commune		10
Fossitt (2000) Habitat Classification		Dry siliceous heath (HH1)
IVC community classification		HE3A *Calluna vulgaris* - *Hylocomium splendens*

Table 3-5 Example of relevé of dry siliceous heath (HH1) within the Study Area Boundary

Relevé 2	Grid reference: ITM 553312 669679	Date 24/08/2023
Species	**Common Name**	**% Cover**
Vascular Plants		
Vaccinium myrtilis	Bilberry	60
Molinia caerulea	Purple moor grass	10
Calluna vulgaris	Ling heather	20
Non-vascular Plants/lichens		
Hylocomium splendens		40

Rhytidiadelphus loreus		30
Pleurozium schreberi		20
Hypnum jutlandicum		5
Fossitt (2000) Habitat Classification		Dry siliceous heath (HH1)
IVC community classification		HE3A *Calluna vulgaris* - *Hylocomium splendens*

Table 3-6 Example of relevé of dry siliceous heath (HH1) within the Study Area Boundary

Relevé 3	**Grid reference: ITM 553320 669680**	**Date 24/08/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Vaccinium myrtilis	Bilberry	50
Calluna vulgaris	Ling heather	30
Erica cinerea	Bell heather	10
Molinia caerulea	Purple moor grass	5
Non-vascular Plants/lichens		
Hylocomium splendens		70
Hypnum jutlandicum		5
Sphagnum fallax		10
Fossitt (2000) Habitat Classification		Dry siliceous heath (HH1)
IVC community classification		HE3A *Calluna vulgaris* - *Hylocomium splendens*

3.1.2.4 Cutover bog (PB4)

Cutover bog is present within the centre of the site and to the north of the site, the latter area is adjacent to Gortacullin Bog NHA. Areas of cutover bog have obvious face banks and are comprised of purple moor-grass (*Molinia caerulea*), common cottongrass (*Eriophorum angustifolium*), ling (*Calluna vulgaris*), and deergrass (*Trichophorum germanicum)* with small amounts of cross-leaved heath (*Erica tetralix*) also present. Drier areas of cutover bog consist of scrub (WS1) dominated by willows (*Salix sp.).*

Plate 3-9 Cutover bog (PB4) within the centre of the site.

3.1.3 Grasslands

3.1.3.1 Wet grassland (GS4)

Small, isolated areas of wet grassland (GS4) are present within the site, usually adjacent to peatland habitats or conifer plantations. Communities are dominated by soft rush (*Juncus effusus),* purple moor grass (*Molinia caerulea),* with small areas of devils bit scabious (*Succisa pratensis).* These areas are mainly found along forestry tracks as small areas and for the most part have not been represented on the habitat map due to their small size and rare occurrence.

Plate 3-10 Wet grassland (GS4) dominated by soft rush adjacent to conifer plantations and peatland to the north of the site.

3.1.3.2 Grassy verges (GS2)

Dry grassy verge habitat (GS2) is present along forestry tracks within the site and occurs in small, isolated areas. As such this habitat has not been represented on the habitat map. These areas are dominated by common graminoids including cocks foot (*Dactylis glomerata),* false oat grass (*Arrhenatherum elatius),* Yorkshire fog (*Holcus lanatus),* sweet vernal grass (*Anthoxanthum odoratum*), and meadow grasses (*Poa spp.).*

3.1.3.3 Improved agricultural grassland (GA1)

Improved agricultural grasslands (GA1) are present adjacent to the Study Area Boundary, including along the proposed access road from the southeast. These fields are species-poor and are typically dominated by perennial rye grass (*Lolium perenne)* with white clover (*Trifolium repens),* Broadleaved dock (*Rumex obtusifolius),* creeping buttercup (*Ranunculus repens)* and dandelion (*Taraxacum officinale agg.).*

Improved agricultural grassland is also present within the boundary of the proposed turbine delivery route transition compound (see Section 3.2.23).

Plate 3-11 Improved agricultural grassland (GA1) along the proposed access road.

3.1.4 Watercourses/waterbodies

3.1.4.1 Eroding/upland rivers (FW1)

Due to the upland nature of the Study Area, the majority of watercourses within the site are eroding in nature, typical of headwaters and as such are categorised as FW1. Several small streams are found throughout the site. The Clashduff and Gortadroma streams drain the western portion of the site to the Owenogarney River. The Snaty, O'Neill's Stream, Knockshanvo stream and Mountrice stream drain the central areas of the site southwards towards the Blackwater River. The Glenomra Wood Stream is found to the east of the site which also drains to the Blackwater River. No Annex I river habitats, nor rare or protected aquatic macrophytes or bryophytes were found within the Study Area Boundary. As is typical of FW1 type rivers, these watercourses were typically narrow and shallow with trickling to fast flows, and the substrate typically comprised bedrock, boulders, cobbles and gravels.

Plate 3-12 Representative image of eroding/upland watercourses which flow through the site, including through plantation forestry.

Plate 3-13 Representative image of eroding/upland watercourses which flow through the site

Plate 3-14 Stream crossing under the proposed access road from the southeast of the site. This stream flows into the Kyleglass Stream and Glenomra Wood Stream to the east of the site.

3.1.4.2 Drainage Ditches (FW4)

Drainage ditches (FW4) associated with forestry plantations are found throughout the site. These ditches were often completely dry during the survey periods. Other drains contained pools and standing water. Drainage ditches are present within forestry plots, along forestry tracks and through peatlands associated with forestry.

Plate 3-15 Drainage ditch (FW4) with standing water through wet heath vegetation within a recently planted conifer plantation within the site.

3.1.4.3 Artificial Pond (FL8)

A pond has been constructed for biodiversity purposes within the Study Area Boundary within the middle-east of the site in the vicinity of Turbine 6. The pond is surrounded by a clear-fell area (WS5) and planted broadleaved trees and its edges are dominated by soft rush (*Juncus effusus)* with pondweeds (*Potamogeton spp.)* beginning to colonise within. The Drumsillagh River (FW1) flows into the pond.

Plate 3-16 Artificial pond within the east of the Study Area Boundary.

3.1.5 Treelines (WL2) and Hedgerows (WL1)

The proposed wind farm site is dominated by conifer forestry and as such does not comprise a large amount of linear habitat such as treelines (WL2) or hedgerows (WL1). However, the area to the southeast of the Study Area Boundary associated with the proposed access road into the site consists of agricultural fields bordered by treelines (WL2) of ash (*Fraxinus excelsior)* and hedgerows (WL1) of hawthorn (*Crataegus monogyna),* bramble (*Rubus fruticosus agg.),* false oat grass (*Arrhenatherum elatius),* common gorse (*Ulex europaeus),* and occasional elder (*Sambucus nigra)* and rowan (*Sorbus aucuparia).*

Treelines and hedgerows are also present along roads within which the proposed Grid Connection Route will be located as well as along roads which the turbine delivery route will follow. Treelines are also present around the boundaries and bisecting the proposed transition compound along the turbine delivery route (further details in Section 3.2.23).

Plate 3-17 Treeline and hedgerow bordering a field within the southeast of the Study Area Boundary.

3.1.6 Other Habitats

3.1.6.1 Scrub

Areas of scrub (WS1) are found throughout the site, occurring on peatland habitats, within or adjacent to forestry edges or associated with grassland habitats. Scrub within the site is comprised of bramble (*Rubus fruticosus agg.),* willows (*Salix spp.),* or common gorse (*Ulex europaeus).*

Plate 3-18 Bramble and willow scrub on peatland within the site.

