

Appendix 7-1 Botanical Study Lyrenacarriga

Lyrenacarriga Wind Farm





DOCUMENT DETAILS

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1. INTRODUCTION

1.1 Introduction

MKO were commissioned to undertake detailed botanical surveys to provide an evaluation and assessments of the habitats occurring on site at Proposed Lyrenacarriga Wind Farm. The detailed assessments focused on the habitats occurring immediately adjacent to the Proposed Development footprint. The detailed botanical surveys were undertaken on the 31st August 2018, 05th October 2018, 26th of September 2019, 29th May 2020 and 19th November 2020.

1.2 Survey Methods

Relevés were undertaken within the construction footprint or representative habitats within the study area. In addition, where turbines are located within highly modified coniferous plantation forestry or modified agricultural lands, detailed descriptions of this habitat at each location is provided. The location of each is provided on Figure 1.1.

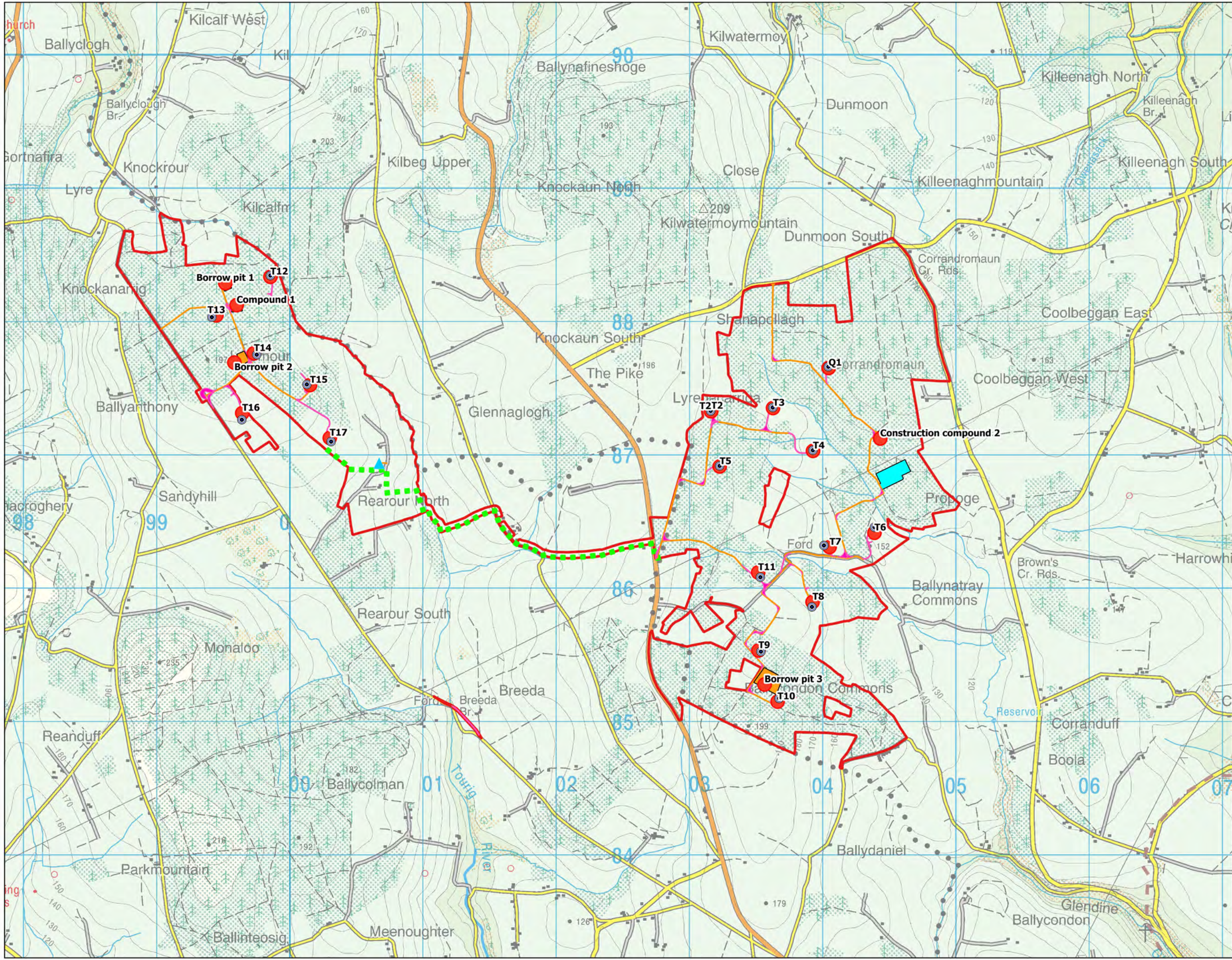
Relevés that were undertaken in peatland habitats followed guidelines set out in the following document:

