APPENDIX 6-4

BIODIVERSITY MANAGEMENT AND ENHANCEMENT PLAN

Planning and Environmental Consultants

Biodiversity Management and Enhancement Plan

Seskin Wind Farm, Co. Carlow

DOCUMENT DETAILS

Client:	**EDF Renewables Ireland Ltd.**
Project Title:	**Seskin Wind Farm, Co. Carlow**
Project Number:	**220246**
Document Title:	**Biodiversity Management and Enhancement Plan**
Document File Name:	**BMEP F - 2024.05.03 – 220246**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
02	Final	11/03/2024	CH	CC

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1. INTRODUCTION

1.1 Background

This Biodiversity Management and Enhancement Plan (BMEP) has been prepared by MKO on behalf of EDF Renewables Ireland Ltd., to accompany an application for planning permission for the Proposed Project to both Carlow County Council (CCC) and Kilkenny County Council (KCC).

The Proposed Project comprises 7 no. wind turbines and associated infrastructure, in the townlands of Seskinrea and Ridge, and adjacent townlands, in Co. Carlow, and a 38kV on-site substation, battery energy storage system and associated works, including underground 38kV cabling to connect to the national grid at Kilkenny 110kV substation, in the townland of Scart near Kilkenny, Co. Kilkenny. The BMEP has been prepared as part of the Proposed Project to mitigate for the loss of approximately 540m of native hedgerow (and associated stone walls) and 82m of native treeline. Enhancement measures for fauna known to occur within the site have also been incorporated into the BEMP including management of habitat for marsh fritillary butterfly and the provision of artificial breeding sites for pine marten and red squirrel.

1.2 Brief Description of the Proposed Project

This section describes the Proposed Wind Farm and the Proposed Grid Connection Route, collectively referred to as the Proposed Project. A full description of the Proposed Project is included in Chapter 4 of this EIAR: Description of the Proposed Project.

The Proposed Wind Farm comprises the construction of 7 No. wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of 180 metres, above the top of the foundation.

The proposed turbines installed on the site will have the following dimensions:

- Total tip height range of 179.5m – 180m,
- Rotor diameter range of 149m – 155m,
- Hub height range of 102.5m to 105m,

The overall layout of the Proposed Project is shown on Figure 4-1 of the EIAR. This drawing shows the proposed locations of the wind turbines, electricity substation, grid connection route, peat and spoil management areas, construction compounds, internal roads layout, the turbine delivery route link road and the main site entrance.

The Proposed Project includes for an onsite 38kV electricity substation and underground grid connection cabling, connecting the Proposed Wind Farm to the national electricity grid via the existing Kilkenny 110kV electricity substation located in the townland of Scart, Co. Kilkenny. The cabling will be located within the public road corridor or existing tracks for its entire length. The total length of the Proposed Grid Connection Route is approximately 20.1km, of which 2km is located within Co. Carlow and 18.1km is located within Co. Kilkenny.

1.3 Objectives of the BEMP

The objectives of this BEMP are as follows:

- To mitigate the loss of linear habitats required for the construction of the Proposed Project by replanting of native hedgerows, treelines within the Proposed Wind Farm site, to achieve a net gain in linear habitats.
- To provide Biodiversity Enhancement within the Proposed Wind Farm site, by managing areas specifically for marsh fritillary, establishing new native tree and hedgerow planting and managing these to enhance their potential for pollinator species.
- To provide additional foraging areas and nesting opportunities for pollinator species, nesting birds, small mammals etc.
- To provide additional breeding sites for protected mammals known to occur within the Proposed Wind Farm site e.g. pine marten and red squirrel.
- To provide a management and monitoring plan to ensure the success of the proposed measures.

1.4 Statement of Authority

The baseline ecological surveys including bat habitat assessment and activity surveys were conducted by MKO ecologists; Sara Fissolo (BSc), Stephanie Corkery (BSc, MSc), Corey Cannon, Valerie Kendall (B.Sc(H)., M.Env.Sc.), Cathal Bergin (BSc), Cora Twomey (BSc), Brónagh Boylan (BSc Env) and Ciara Hackett (BSc). All surveyors have relevant academic qualifications and are competent in undertaking the habitat and ecological assessments.