3.1.6.2 Recolonising bare ground (ED3) and spoil and bare ground (ED2)

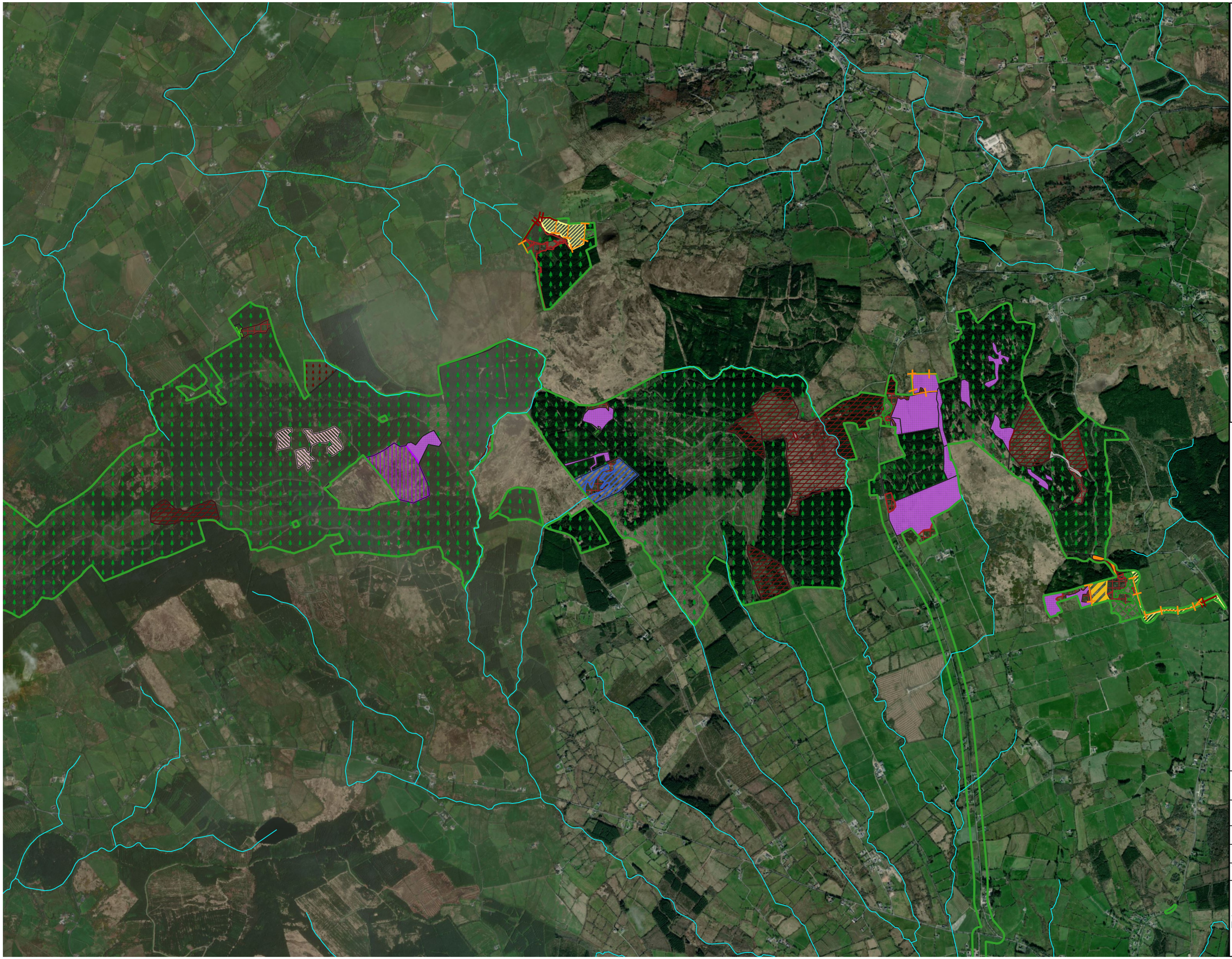
A number of areas where ground disturbance and rock breaking has been undertaken in the recent past still exist as bare surfaces or have begun to recolonise. These areas are small in area and as such, nave not been mapped in detail.

Plate 3-19 Example of a previously disturbed/excavated area within the Study Area Boundary.

3.1.6.3 Buildings and artificial surfaces (BL3)

Several man-made structures are present within the Study Area Boundary including an existing substation, sheds and areas of former house ruins. Forestry roads within the site are also within this category. These areas are small and as such are not represented on the habitat map.

Plate 3-20 Forestry road within the Study Area Boundary.


Map Legend
Pond (FL8)
Improved agricultural grassland (GA1)
Wet grassland (GS4)
Wet grassland/Scrub (GS4/WS1)
Dry siliceous heath (HH1)
Wet heath (HH3)
Upland blanket bog (PB2)
Cutover bog (PB4)
Ash plantation (WD1)
Conifer plantation (WD4)
Oak-ash-hazel woodland (WN2)
Scrub (WS1)
Recently felled woodland (WS5)
Hedgerows (WL1)
Treelines (WL2)
Rivers
EIAR Site Boundary (Study Area Boundary)
N
Microsoft product screen shots reprinted with permission from Microsoft Corporation
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Drawing Title
Habitat Map
Project Title
Knockshanvo Wind Farm
Drawn By
RW
Checked By
PR
Project No.
200513
Drawing No.
Fig 3-1
Scale
1:25,000
Date
22.08.2024
MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

3.2 Infrastructure Footprint

All nine of the proposed turbines are located within conifer forestry (WD4): either in mature forestry (Turbines 1, 2, 3, 6, 7), recently replanted forestry (Turbines 4 and 5), or semi-mature to mature, fragmented plantations located on degraded wet heath/upland blanket bog mosaic (HH3/PB2) (Turbines 8 and 9). Other proposed key infrastructure areas are also predominantly within conifer forestry. Details of the habitats within all infrastructure areas are provided in the below sections.

A map showing the Proposed Development layout overlain on the Habitat Map is shown in Figure 3-2.

3.2.1 Turbine 1

Turbine 1 will be located within Conifer plantation (WD4) dominated by Sitka spruce *(Picea sitchensis).*

Table 3-7 Relevé within footprint of turbine 1

Relevé 1	**Grid reference: ITM 553279 669404**	**Date 26/04/2023**
Species	**Common Name**	**% Cover**
Canopy		
Picea sitchensis	Sitka Spruce	95%
Shrub Layer		
-		
Field Layer		
Pteridium aquilinum	Bracken	5%
Ground layer		
Thuidium tamariscinum	Tamarisk-moss	20%
Needles		80%
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-21 Habitat within footprint of Turbine 1

3.2.2 Turbine 2

Turbine 2 will be located within Conifer plantation (WD4) dominated by Sitka spruce *(Picea sitchensis).*

Table 3-8 Relevé within footprint of turbine 2

Relevé 1	**Grid reference: ITM 553440 670090**	**Date 26/04/2023**
Species	**Common Name**	**% Cover**
Canopy		
Picea sitchensis	Sitka Spruce	90
Shrub layer		
-		
Field Layer		
Pteridium aquilinum	Bracken	1
Blechnum spicant	Hard fern	1
Ground layer		
Thuidium tamariscinum	Tamarisk-moss	40
Needles		60
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-22 Habitat within footprint of Turbine 2

3.2.3 Turbine 3

Turbine 3 will be located within Conifer plantation (WD4) dominated by Sitka spruce *(Picea sitchensis)*.

Table 3-9 Relevé within footprint of turbine 3

Relevé 1	Grid reference: ITM 553846 669868	Date 26/04/2023
Species	Common Name	% Cover
Canopy		
Picea sitchensis	Sitka Spruce	95
Shrub Layer		
-		
Field Layer		
Pteridium aquilinum	Bracken	1
Ground Layer		
Thuidium tamariscinum	Tamarisk-moss	25
Needles		75

Fossitt (2000) Habitat Classification	Conifer Plantation (WD4)

Plate 3-23 Habitat within footprint of Turbine 3

3.2.4 Turbine 4

Turbine 4 is located on a young conifer plantation on peatland habitat. To the immediate north of the Turbine is a mature plantation of Lodgepole Pine (*Pinus contorta*).