- 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.*
- Commission of the European Communities (2013) *Interpretation manual of European Union habitats.* Eur 27. European Commission DG Environment.
- O’Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), *The Irish semi-natural grasslands survey 2007-2012.* Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

All species were readily identifiable during the survey. 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).

1.3 Statement of Authority

Field surveys were undertaken by David McNicholas (B.Sc., M.Sc., MCIEEM), Julie O’Sullivan (B.Sc, M.Sc), Irene Sullivan (B.Sc.). David is an experienced ecologist with over 10 years professional experience and is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Julie is an experienced ecologist with over 5 years professional experience. Irene is an ecologist experience in undertaking habitat and ecological assessments.



- Map Legend**
- Site Boundary
 - Proposed 110kV Substation
 - Proposed Turbine
 - ▲ Proposed Met Mast
 - Proposed Borrow Pit
 - - - Collector Cabling Route
 - Proposed Compound
 - Proposed New Road
 - Existing Road Proposed for Upgrade
 - Quadrat locations

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Quadrat Locations

Project Title	
Lyrenacarriga Wind Farm	
Drawn By	Checked By
H Witter	D McNicholas
Project No.	Drawing No.
170749	Figure 1-1
Scale	Date
1:25000	2020.11.06

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2.

RESULTS

The botanical surveys of the proposed wind farm infrastructure including turbine bases and site compounds were surveyed and the below sections provide a description of each of the infrastructure locations and provide a representative example of the habitats occurring within or adjacent to the proposed development footprint.

2.1

Turbine 1

Turbine 1 is located in the area between young second rotation conifer plantation dominated by Sitka spruce and an area of Eucalyptus plantation, see Plate 2-1. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 1	Grid reference: 52.041462, -7.9424216	Date: 05.10.2018
Species	Common name	Percentage Cover
<i>Picea sitchensis</i>	Sitka spruce	5
<i>Sorbus aucuparia</i>	Rowan	+
<i>Salix spp.</i>	Willow	+
<i>Molinia caerulea</i>	Molinia	15
<i>Betula pubescens</i>	Downy birch	15
<i>Juncus effuse</i>	Soft rush	7
<i>Ulex europaeus</i>	Gorse	46
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	10
<i>Potentilla erecta</i>	Tormentil	5
<i>Eucalyptus spp.</i>	Eucalyptus	20
Habitat Classification	Conifer Plantation (WD4) / Eucalyptus plantation	



Plate 2-1 Example of second rotation conifer plantation (WD4), foreground and Eucalyptus plantation, right of background.

2.2

Turbine 2

Turbine 2 is located within young conifer plantation comprised of Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 2	Grid reference: 52.038542 -7.9542438	Date: 31.08.2018
Habitat description		
This turbine and associated infrastructure is located within an area of dense plantation forests dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was bare, dominated by pine needles with only hard fern (<i>Blechnum spicant</i>) recorded in some areas surrounding the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-2 Example Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.3

Turbine 3

Turbine 3 is located in the area dominated by highly managed and improved agricultural grassland (GA1), see Plate 2-3. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 3	Grid reference: 52.038665 -7.9478368	Date: 31.08.2018
Species	Common name	Percentage Cover
<i>Lolium perenne</i>	Perennial rye-grass	75
<i>Trifolium repens</i>	White clover	10
<i>Cerastium fontanum</i>	Mouse-ear	5
<i>Rumex obtusifolius</i>	Broad-leaved dock	10
<i>Ranunculus repens</i>	Creeping buttercup	2
Habitat Classification		
		Improved agricultural grassland (GA1)



Plate 2-3 Example of improved agricultural grassland occurring within the study area.