This Plan has been prepared by Ciara Hackett and Corey Cannon. Corey is a Senior Ecologist at MKO and holds a BSc in Zoology and an MSc in Biodiversity Survey. Corey is also a Chartered Ecologist and Full Member of CIEEM. Corey has over ten years' consultancy experience. She is an experienced ecologist with skills covering habitat and botanic assessments and specialist mammal (including all bat species) surveys. Corey has undertaken numerous Ecological Impact Assessment and AA assessments for public and private sector clients. This report has been reviewed by Pat Roberts (B.Sc., M.Sc., MCIEEM). Pat has 18 years' experience in ecological management and assessment.

2. ECOLOGICAL BASELINE

Multidisciplinary ecological surveys were undertaken by MKO between 2021 and 2023 as detailed within Chapter 6 (Biodiversity) of the EIAR submitted as part of the application.

2.1 Habitats and Flora

A detailed account of the habitats and associated species recorded within the site can be found in Chapter 6 (Biodiversity). The following habitats were recorded within the boundary of the Proposed Project site:

- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- Conifer plantation (WD4)
- Recently felled woodlands (WS5)
- Scrub (WS1)
- Hedgerows (WL1)
- Stonewalls (BL1)
- Earth banks (BL2)
- Treelines (WL2)
- Drainage Ditches (FW4)
- Eroding Upland Rivers/Streams (FW1)
- Buildings and artificial surfaces (BL3)

2.2 Protected Habitats and Flora

No Annex I habitats and/or protected flora were recorded within the Proposed Project site.

2.3 Protected Fauna

A number of protected fauna species were recorded within the Proposed Project site (as listed below). The BEMP has been developed taking into account the protected fauna known to occur within the Proposed Project site.