Table 3-10 Relevé within footprint of turbine 4

Relevé 1	Grid reference: ITM 556199 669448	Date 26/04/2023
Species	**Common Name**	**% Cover**
Vascular Plants		
Calluna vulgaris	Ling heather	50
Molinia caerulea	Purple moor grass	10
Vaccinium myrtillis	Bilberry	15
Picea sitchensis	Sitka Spruce	5
Juncus effusus	Soft rush	5
Non-vascular Plants		
Sphagnum capillifolium		5

Polytrichum commune		5
Rhytidiadelphus loreus		5
Thuidium tamariscum		5
Hypnum jutlandicum		5
Hylocomium splendens		5
Dicranum Scoparium		5
Other		
Bare Peat		10
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-24 Habitat within footprint of Turbine 4

3.2.5 Turbine 5

Turbine 5 is located within recently replanted clearfell/conifer plantation. The site itself is surrounded by mature plantations to the north, east and south and a forest road to the southwest. The replanted clearfell area is well revegetated with willow (*Salix sp.)* scrub and soft rush (*Juncus effusus)* dominating the area with foxglove (*Digitalis purpurea)* also abundant.

Table 3-11 Relevé within footprint of Turbine 5

Relevé 1	Grid reference: ITM 556657 669996	Date 07/06/2023
Species	Common Name	% Cover
Vascular Plants		
Juncus effusus	Soft rush	70
Salix sp.	Willow	15
Rubus fruticosus	Bramble	3
Carex flacca	Glaucous sedge	2
Carex echinata	Star sedge	3
Juncus acutiflorus	Sharp-flowered rush	2
Cirsium palustre	Marsh thistle	1
Picea sitchensis	Sitka spruce sapling	1
Rumex acetosa	Common sorrel	1
Anthoxanthum odoratum	Sweet vernal grass	5
Epilobium angustifolium	Fireweed	5
Carex demissa	Common yellow sedge	1
Fossitt (2000) Habitat Classification		Recently replanted Conifer Plantation (WD4)/willow scrub (WS1) mosaic

Plate 3-25 Recently replanted conifer plantation and willow scrub at Turbine 5 location.

Plate 3-26 Recently replanted conifer plantation and willow scrub at Turbine 5 location.

3.2.6 Turbine 6

Turbine 6 is located in mature conifer forestry (WD4). The plot to the west of the site consists of an immature plantation.

Table 3-12 Relevé within footprint of Turbine 6

Relevé 1	**Grid reference: ITM 556888 669548**	**Date 15/09/2022**
Species	**Common Name**	**% Cover**
Canopy		
Picea sitchensis	Sitka spruce	80
Shrub Layer		
-		
Field Layer		
-		
Ground Layer		
Thuidium tamariscinum	Tamarisk moss	70
Oxalis acetosella	Wood sorrel	5
Hedera hibernica	Ivy	1
Polytrichum commune	Common haircap moss	1
Needles/leaf litter		20
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-27 Habitat within footprint of Turbine 6

3.2.7 Turbine 7

Turbine 7 is located partly (southeast) within mature conifer forestry (WD4) and partly (northwest) within young plantation (WD4) with dense bramble scrub (WS1). The mature forestry is adjacent to clearfell (WS5) to the south.

Table 3-13 Relevé data for Turbine 7 area within young forestry

Relevé 1	Grid reference: ITM 556653 669130	Date 07/06/2023
Species	Common Name	% Cover
Vascular Plants		
Picea sitchensis	Sitka Spruce	50
Rubus fruticosus agg.	Bramble	60
Juncus effusus	Soft rush	15
Potentilla erecta	Tormentil	5
Salix sp.	Willow	3

Fossitt (2000) Habitat Classification	Conifer Plantation (WD4) and Bramble scrub (WS1)

Table 3-14 Relevé for Turbine 7 within mature forestry

Relevé 2	**Grid reference: ITM 556730 669042**	**Date 07/06/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Canopy		
Picea sitchensis	Sitka Spruce	90
Understorey		
Rubus fruticosus agg.	Bramble	15
Blechnum spicant	Hard fern	1
Dryopteris dilitata	Buckler fern	20
Lysimachia nemorum	Yellow pimpernel	1
Thuidium tamariscinum	Tamarisk moss	50
	Bare needles	50
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-28 Young forestry in footprint of Turbine 7

Plate 3-29 Mature forestry in the footprint of Turbine 7

3.2.8 Turbine 8

Turbine 8 is located within conifer forestry (WD4) on degraded wet heath (HH3). The general area consists of semi mature to mature forestry. Evidence of burning is present within the area with charred remains of ling heather, charred spruce trees and very dry, bare patches of peat present.

Table 3-15 Relevé data within footprint of Turbine 8

Relevé 1	Grid reference: ITM 558505 669885	Date 26/04/2023
Species	Common Name	% Cover
Vascular Plants		
Molinia caerulea	Purple moor grass	50
Calluna vulgaris	Ling heather	15
Potentilla erecta	Tormentil	1
Eriophorum vaginatum	Hare's tail Cottongrass	1
Non-vascular Plants		
Hypnum jutlandicum	Heath plait moss	5
Sphagnum capillifolium		70
Bare peat		15
Fossitt (2000) Habitat Classification		Degraded/burnt wet heath/upland blanket bog (HH3/PB2) adjacent to conifer plantation (WD4)
IVC community classification		HE4E *Molinia caerulea - Calluna vulgaris - Erica tetralix*

Table 3-16 Relevé within footprint of Turbine 8

Relevé 2	Grid reference: ITM 558502 669930	Date 26/04/2023
Species	Common Name	% Cover
Vascular Plants		
Picea sitchensis	Sitka spruce	30

Molinia caerulea	Purple moor grass	50
Calluna vulgaris	Ling heather (charred, regenerating)	10
Erica tetralix	Cross leaved heath	5
Non-vascular Plants		
Sphagnum capillifolium		20
Bare peat		30
Fossitt (2000) Habitat Classification		Conifer plantation (WD4)
IVC community classification		HE4E *Molinia caerulea* - *Calluna vulgaris* - *Erica tetralix*

Plate 3-30 Charred sitka spruce and wet heath/blanket bog vegetation in the footprint of Turbine 8

Plate 3-31 Charred sitka spruce and heather in the footprint of Turbine 8

Plate 3-32 Mature conifer forestry (WD4) and recently replanted areas adjacent to the Turbine 8.

Plate 3-33 Recently replanted areas to the west and adjacent to Turbine 8.

3.2.8.1 Wet Heath Condition Assessment

An assessment of the wet heath habitat within the vicinity of proposed Turbine 8 was carried out as per the criteria in Irish Wildlife Manual 79. The assessment was carried out per the 2m x 2m relevé data as provided in the above section as well as within the local vicinity (50m to 100m radius as per IWM79). The criteria and assessments are provided below.

Table 3-17 Wet heath assessment criteria as per IWM79 – Relevé 1

Criteria	Scale of Assessment	Pass/Fail
Vegetation composition		
1. *Erica tetralix* present	20m radius	Pass
2. Cover of positive indicator species ≥ 50% (Appendix VI of IWM79)	Relevé	Pass
3. Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%	Relevé	Pass
4. Cover of ericoid species and *Empetrum nigrum* ≥ 15%	Relevé	Pass
5. Cover of dwarf shrub species < 75%	Relevé	Pass

6. Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%	Relevé	Pass
7. Cover of non-native species < 1%	Relevé	Pass
8. Cover of non-native species < 1%	Local vicinity	Fail
9. Cover of scattered native trees and scrub < 20%	Local vicinity	Fail
10. Cover of *Pteridium aquilinum* < 10%	Local vicinity	Pass
11. Cover of *Juncus effusus* < 10%	Local vicinity	Pass
Vegetation structure		
12. Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé	Pass
13. Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé	Pass
14. No signs of burning into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity	Fail
15. No signs of burning inside boundaries of sensitive areas[3]	Local vicinity	Fail
Physical structure		
16. Cover of disturbed bare ground < 10%	Relevé	Fail
17. Cover of disturbed bare ground < 10%	Local vicinity	Fail
18. Area showing signs of drainage resulting from heavy trampling or tracking or ditches < 10%	Local vicinity	Fail

[3] ** Sensitive areas definition:*
(a) Vegetation severely wind-clipped, mostly forming a mat less than 10 cm thick.
(b) Areas where soils are thin and less than 5 cm deep.
(c) Slopes greater than 1 in 3 (18°) and all the sides of gullies.
(d) Ground with abundant, and/or an almost continuous carpet of Sphagnum, liverworts and/or lichens.
(e) Pools, wet hollows, haggs and erosion gullies, and within 5 – 10 m of the edge of watercourses.
(f) Areas above 400 m in altitude.
(g) Areas within 50 m of functioning drains.