2.4

Turbine 4

Turbine 4 is located in the area dominated by highly managed and improved arable crops (BC1), see Plate 2-4. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 4	Grid reference: 52.035843 -7.9442379	Date: 31.08.2018
Species	Common name	Percentage Cover
<i>Hordeum vulgare</i>	Barley	25
	Bare ground	65
<i>Poa annua</i>	Annual meadow grass	+
Habitat Classification		Arable field (BC1)



Plate 2-4 Example of arable crops (BC1) occurring within the proposed development footprint

2.5

Turbine 5

Turbine 5 is located within young conifer plantation comprised of Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 5	Grid reference: 52.034309 -7.9540292	Date: 31.08.2018
Habitat description		
This turbine and associated infrastructure is located within an area of dense plantation forests dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was bare, dominated by pine needles with only hard fern (<i>Blechnum spicant</i>) recorded in some areas surrounding the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-5 Example of Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.6

Turbine 6

Turbine 6 is located in the area dominated by highly managed and improved agricultural grassland (GA1), see Plate 2-6. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 6	Grid reference: 52.030506 -7.9371129	Date: 31.08.2018
Species	Common name	Percentage Cover
<i>Lolium perenne</i>	Perennial rye-grass	75
<i>Rumex obtusifolius</i>	Broad-leaved dock	5
<i>Taraxacum vulgaria</i>	Dandelion	+
<i>Rumex acetosa</i>	Common sorrel	+
<i>Ranunculus repens</i>	Creeping buttercup	25
Habitat Classification		Improved agricultural grassland (GA1)



Plate 2-6 Example of improved agricultural grassland occurring within the study area.

2.7

Turbine 7

Turbine 7 is located in the area dominated by highly managed and improved arable crops (BC1), see Plate 2-7. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 7	Grid reference:	Date: 31.08.2018
Species	Common name	Percentage Cover
<i>Hordeum vulgare</i>	Barley	40
	Bare ground	60
<i>Poa annua</i>	Annual meadow grass	+
Habitat Classification		
		Arable field (BC1)



Plate 2-7 Example of arable crops (BC1) occurring within the proposed development footprint



Plate 2-4 Example of arable lands occurring within the proposed development footprint.

2.8

Turbine 8

Turbine 8	Grid reference: 52.025150 -7.9441294	Date: 31.08.2018
Habitat description		
<p>Turbine number 8 is located within dense young forestry (WD4) composed of 6m high Sitka spruce. Ground layer dominated by pine needles with no or very few vascular plants in the wider area.</p> <p>Species present along a nearby old track verge include soft rush (<i>Juncus effusus</i>), gorse (<i>Ulex europaeus</i>), St. John's wort (<i>Hypericum perforatum</i>), sweet vernal grass (<i>Anthoxanthum odoratum</i>), self-heal (<i>Prunella vulgaris</i>), hard fern (<i>Blechnum spicant</i>) marsh ragwort (<i>Senecio aquaticus</i>), blackthorn (<i>Prunus spinosa</i>), bramble (<i>Rubus fruticosus</i>), ling heather (<i>Calluna vulgaris</i>), and Rosebay willow-herb (<i>Chamerion angustifolium</i>).</p>		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-8 Example Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.9

Turbine 9

Turbine 9 is located within young conifer plantation comprised of Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 9	Grid reference: 52.022500 -7.9497222	Date: 31.08.2018
Habitat description		
This turbine and associated infrastructure is located within an area of dense semi-mature coniferous plantation forestry, dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was bare, dominated by pine needles within the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-9 Example of Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.10

Turbine 10

The area is occupied by young second-rotation Sitka spruce forestry (*Picea sitchensis*), 4-6m tall, planted on heath.

Species	Common name	Percentage Cover
<i>Picea sitchensis</i>	Sitka spruce	60
<i>Eucalyptus spp.</i>	Eucalyptus	+
<i>Calluna vulgaris</i>	Heather	25
<i>Rubus fruticosus</i>	Bramble	5
<i>Ulex europaeus</i>	Gorse	5
<i>Polytrichum commune</i>		10
Habitat Classification		Conifer Plantation (WD4)



Plate 2-10 Example of second rotation Sitka spruce dominated forestry with Eucalyptus in the background.