- Badger
- Pine marten
- Red squirrel
- Bats
- Marsh fritillary

3. BIODIVERSITY MEASURES

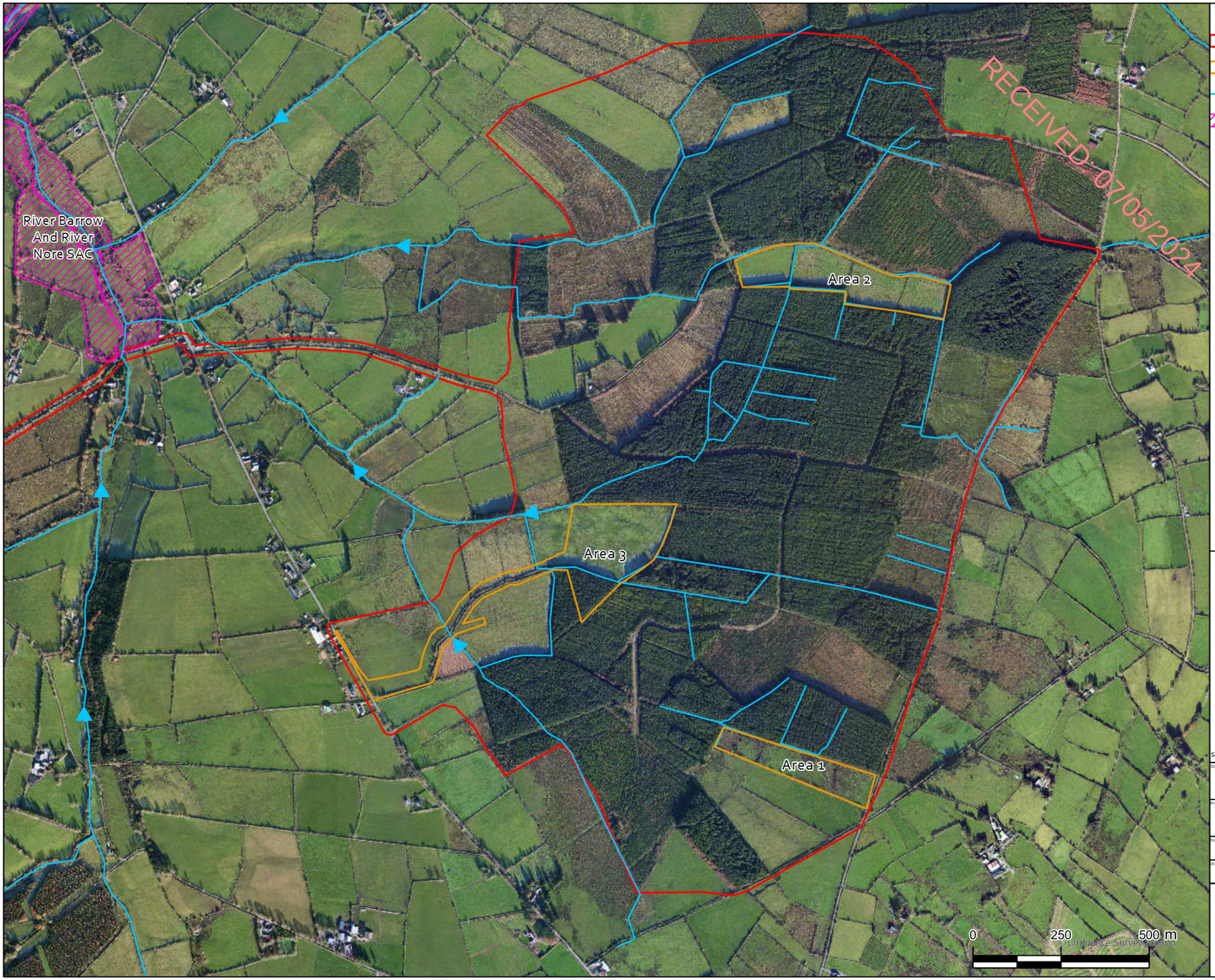
3.1 Overview

A total of three areas have been selected for the inclusion of biodiversity measures to mitigate the loss of habitat associated with the Proposed Project and to enhance the site for species known to occur within the site. An overview map of the biodiversity enhancement areas is shown in **Figure 3-1** below.

- **Biodiversity Enhancement Area 1**
  Biodiversity Enhancement Area 1 as shown in **Figure 3-2**. This area is to be managed specifically for marsh fritillary and will include the establishment of native shrubs and the management of the area in a way that will benefit marsh fritillary (discussed in Section 3.3 below).

- **Biodiversity Enhancement Area 2**
  Biodiversity Enhancement Area 2 is shown in **Figure 3-3**. Planting and enhancement of approx. 750m of native broadleaved treelines around the proposed 38V substation and battery energy storage system compound, and along the edge of the conifer plantation on the southern boundary (discussed in section 3.2 below).

- **Biodiversity Enhancement Area 3**
  Biodiversity Enhancement Area 3 is shown in **Figure 3-4.** Planting will comprise approx. 480m of native broadleaved treelines. Approx. 420m of native hedgerow will be established along field boundaries, while another 1,180m of native hedgerow will be established along new or realigned access tracks.



Map Legend

- Proposed EIAR Site Boundary
- Biodiversity Enhancement Areas
- Watercourses & Drains
- Special Area of Conservation (SAC)

SITE LOCATION - NOT TO SCALE

Drawing Title
Figure 3-1 - Proposed Biodiversity Enhancement Options - Overview

Project Title
Seskin Wind Farm, County Carlow

Project No.	Drawing No.	Scale
220246-g	3-1	1:10,000
Drawn By	Checked By	Date
JB	CC	30/04/24

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

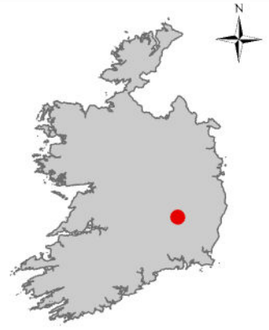
Area to be managed specifically for marsh fritillary. Habitat management for this species will be detailed in the Biodiversity Management Plan (BMP).

Planting of native shrubs and/or establishment of scrub along field boundaries providing shelter for marsh fritillary and buffer to adjacent drainage ditches. Establishment and management of the same will be detailed in the BMP.

0 100 200 m

Map Legend

- Proposed EIAR Site Boundary
- Biodiversity Enhancement Area 1
- Drains
- Marsh Fritillary Management Areas
- Planting Native Shrubs