3.2.9 Turbine 9

Turbine 9 is located within fragmented plots of conifer forestry (WD4) on wet heath (HH3). Conifer forestry consists of lodgepole pine (*Pinus contorta)* and sitka spruce (*Picea sitchensis).* Isolated patches of wet heath are present with rocky outcrops. Besides those listed in the relevé below, species in the area include lousewort (*Pedicularis sylvatica),* bilberry (*Vaccinium myrtilis),* common haircap moss (*Polytrichum commune), Aulacomnium palustre, Plagiothecium undulatum, Sphagnum papillosum, Sphagnum compactum* and liverworts (*Plagiomnium sp.).* The area contains dense tufts of purple moor grass (*Molinia caerulea).*

Table 3-18 Relevé data within footprint of Turbine 9

Relevé 1	Grid reference: ITM 558872 669583	Date 26/04/2023
Species	Common Name	% Cover
Vascular Plants		
Molinia caerulea	Purple moor grass	80
Calluna vulgaris	Ling heather	20
Erica tetralix	Cross leaved heath	3
Potentilla erecta	Tormentil	1
Erica cinerea	Bell heather	5
Pinus contorta	Lodgepole pine sapling	1
Picea sitchensis	Sitka spruce sapling	2
Non-vascular Plants/lichens		
Sphagnum capillifolium		70
Breutelia chrysocoma		15
Sphagnum palustre		10
Hypnum jutlandicum	Heath plait moss	6
Hylocomium splendens		3
Racomitrium lanuginosum		1
Cladonia sp.		1
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4) on wet heath (HH3)

IVC community classification	HE4E *Molinia caerulea - Calluna vulgaris - Erica tetralix*

Table 3-19 Relevé data within footprint of Turbine 9

Relevé 2	Grid reference: ITM 558887 669573	Date 26/04/2023
Species	**Common Name**	**% Cover**
Vascular Plants		
Molinia caerulea	Purple moor grass	75
Calluna vulgaris	Ling heather	15
Erica tetralix	Cross leaved heath	2
Erica cinerea	Bell heather	5
Picea sitchensis	Sitka spruce sapling	5
Non-vascular Plants/lichens		
Sphagnum subnitens		10
Sphagnum capillifolium		10
Hylocomium splendens		3
Hypnum jutlandicum	Heath plait moss	1
Odontoschisma sphagnii		0.5
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4) on wet heath (HH3)
IVC community classification		HE4E *Molinia caerulea - Calluna vulgaris - Erica tetralix*

Plate 3-34 Habitat in the footprint of Turbine 9

Plate 3-35 Habitat in the footprint of Turbine 9

3.2.9.1 Wet Heath Condition Assessment

An assessment of the wet heath habitat within the vicinity of proposed Turbine 9 was carried out as per the criteria in Irish Wildlife Manual 79. The assessment was carried out per the 2m x 2m relevé data as provided in the above section as well as within the local vicinity (50m to 100m radius as per IWM79). The criteria and assessments are provided below.

Table 3-20 Wet heath assessment criteria as per IWM79 – Relevé 1

Criteria	Scale of Assessment	Pass/Fail
Vegetation composition		
1. *Erica tetralix* present	20m radius	Pass
2. Cover of positive indicator species ≥ 50% (Appendix VI of IWM79)	Relevé	Pass
3. Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%	Relevé	Pass
4. Cover of ericoid species and *Empetrum nigrum* ≥ 15%	Relevé	Pass
5. Cover of dwarf shrub species < 75%	Relevé	Pass
6. Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%	Relevé	Pass
7. Cover of non-native species < 1%	Relevé	Fail
8. Cover of non-native species < 1%	Local vicinity	Fail
9. Cover of scattered native trees and scrub < 20%	Local vicinity	Fail
10. Cover of *Pteridium aquilinum* < 10%	Local vicinity	Pass
11. Cover of *Juncus effusus* < 10%	Local vicinity	Pass
Vegetation structure		
12. Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé	Pass
13. Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé	Pass
14. No signs of burning into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity	Pass
15. No signs of burning inside boundaries of sensitive areas[3]	Local vicinity	Pass

Physical structure		
16. Cover of disturbed bare ground < 10%	Relevé	Pass
17. Cover of disturbed bare ground < 10%	Local vicinity	Pass
18. Area showing signs of drainage resulting from heavy trampling or tracking or ditches < 10%	Local vicinity	Fail

Table 3-21 Wet heath assessment criteria as per IWM79 – Relevé 2

Criteria	Scale of Assessment	Pass/Fail
Vegetation composition		
1. *Erica tetralix* present	20m radius	Pass
2. Cover of positive indicator species ≥ 50% (Appendix VI of IWM79)	Relevé	Pass
3. Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%	Relevé	Pass
4. Cover of ericoid species and *Empetrum nigrum* ≥ 15%	Relevé	Pass
5. Cover of dwarf shrub species < 75%	Relevé	Pass
6. Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%	Relevé	Pass
7. Cover of non-native species < 1%	Relevé	Fail
8. Cover of non-native species < 1%	Local vicinity	Fail
9. Cover of scattered native trees and scrub < 20%	Local vicinity	Fail
10. Cover of *Pteridium aquilinum* < 10%	Local vicinity	Pass
11. Cover of *Juncus effusus* < 10%	Local vicinity	Pass
Vegetation structure		
12. Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé	Pass
13. Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé	Pass
14. No signs of burning into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity	Pass

15. No signs of burning inside boundaries of sensitive areas[3]	Local vicinity	Pass
Physical structure		
16. Cover of disturbed bare ground < 10%	Relevé	Pass
17. Cover of disturbed bare ground < 10%	Local vicinity	Pass
18. Area showing signs of drainage resulting from heavy trampling or tracking or ditches < 10%	Local vicinity	Fail

3.2.10 Proposed substation

The proposed substation is located within conifer forestry (WD4) dominated by mature sitka spruce (*Picea sitchensis)*. European larch (*Larix decidua)* is also present along the edge of the plantation.

Table 3-22 Relevé within proposed substation footprint

Relevé 1	Grid reference: ITM 557824 669468	Date 24/10/2023
Species	Common Name	% Cover
Canopy		
Picea sitchensis	Sitka spruce	80
Field Layer		
Rubus fruticosus agg.	Bramble	8
Dryopteris dilatata	Broad bucker fern	5
Vaccinium myrtilis	Bilberry	1
Blechnum spicant	Hard fern	1
Juncus effusus	Soft rush	0.5
Erica cinerea	Bell heather	0.5
Ground Layer		
Thuidium tamariscinum		85
Rhytidiadelpus loreus		10
Kindbergia praelonga		5
Polytrichum commune		3

Pine needles	5
Fossitt (2000) Habitat Classification	Conifer Plantation (WD4)

Plate 3-36 Habitat within the footprint of the proposed substation

Plate 3-37 Habitat within the footprint of the proposed substation

3.2.11 Proposed Borrow Pit 1 (BP01)

Borrow pit 1 is located within very dense, mature, closed-canopy conifer plantation (WD4). A grassy path (GS2) containing grassy verges of wood rush (*Luzula sylvatica), Polytrichum commune,* tormentil (*Potentilla erecta),* ling (*Calluna vulgaris)* and soft rush (*Juncus effusus)* runs through the middle of the footprint, south of which is a semi-mature conifer plantation of sitka spruce (*Picea sitchensis)* and lodgepole pine (*Pinus contorta).*

Table 3-23 Relevé within footprint of Borrow Pit 1 (BP01)

Relevé 1	Grid reference: ITM 553437 669348	Date 24/08/2023
Species	Common Name	% Cover
Canopy		
Picea sitchensis	Sitka spruce	100
Non-vascular Plants		
Pseudoscleropodium purum		5
Thuidium tamarascinum	Tamarisk moss	10
Pine needles		85
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-38 Conifer forestry within the footprint of borrow pit 1

Plate 3-39 Grassy path within the footprint of borrow pit 1

3.2.12 Proposed Borrow Pit 2 (BP02)

Borrow pit 2 is located within semi-mature conifer forestry (WD4). Bryophytes in the relevés presented below were recorded according to the Domin scale due to the relative inaccessibility of much of the relevé due to the density of the plantation.