2.11

Turbine 11

Turbine 11 is located within young conifer plantation comprised of Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 11	Grid reference: 52.038542 -7.9542438	Date: 31.08.2018
Habitat description		
This turbine and associated infrastructure is located within an area of dense plantation forests dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was bare, dominated by pine needles.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-11 Example of Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.12

Turbine 12

Turbine 12 is located within an area of second rotation coniferous plantation dominated by Sitka spruce with part of the infrastructure located within a narrow strip of mature forestry, some of which has fallen as a result of high winds. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 12	Grid reference: 52.047372 -8.0030171	Date: 29 th May 2020
Habitat description		
This turbine and associated infrastructure is located within an area of dense coniferous plantation forestry, dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was bare, dominated by pine needles within the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-12 Access road to T12 with the turbine base located in the background within second rotation forestry.

2.13

Turbine 13

Turbine 13 is located within an area of second rotation coniferous plantation forestry dominated by Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 12	Grid reference: 52.045008 -8.0090329	Date: 29 th May 2020
Habitat description		
This turbine and associated infrastructure is located within an area of dense second rotation coniferous forestry dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover beneath was dominated by bramble, soft rush and purple moor-grass (<i>Molinia caerulea</i>) within the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-13 Second rotation forestry (WD4) at T13

2.14

Turbine 14

Turbine 14 is located in the area dominated by highly managed and improved agricultural grassland (GA1), see Plate 2-14. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 14	Grid reference: 52.042520 -8.0037356	Date: 31.08.2018
Species	Common name	Percentage Cover
<i>Lolium perenne</i>	Perennial rye-grass	85
<i>Trifolium repens</i>	White clover	5
<i>Cerastium fontanum</i>	Mouse-ear	2
<i>Rumex obtusifolius</i>	Broad-leaved dock	5
<i>Ranunculus repens</i>	Creeping buttercup	3
Habitat Classification	Improved agricultural grassland (GA1)	