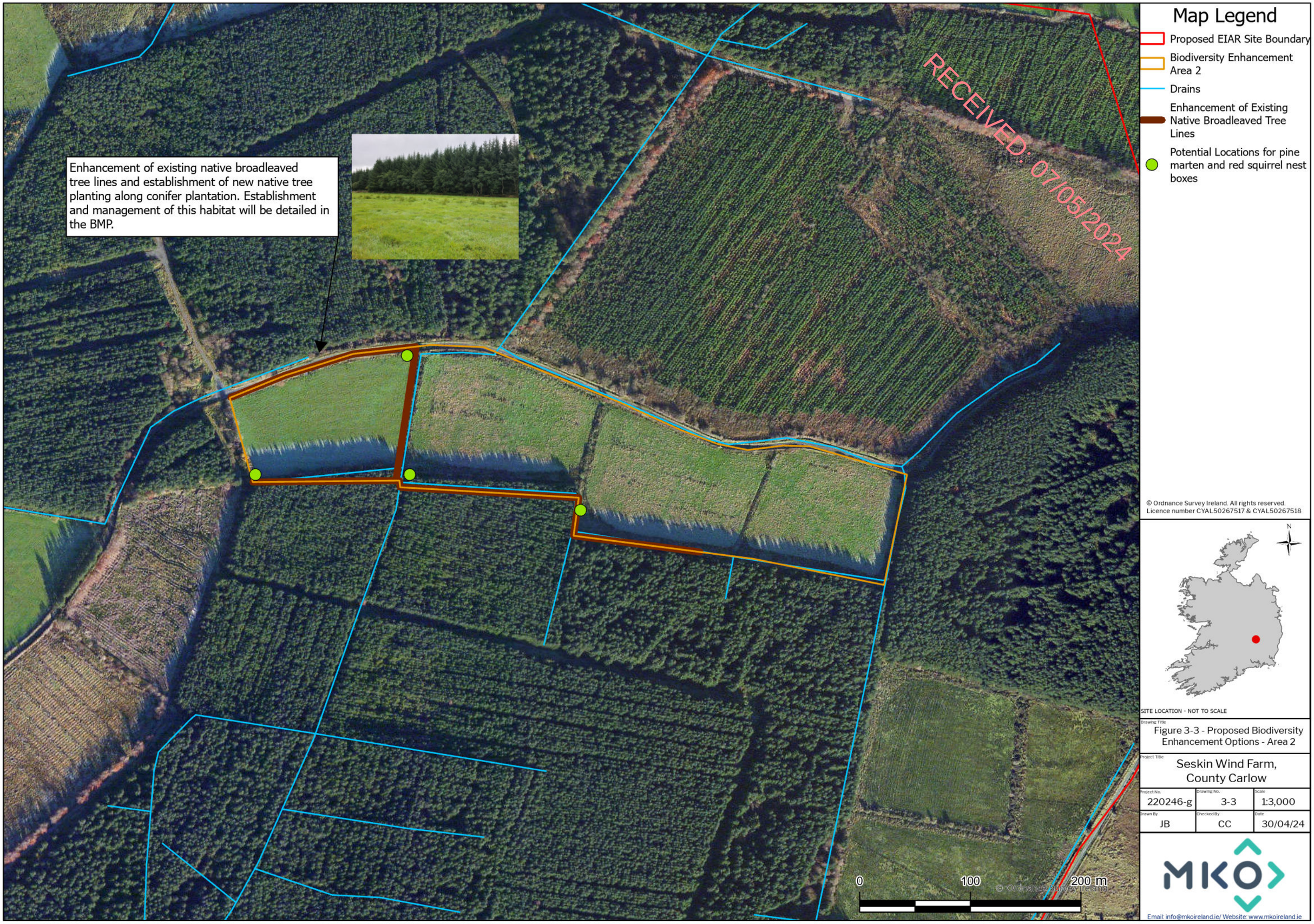
SITE LOCATION - NOT TO SCALE

Drawing Title
Figure 3-2 - Proposed Biodiversity Enhancement Options - Area 1

Project Title
Seskin Wind Farm, County Carlow

Project No.	Drawing No.	Scale
220246-g	3-2	1:3,000
Drawn By	Checked By	Date
JB	CC	30/04/24

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Proposed EIAR Site Boundary
- Biodiversity Enhancement Area 2
- Drains
- Enhancement of Existing Native Broadleaved Tree Lines
- Potential Locations for pine marten and red squirrel nest boxes