Table 3-24 Relevé 1 within footprint of borrow pit B

Relevé 1 (10m x 10m)	Grid reference: ITM 555516 669830	Date 07/11/2023
Species	Common Name	% Cover
Canopy (% cover)		
Picea sitchensis	Sitka spruce	30
Shrub layer (% cover)		
-		
Field layer (% cover)		
Vaccinium myrtilis	Bilberry	25
Molinia caerulea	Purple moor grass	20
Calluna vulgaris	Ling heather	15
Ground layer (Domin scale)		
Pleurozium schreberi		5
Rhytidiadelphus loreus		7
Hypnum jutlandicum		2
Sphagnum palustre		Total *Sphagnum* 80
Sphagnum rubellum		
Sphagnum fallax		
Fossitt (2000) Habitat Classification		Conifer plantation (WD4)

Table 3-25 Relevé 2 within footprint of borrow pit 2

Relevé 2 (10m x 10m)	Grid reference: ITM 555489 669811	Date 07/11/2023
Species	Common Name	% Cover

Canopy (% cover)		
Picea sitchensis	Sitka spruce	80
Shrub layer (% cover)		
-		
Field layer (% cover)		
Vaccinium myrtilis	Bilberry	20
Ground layer (Domin scale)		
Pleurozium schreberi		6
Rhytidiadelphus loreus		7
Polytrichum commune		4
Kindbergia praelonga		4
Plagiothecium undulatum		3
Sphagnum palustre		Total *Sphagnum* 9
Sphagnum rubellum		
Sphagnum fallax		
Fossitt (2000) Habitat Classification		Conifer plantation (WD4)

Table 3-26 Relevé 3 in the footprint of borrow pit 2

Relevé 3 (10m x 10m)	**Grid reference: ITM 555474 669797**	**Date 07/11/2023**
Species	**Common Name**	**% Cover/Domin scale**
Canopy (% cover)		
Picea sitchensis	Sitka spruce	70
Shrub layer (% cover)		
-		
Field layer (% cover)		
Vaccinium myrtilis	Bilberry	20
Molinia caerulea	Purple moor grass	5

Ground layer (Domin scale)		
Pleurozium schreberi		1
Rhytidiadelphus loreus		7
Plagiothecium undulatum		3
Sphagnum palustre		Total *Sphagnum* 9
Sphagnum rubellum		
Sphagnum fallax		
Fossitt (2000) Habitat Classification		Conifer plantation (WD4)

Plate 3-40 Conifer plantation in the footprint of borrow pit 2 (BP02)

Plate 3-41 Conifer plantation in the footprint of borrow pit 2 (BP02)

3.2.13 Borrow Pit 3 (BP03)

Borrow pit 3 is located within newly planted sitka forestry (WD4) with bramble scrub (WS1).

Table 3-27 Relevé within footprint of borrow pit 3

Relevé 1	Grid reference: ITM 556308 669142	Date 24/08/2023
Species	**Common Name**	**% Cover**
Vascular Plants		
Picea sitchensis	Sitka spruce	60
Juncus effusus	Soft rush	25
Rubus fruticosus agg.	Bramble	10
Calluna vulgaris	Ling	30
Agrostis sp.	Bent grass	5
Molinia caerulea	Purple moor grass	5

Fossitt (2000) Habitat Classification	Conifer Plantation (WD4)

Plate 3-42 Habitat within footprint of borrow pit 3 (BP03)

3.2.14 Proposed Borrow Pit 4 (BP04)

Borrow pit 4 is located within mature, dense sitka spruce forestry (WD4).

Table 3-28 Relevé within footprint of borrow pit 4

Relevé 1	**Grid reference: 556708 669564**	**Date 24/08/2023**
Species	**Common Name**	**% Cover**
Vascular Plants		
Picea sitchensis	Sitka spruce	100
Field layer		
Rubus fruticosus agg.	Bramble	80
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-43 Habitat within footprint of borrow pit 4 (BP04)

3.2.15 Proposed Borrow Pit 5 (BP05)

Borrow pit 5 is located within mature sitka spruce (*Picea sitchensis)* and lodgepole pine (*Pinus contorta)* forestry with a mosaic area of bracken and bramble scrub (WS1) with elements of dry heath vegetation.

Table 3-29 Relevé within footprint of borrow pit 5

Relevé 1	Grid reference: ITM 559117 669592	Date 24/08/2023
Species	Common Name	% Cover
Vascular Plants		
Rubus fruticosus agg.	Bramble	80
Calluna vulgaris	Ling heather	40
Erica cinerea	Bell heather	30
Agrostis stolonifera	Creeping bent	10
Vaccinium myrtilis	Bilberry	25
Molinia caerulea	Purple moor grass	15
Blechnum spicant	Hard fern	5

Potentilla erecta	Tormentil	10
Salix caprea	Goat willow	5
Non-vascular Plants		
Hylocomium splendens		60
Polytrichum commune	Common hair moss	30
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4) and scrub (WS1) mosaic

Plate 3-44 Habitat within footprint of borrow pit 5 (BP05)

Plate 3-45 Habitat within footprint of borrow pit 5 (BP05)

3.2.16 Construction Compound 1 (CC1)

Construction compound 1 is located close to Turbine 9 within mature conifer forestry (WD4) planted on wet heath (HH3) vegetation.

Table 3-30 Relevé within footprint of construction compound 1

Relevé 1	Grid reference: ITM 558773 669577	Date 24/08/2023
Species	Common Name	% Cover
Vascular plants		
Picea sitchensis	Sitka spruce	30
Molinia caerulea	Purple moor grass	70
Calluna vulgaris	Ling heather	10
Non-vascular plants		
Hypnum jutlandicum	Heath plait moss	10
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-46 Habitat within the footprint of construction compound 1

3.2.17 Construction Compound 2 (CC2)

Construction no. 2 near turbine 5 is located within mature conifer forestry (WD4).

Table 3-31 Relevé within footprint of construction compound 2

Relevé 1	Grid reference: ITM 556732 669667	Date 07/06/2023
Species	Common Name	% Cover
Canopy		
Picea sitchensis	Sitka spruce	100
Ground layer		
Thuidium tamarascinum		40
Pine needles		60
Fossitt (2000) Habitat Classification		Conifer Plantation (WD4)

Plate 3-47 Habitat within footprint of construction compound 2

3.2.18 Construction Compound 3 (CC3)

Construction compound no. 3 is near Turbine 3 and is located within closed canopy mature conifer forestry (WD4) with a forestry track also within the footprint.

Table 3-32 Relevé within footprint of construction compound 3

Relevé 1	Grid reference: ITM 553787 670027	Date 24/08/2023
Species	Common Name	% Cover
Canopy		
Picea sitchensis	Sitka spruce	100
Ground layer		
Dryopteris dilatata	Broad buckler fern	5
Thuidium tamarascinum		70
Polytrichum commune		20
Pine needles		10

Fossitt (2000) Habitat Classification	Conifer Plantation (WD4)

Plate 3-48 Habitat within footprint of construction compound 3

Plate 3-49 Habitat within footprint of construction compound 3

3.2.19 Proposed Met Mast

The proposed met mast is within newly planted forestry (WD4) of sitka spruce (*Picea sitchensis)* and alder (*Alnus glutinosa)* on clearfell which is colonised by bramble, soft rush and ling heather.