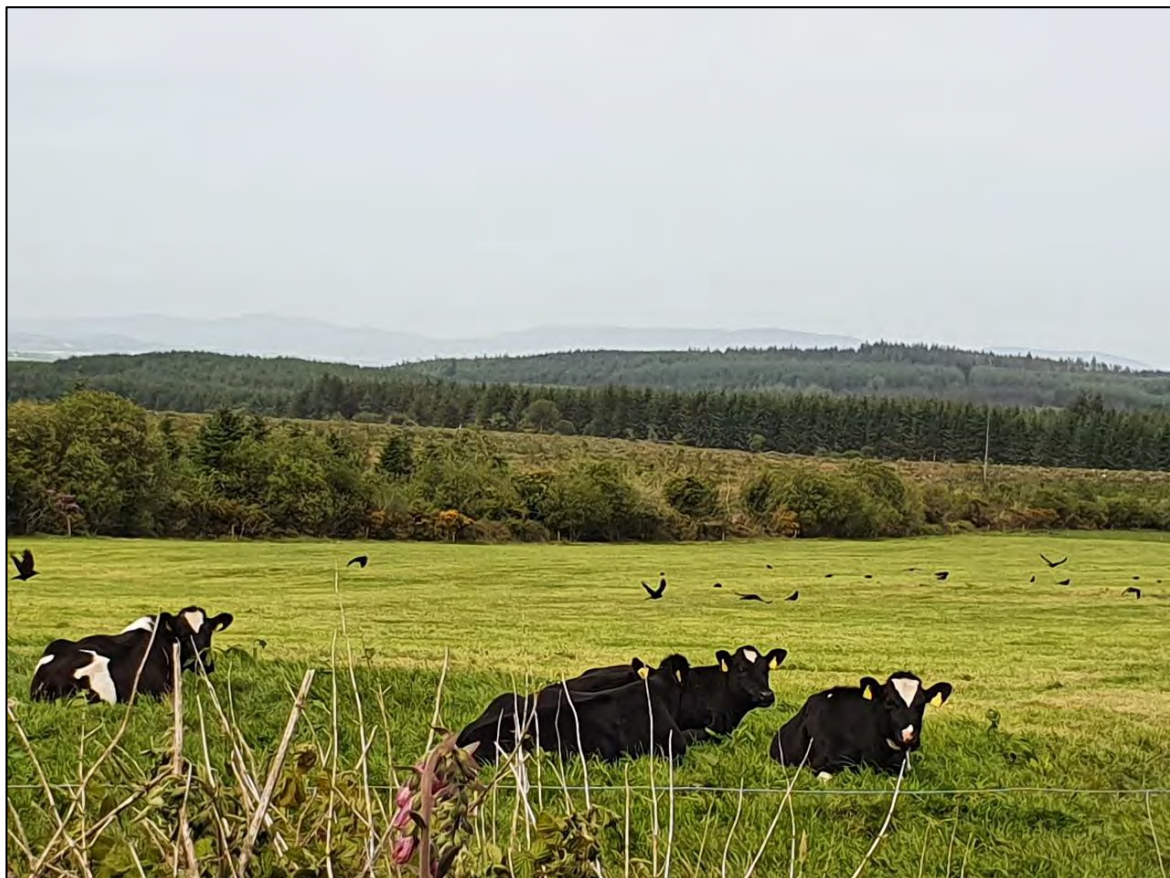


Plate 2-14 Example of improved agricultural grassland occurring within the study area.

2.15

Turbine 15

Turbine 15 is located within an area of mature coniferous plantation forestry (WD4) dominated by Sitka spruce. A number of the mature trees has fallen as a result of high winds. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 15	Grid reference: 52.040339 -7.9989480	Date: 29 th May 2020
Habitat description		
This turbine and associated infrastructure is located within an area of dense coniferous plantation forestry, dominated by Sitka spruce (<i>Picea sitchensis</i>). The ground cover was dominated by pine needles within the survey plot.		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-15 Example of Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.16

Turbine 16

Turbine 16 is located in the area dominated by highly managed and improved agricultural grassland (GA1), see Plate 2-16. The below table provides the quadrat data for the species assemblages recorded within the proposed development footprint.

Turbine 16	Grid reference: 52.038310 -8.0062378	Date: 29th May 2020
Species	Common name	Percentage Cover
<i>Lolium perenne</i>	Perennial rye-grass	95
<i>Trifolium repens</i>	White clover	2
<i>Cerastium fontanum</i>	Mouse-ear	+
<i>Rumex obtusifolius</i>	Broad-leaved dock	1
<i>Ranunculus repens</i>	Creeping buttercup	3
Habitat Classification		Improved agricultural grassland (GA1)



Plate 2-16 Example of improved agricultural grassland occurring within the study area.

2.17

Turbine 17

Turbine 17 is located within an area of recently planted coniferous plantation forestry (WD4) dominated by Sitka spruce. The below table provides a description of the habitat recorded within the proposed development footprint.

Turbine 17	Grid reference: 52.036737 -7.9962422	Date: 31 st August 2018
Habitat description		
This area of recently planted forestry (WD4), dominated by young Sitka spruce, has a ground layer comprising of Sweet Vernal-grass (<i>Anthoxanthum odoratum</i>), cocksfoot (<i>Dactylis glomerata</i>), <i>Poa</i> spp., Broadleaved dock (<i>Rumex obtusifolius</i>), greater bird's foot trefoil (<i>Lotus pedunculatus</i>), field speedwell (<i>Veronica persica</i>), spear thistle (<i>Cirsium vulgare</i>), bramble (<i>Rubus fruticosus</i>), gorse (<i>Ulex europaeus</i>) and common sorrel (<i>Rumex acetosa</i>).		
Habitat Classification		Conifer Plantation (WD4)



Plate 2-17 Recently planted forestry (WD4).

2.18

Substation

There is a substation situated within second rotation forestry.