Table 3-33 Relevé within footprint of proposed met mast

Relevé 1	Grid reference: 556237 669056	Date 24/08/2023
Species	Common Name	% Cover
Vascular Plants		
Juncus effusus	Soft rush	60
Rubus fruticosus agg.	Bramble	30
Calluna vulgaris	Ling	15
Agrostis stolonifera	Creeping bent-grass	10
Potentilla erecta	Tormentil	5
Fossitt (2000) Habitat Classification		Recently replanted Conifer Plantation (WD4)

Plate 3-50 Habitat within footprint of proposed met mast

3.2.20 Amenity Trails

The proposed amenity trail begins from the Snaty Road off the L3080 to the northwest of the Study Area boundary where it traverses the edge of a sitka spruce conifer plantation (WD4) along a well-worn path through the ground vegetation and along a stone wall (BL1) (Plate 3-51) until it meets an intersecting stone wall after an approx. 80-meter stretch. Beyond this wall is an area mapped as Article 17 Dry Heath habitat. This area consists of scrub (WS1) dominated by bramble (*Rubus fruticosus agg.),* common gorse (*Ulex europaeus),* bracken (*Pteridium aquilinum),* holly (*Ilex aquifolium),* ivy (*Hedera hibernica)* and hawthorn (*Crataegus monogyna),* with *Hylocomium splendens* and *Pleurozium schreberi.* This habitat was surveyed from both eastern and western extents (Plate 3-52, Plate 3-53).

The route then proceeds through mature conifer forestry (WD4) (Plate 3-54) including via the footprint of turbine 2 and proposed construction compound 3, wherein a small area of scrub (WS1) dominated by willow (*Salix sp.)* and gorse is also encountered (Plate 3-55) before reaching an existing track categorised as recolonising bare ground (ED3) (Plate 3-56) and ultimately an existing forestry road.

Plate 3-51 the beginning of the proposed amenity trail from the north along existing worn path at the edge of a conifer plantation.

Plate 3-52 Article 17 mapped 'Dry heath' area completely encroached by scrub

Plate 3-53 Article 17 mapped 'Dry heath' area completely encroached by scrub

Plate 3-54 Mature conifer forestry (WD4) along the proposed amenity trail.

Plate 3-55 Scrub (WS1) along the proposed amenity trail.

Plate 3-56 Existing tracks along the proposed amenity trail

3.2.20.1 Viewing Areas

Viewing areas are proposed along existing trails within the Study Area Boundary including along the existing 'Fairy Trail' within the northwest of the site and the top of the '12 O Clock Hills' trail (Plate 3-57). The latter area is along an existing track adjacent to dry siliceous heath (HH1) which had been recently burned at the time of survey (Plate 3-58). The area was dominated by bare peat, with recolonising tufts of purple moor grass (*Molinia caerulea),* shoots of ling heather (*Calluna vulgaris)* and bilberry (*Vaccinium myrtilis)* with occasional recolonising bryophytes (*Bryum sp., Polytrichum commune).*

Table 3-34 Relevé on burnt Dry siliceous heath (HH1) in the vicinity of proposed amenity viewing area

Relevé 1	Grid reference: ITM 553148 669830	Date 07/11/2023
Species	Common Name	% Cover
Vascular Plants		
Calluna vulgaris	Ling heather (shoots)	10
Vaccinium myrtilis	Bilberry (shoots)	2
Epilobium sp.	Willowherb	2
Non-vascular Plants		
Bryum pseudotriquetrum		15
Marchantia polymorpha		5
Polytrichum commune		1
Bare peat		65
Fossitt (2000) Habitat Classification		Dry siliceous heath (HH1)

Plate 3-57 Existing 12 O Clock Hills trail

Plate 3-58 Recently burned dry siliceous heath (HH1) in the vicinity of proposed viewing area

3.2.21 Wind Farm Roads

The proposed wind farm access roads will predominantly follow existing forestry access roads which will be upgraded. New roads are also proposed which will cut through conifer plantations (WD4). A small section of the connecting road between the main site containing Turbines 1 to 7 and the eastern parcel containing Turbines 8 and 9 will cross the perimeter of a small section of wet heath (HH3) and gorse scrub (WS1) habitat (Plate 3-59).

The proposed access road to the southeast of the site will cross through a number of fields of improved agricultural grassland (GA1) with treeline (WL2) and hedgerow (WL1) boundaries, and through a peripheral area of oak-ash-hazel woodland (WN2) (Plate 3-60) before continuing into the site through conifer forestry (WD4) and along existing tracks.

Six water crossing structures (comprising one existing and 5 new crossings) will be required for new and existing sections of new road:

- Existing water crossing over the Mountrice Stream, 500m east of T05 (ITM 557154 670018) (Plate 3-61), along the eastern access road into the site. This is an eroding/upland river (FW1) with 2 meter width and a fast flow at this location.
- Over the Knockshanvo Stream to the east of proposed Turbine 4 (ITM 556251 669499)
- Over the Snaty Stream (ITM 555020 670201). The river is split into two streams, eroding/upland rivers (FW1) at this location (Plate 3-62, Plate 3-63). These are found within wet grassland (GS4) dominated by soft rush (*Juncus effusus)* and purple moor grass (*Molinia caerulea).*
- Over an unmapped tributary of the Snaty Stream, 750m northeast of T03 (ITM 555020 670201)
- Over the Gortadroma stream to the northeast of T01 (ITM 553406 669478)
- Over an unmapped tributary of the Kyleglass and Glenomra Wood Stream (ITM 559296 668957) (Plate 3-64), an eroding/upland watercourse (FW1) located within oak-ash-hazel woodland (WN2).

Plate 3-59 Gorse scrub (WS1) and grassland vegetation on the periphery of wet heath (HH3) through which a new road is proposed.

Plate 3-60 Peripheral oak-ash-hazel woodland (WN2) within the footprint of southeastern access road

Plate 3-61 Existing crossing over the Mountrice River

Plate 3-62 Snaty Stream water crossing location, one of two streams at this location

Plate 3-63 Snaty Stream water crossing location, one of two streams at this location

Plate 3-64 Proposed new water crossing location for southeast access road

3.2.22 Grid Connection Route

The proposed underground cable for the Grid Connection route will follow an existing forestry track from the proposed electrical substation and will be laid within the existing road to the Ardnacrusha substation. The new cable will be located entirely within the road. Habitats found along the road include grassy verges (GS2), improved agricultural grasslands (GA1), hedgerows (WL1), treelines (WL2), agricultural sheds and private dwellings (BL3). As the cable approaches the Ardnacrusha substation, it follows a smaller track adjacent to areas of amenity grassland (GA2) and groves of mature sycamore (*Acer pseudoplatanus)* and beech trees (*Fagus sylvatica),* areas of scrub (WS1) and broadleaved woodland (WD1). Seven existing water-crossings are found along the route which are detailed in the table below. The culvert crossings consist of small streams or drains culverted beneath the existing road and are not directly accessible or visible from the road due to the culvert or dense vegetation. Bridge 01 consists of a stone bridge over the Blackwater River which occurs as a depositing/lowland river (FW2) at this location (Plate 3-68). Water levels were high at the time of survey with a fast flow. Bankside vegetation consists of treelines (WL2) of ash (*Fraxinus excelsior)* with bramble and willow scrub.

Table 3-35 Water crossings along the Grid Connection route

Crossing ID	ITM	Existing Structure	EPA watercourse reference
Culvert 01	558160 661793	Culvert	N/A
Culvert 02	558613 663310	Culvert	BLACKWATER (CLARE)_020 (Glenlon South)
Culvert 03	558406 666142	Culvert	N/A
Culvert 04	558382 666533	Culvert	N/A
Culvert 05	558153 668232	Culvert	MOUNTRICE_010 (East Cloontra)
Bridge 01	558345 665650	Stone bridge (with cement and pointing)	BLACKWATER (CLARE)_010
Bridge 02	558308 667280	Bridge	MOUNTRICE_010

Plate 3-65 Amenity grassland, mature trees and woodland along an existing track approaching the Ardnacrusha substation

Plate 3-66 Scrub (WS1) along the track towards Ardnacrusha substation

Plate 3-67 Scrub (WS1) and woodland (WD1) along the track approaching Ardnacrusha substation

Plate 3-68 Bridge 01 over the Blackwater River along the Grid Connection route.

3.2.23 Turbine Delivery Route

The delivery of turbines to the Proposed Development site will require over-run works (which will require gravelling and hardstand creation) and over-sail works (which will require vegetation removal or trimming). The locations of these areas are shown in Figure 3-2. The habitats within these areas are described below.

The north-most oversail area along the R465 road will require trimming of approx. 65m of a hedgerow (WL1) consisting of hazel (*Corylus avellana)* and bramble (*Rubus fruticosus agg.*). Further south, the oversail area is approx. 55m in length and consists of a stone wall (BL1) with associated bramble scrub (WS1), ivy (*Hedera hibernica),* bracken (*Pteridium aquilinum)* and hard fern (*Blechnum spicant)*. There is also one small sycamore tree (*Acer pseudoplatanus),* and two ash (*Fraxinus excelsior)* (Plate 3-69). Further south, the oversail area consists of a hedgerow (WL1) of hawthorn (*Crataegus monogyna),* bramble, nettle (*Urtica dioica),* with immature sycamore and ash (Plate 3-70). These areas border improved agricultural grasslands (GA1).

3.2.23.1 Temporary Transition Compound

The delivery of turbines along the delivery route will require the construction of a temporary transition compound for storage of turbines. This is proposed adjacent to the N69, in the townland of Court, Co. Limerick, to facilitate turbine blade delivery. The compound measures approximately 200m along the N69 and 60m in width.

A Habitat Map of the transition compound area is shown in Figure 3-3.

The transition compound area consists of improved agricultural grasslands (GA1) and wet grassland (GS4) divided and bordered by treelines (WL2) and drainage ditches (FW4). The western most field consists of perennial rye grass (*Lolium perenne),* cocks foot (*Dactylis glomerata),* creeping buttercup (*Ranunculus repens),* white clover (*Trifolium repens),* broad leaved dock (*Rumex obtusifolius),* dandelion (*Taraxacum officinale agg.),* common sorrel (*Rumex acetosa)* and *Rhytidiadelphus squarrosus.* The field is dry where it is raised (Plate 3-71) and has wetter margins eastwards towards the drainage ditch which bisects the site. Four sycamore trees (*Acer pseudoplatanus)* are present within the raised, dry area. The wetter area is wet grassland (GS4) comprising soft rush (*Juncus effusus),* hard rush (*Juncus inflexus),* sedge (*Carex sp.),* creeping bent (*Agrostis stolonifera),* meadowsweet (*Filipendula ulmaria),* pointed spear moss (*Calliergonella cuspidata)* and occasional purple moor grass (*Molinia caerulea).*

A treeline bounds the southern boundary of the site (Plate 3-72) and consists of willow (*Salix cinerea),* aspen (*Populus tremula),* and hawthorn (*Crataegus monogyna).*

Drainage ditches (FW4) are present along the western-most boundary, along the southern boundary, and within a double treeline within the west of the site (Plate 3-73). A drainage channel also bisects the site towards the east. The double treeline consists of hawthorn, ash and willow.

The drainage ditch along the southern boundary (Plate 3-74) is 2 to 3 metres wide with stagnant water at the time of survey (January 2024). The drain is vegetated with common reed (*Phragmites australis)* and contains silted, turbid water.

The drainage channel which bisects the site within the east of the site (Plate 3-75) was stagnant and lacked any flow. It is vegetated with reed canary grass (*Phalaris arundinaceae*) and soft rush (*Juncus effusus).* Small willow trees (*Salix spp.)* and bramble (*Rubus fruticosus agg.*) are also present.

The Faha River (EPA code 24F26), a lowland/depositing river (FW2), is present downstream of the site (Plate 3-76). The river had a very slow flow at the time of survey and is 2 to 3 metres wide. The river is culverted beneath the road where it flows from upstream to the east of the site. The drain which

bounds the southern boundary of the site is culverted under the field entrance to the east of the site boundary and connects to this river downstream of the site. The mapped river is shown on Figure 3-3.

Plate 3-69 Vegetation within turbine delivery route oversail area.

Plate 3-70 Vegetation within turbine delivery route oversail area.

Plate 3-71 Proposed transition compound area - western field comprising drier agricultural grassland area adjacent to rushy wet grassland (GS4).

Plate 3-72 Treeline along the southern boundary of the site.

Plate 3-73 Drainage ditch and double treeline within the western section of the site.

Plate 3-74 Drainage ditch along the southern boundary of the site.

Plate 3-75 Drainage ditch which bisects the site.

Plate 3-76 The Faha River downstream of the proposed transition compound site.

3.2.24 Habitat Enhancement Areas

3.2.24.1 Forestry

Plots of forestry owned by Coillte and included within the proposed Hen Harrier enhancement areas for felling comprise mature sitka spruce (*Picea sitchensis)* forestry (WD4). the dense canopy, ground vegetation is mainly limited to needle cover, tamarisk moss (*Thuidium tamariscinum)* and remnant areas of peatland vegetation including *Sphagnum spp.* and bilberry (*Vaccinium myrtilis).*

The plot of private forestry and farmland within the north of the Study Area Boundary consists of mature conifer plantation (WD4) dominated by Sitka spruce (*Picea sitchensis)* with lodgepole pine (*Pinus contorta)* (Plate 3-78). Native scrub (WS1) is present along the western boundary (Plate 3-79)of the forestry plot with hawthorn, grey willow, common gorse, Rowan, pedunculate oak, and bramble. An embankment and drain is also present along this boundary.

A treeline (WL2) is present along the northwestern boundary (Plate 3-80) consisting of rowan, pedunculate oak.

To the north of the plot are agricultural grasslands (GA1) with a short, species poor sward (Plate 3-81), bisected by hawthorn hedgerows. A thick hedgerow is present between the fields and the forestry plot and consists of grey willow, goat willow, pedunculate oak, hawthorn, gorse (Plate 3-82).

Plate 3-77 Example of mature conifer forestry within Hen Harrier Enhancement Areas.

Plate 3-78 Mature sitka spruce forestry within the northern enhancement plot.

Plate 3-79 Native scrub present along the western boundary of the northern enhancement plot.

Plate 3-80 Treeline along the northwestern boundary of the forestry plot.

Plate 3-81 Improved agricultural grasslands to the north of the forestry plot.

Plate 3-82 Existing hedgerow between agricultural fields and forestry.

3.2.24.2 Wet heath

Areas within the eastern section of the site which are proposed for management for Hen Harrier comprise Wet Heath (HH3). Some of these areas such as the lands to the west of the proposed access road from the southeast of the Proposed Development are under grazed and contain some encroachment with bracken (*Pteridium aquilinum)* and common gorse (*Ulex europaeus)* (Plate 3-85).

Plate 3-83 Wet heath (HH3) within proposed Hen Harrier Enhancement Area within the east of the Proposed Development. This area is located north of a proposed new wind farm road.

Plate 3-84 Wet heath (HH3) within proposed Hen Harrier Enhancement Area within the east of the Proposed Development. This area is located to the south of the proposed substation.

Plate 3-85 Wet heath (HH3) within proposed Hen Harrier Enhancement Area within the east of the Proposed Development. This area is located west of the proposed access road to the southeast of the Proposed Development.