Substation	Grid reference: 52.034016 -7.9353505	Date: 31 st August 2018
Species	Common name	Percentage Cover
<i>Juncus effuses</i>	Soft rush	60
<i>Calluna vulgaris</i>	Heather	7
<i>Rubus fruticosus</i>	Bramble	7
<i>Molinia</i>	Molinia	5
<i>Ulex europaeus</i>	Gorse	3
<i>Salix spp.</i>	Willow spp.	2
<i>Picea stichensis</i>	Sitka Spruce	10
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	+
<i>Potentilla erecta</i>	Tormentil	+
<i>Blechnum spicant</i>	Hard Fern	+
<i>Holcus lanatus</i>	Yorkshire Fog	+
Habitat Classification		Conifer plantation (WD4)

2.19

Construction compound 1

This compound is located in an areas dominated by Eucalyptus plantation.

Compound 1	Grid reference: 52.045460 -8.0069225	Date: 31 st August 2018
Species	Common name	Percentage Cover
<i>Calluna vulgaris</i>	Heather	
<i>Molinia caerulea</i>	Purple moor-grass	5
<i>Blechnum spicant</i>	Hard fern	+
<i>Rubus fruticosus</i>	Bramble	3
<i>Betula pendula</i>	Silver birch	+
<i>Pteridium aquilinum</i>	Bracken	3
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	7
<i>Ulex europaeus</i>	Gorse	7
<i>Eucalyptus spp.</i>	Eucalyptus	10
Habitat Classification		Eucalyptus plantation



Plate 2-18 Example of Eucalyptus plantation occurring within the proposed site compound.

2.20

Construction compound 2

Construction compound 2	Grid reference: 52.036892 -7.9362777	Date: Date: 31 st August 2018
Species	Common name	Percentage Cover
<i>Molinia</i>	Purple Moor Grass	10
<i>Calluna vulgaris</i>	Heather	60
<i>Rubus fruticosus</i>	Bramble	7
<i>Picea sitchensis</i>	Sitka Spruce	30
<i>Potentilla erecta</i>	Tormentil	3
<i>Ulex europaeus</i>	Gorse	7
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	10
<i>Salix spp.</i>	Willow	+
Habitat Classification		Conifer plantation (WD4)



Plate 2-19 Example of Sitka spruce dominated second rotation forestry in the area in which the proposed infrastructure is located.

2.21

Borrow Pit 1

The burrow pit within the site is located within Conifer Plantation (WD4) which is dominated by Sitka Spruce.

Borrow pit	Grid reference: 52.047360 -8.0079007	Date: 31 st August 2018
Species	Common name	Percentage Cover
<i>Picea sitchensis</i>	Sitka spruce	50
<i>Pteridium aquilinum</i>	Bracken	30
<i>Rubus fruticosus</i>	Bramble	10
<i>Molinia caerulea</i>	Purple moor-grass	5
<i>Salix spp.</i>	Willow	+
<i>Calluna vulgaris</i>	Heather	5
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	+
<i>Ranunculus repens</i>	Creeping buttercup	+
<i>Plantago lanceolata</i>	Ribwort plantain	+
<i>Potentilla Erecta</i>	Tormentil	+
Habitat Classification	Conifer plantation (WD4)	



Plate 2-20 Example of Sitka spruce dominated forestry in the area in which the proposed infrastructure is located.

2.22

Borrow Pit 2

The burrow pit located within the southeast of the site, South of Turbine no. T10, is located within second rotation plantation forestry (WD4) which is dominated by Sitka spruce.

Burrow pit 2	Grid reference: 52.020542 -7.9484129	Date: 31 st August 2018
Species	Common name	Percentage Cover
<i>Picea sitchensis</i>	Sitka Spruce	70
<i>Calluna vulgaris</i>	Heather	30
<i>Ulex europaeus</i>	Gorse	10
<i>Potentilla erecta</i>	Tormentil	2
<i>Molinia</i>	Purple Moor Grass	15
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	5
<i>Juncus effusus</i>	Soft rush	3
<i>Jacobaea vulgaris</i>	Ragwort	+
<i>Salix spp.</i>	Willow spp.	+
<i>Blechnum spicant</i>	Hard Fern	+
<i>Hypnum spp.</i>	Hypnum spp.	10
<i>Chamaenerion angustifolium</i>	Rosebay willow herb	+
Habitat Classification	Conifer plantation (WD4)	



Plate 2-21 Example of Sitka spruce dominated second rotation forestry in the area in which the proposed infrastructure is located.

3.

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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