- Watercourse Crossings
- Grid Connection
- Proposed Turbine Hardstand
- Security Cabin
- Proposed New Roads
- Proposed Borrow Pits (BP01 - BP05)
- Turbine Delivery Overrun Area
- Turbine Delivery Oversail Area
- Proposed Amenity Trail
- Proposed Upgrade of Existing Roads
- Proposed Temporary Construction Compound (CC1 to CC3)
- Proposed Permanent Meteorological Mast
- Proposed Substation
- Proposed Amenity Viewing Areas

T01 T02 T03 T04 T05 T06 T07 T08 T09
BP01 BP02 BP03 BP04 BP05
CC1 CC2 CC3

Map Legend

- Pond (FL8)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- Wet grassland/Scrub (GS4/WS1)
- Dry siliceous heath (HH1)
- Wet heath (HH3)
- Upland blanket bog (PB2)
- Cutover bog (PB4)
- Ash plantation (WD1)
- Conifer plantation (WD4)
- Oak-ash-hazel woodland (WN2)
- Scrub (WS1)
- Recently felled woodland (WS5)
- Hedgerows (WL1)
- Treelines (WL2)
- Rivers
- EIAR Site Boundary (Study Area Boundary)

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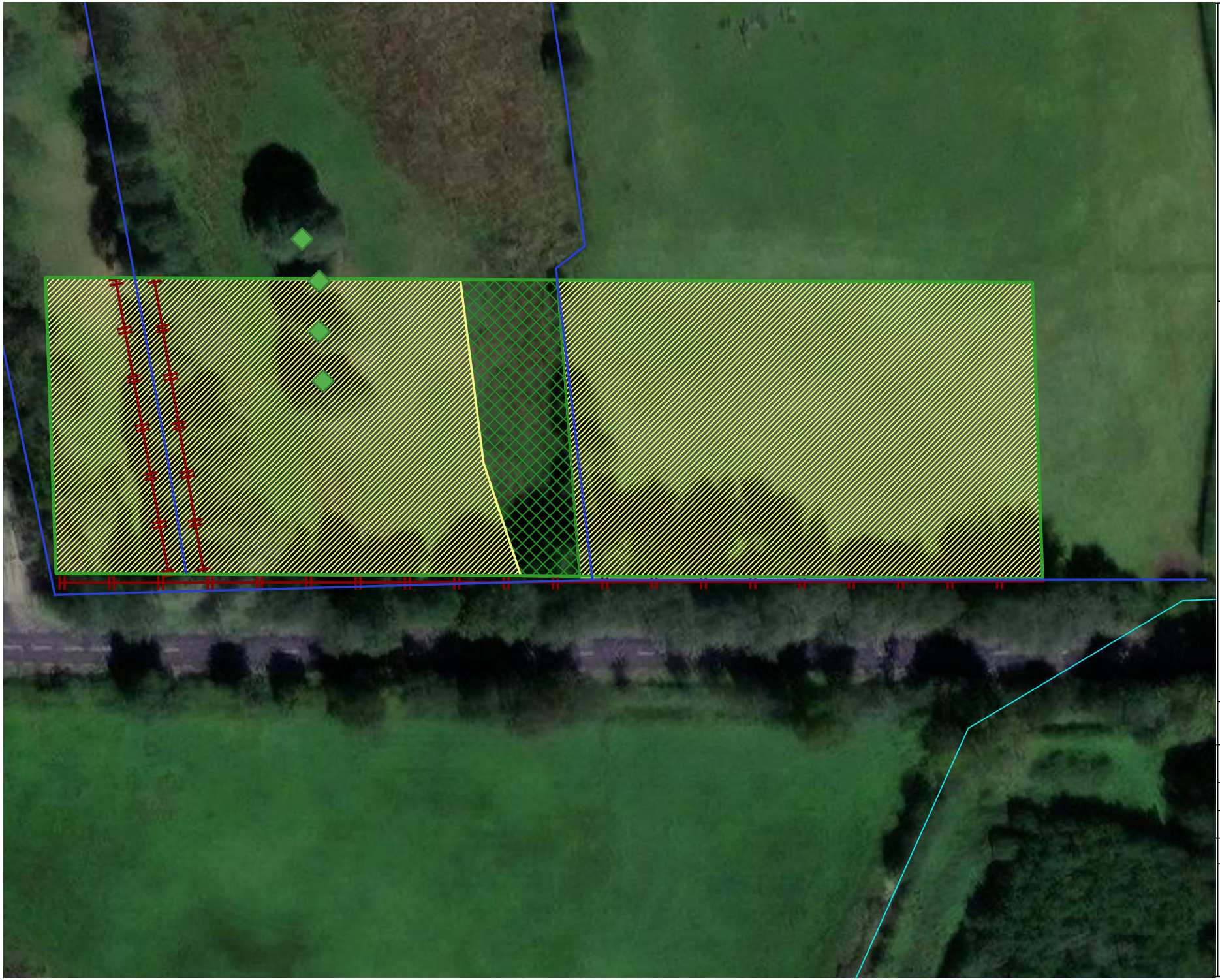
Drawing Title
Habitat Map with Proposed Development Overlay

Project Title
Knockshanvo Wind Farm

Drawn By	Checked By
RW	PR
Project No.	Drawing No.
200513	Fig 3-2
Scale	Date
1:23,000	22.08.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Drawing Title
Proposed Temporary Transition Compound Habitat Map

Project Title
Knockshanvo Wind Farm

Drawn By	Checked By
RW	RW
Project No.	Drawing No.
200513	Fig 3-3
Scale	Date
1:1,000	22.08.2024

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

4. DISCUSSION

The habitat surveys of the Proposed Development site undertaken between 2021 and 2024 have provided a clear picture of the composition of habitats within the Study Area Boundary. The Proposed Development site is dominated by conifer plantations (WD4) of varying stages and clear fell areas (WS5). Peatlands are also a prominent feature, located both within and adjacent to the site boundary, and predominantly comprise upland blanket bog (PB2) and wet heath (HH3). Areas of dry siliceous heath (HH1) are present within the west of the site in the vicinity of existing amenity trails. Isolated patches of wet heath are present amongst conifer forestry in the eastern section of the Study Area Boundary where trees have not taken root. Areas with evidence of past peat extraction in the form of face banks and bog drains, categorised as cutover bog (PB4) are also present within the site boundary. Eroding/upland rivers (FW1) and their smaller unmapped tributaries are found throughout the site and are typical of headwaters.

Three habitats listed under Annex I of the Habitats Directive occur within the Study Area Boundary:

- [7130] Active Blanket Bog
- [4010] Northern Atlantic Wet Heaths with *Erica tetralix*
- [4030] European Dry Heaths

The Proposed Development infrastructure areas are primarily confined to existing conifer plantations. Small, isolated areas of wet heath, where plantation trees have not rooted due to shallows peats, occur within the footprint of turbines 8 and 9 and associated compound no.1. While fragmented areas of wet heath in the vicinity of proposed Turbine 9 and associated construction compound display examples of the Annex I habitat, the habitat is degraded due to the dominance of conifer forestry in the area which has heavily fragmented the habitat at this location. As described in Section 3.2.9.1, sitka spruce forestry is present within the wider radius of the relevés undertaken and self-seeding sitka spruce is present within the relevés themselves. Wet heath in the vicinity of the proposed Turbine 8 is heavily degraded with evidence of burning apparent as well as areas of bare peat, adjacent conifer forestry, clearfell and associated brash piles. As shown in Section 3.2.8.1, 3.2.9.1 and 3.2.12.1, the wet heath areas within the footprint of proposed infrastructure failed a number of criteria of the wet heath condition assessment as per Irish Wildlife Manual 79. These criteria related to presence of non-native species (non-native conifers) within the relevés and local vicinity, and evidence of burning, disturbed ground and/or drainage.

Proposed wind farm roads will be along existing forestry tracks and through conifer forestry, with the access road cutting through improved agricultural grasslands (GA1), treelines (WL2), hedgerows (WL2) and a small peripheral area of oak-ash-hazel woodland (WN2).

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