N

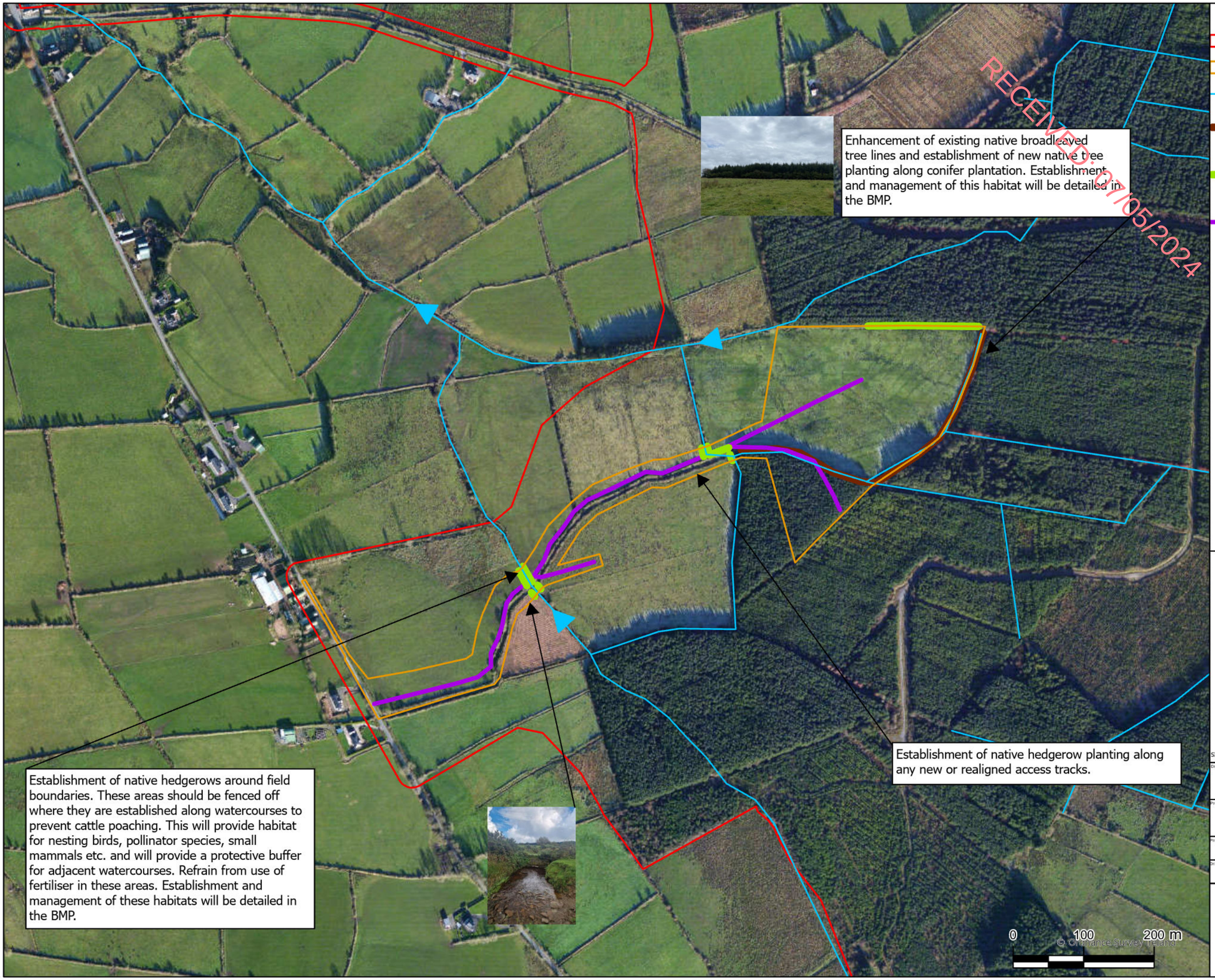
SITE LOCATION - NOT TO SCALE

Drawing Title
Figure 3-3 - Proposed Biodiversity Enhancement Options - Area 2

Project Title
Seskin Wind Farm, County Carlow

Project No.	Drawing No.	Scale
220246-g	3-3	1:3,000
Drawn By:	Checked By	Date:
JB	CC	30/04/24

Email: info@mkoireland.ie/ Website: www.mkoireland.ie



Map Legend

- Proposed EIAR Site Boundary
- Biodiversity Enhancement Area 3
- Watercourses & Drains
- Enhancement of Existing Native Broadleaved Tree Lines
- Establishment of Native Hedgerow Planting - Field Boundaries
- Establishment of Native Hedgerow Planting - Access Track

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Figure 3-4 - Proposed Biodiversity Enhancement Options - Area 3

Project Title
Seskin Wind Farm, County Carlow

Project No.	Drawing No.	Scale
220246-g	3-4	1:5,000
Drawn By	Checked By	Date
JB	CC	30/04/24

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.2 Linear Habitat Loss and Replanting

There will be a loss of approx. 540m of native hedgerow (and associated stone walls) and 82m of native treeline accommodate the footprint of the Proposed Project, including turbines (and associated bat buffers), wind farm roads and other key infrastructure. This will be mitigated through the establishment of approx. 3,350m of planting (see Table 3-1 below) comprising native broadleaved trees, shrubs and hedgerow habitat within the Proposed Wind Farm site. The following documents have helped to inform the establishment, enhancement and management of hedgerows within the Proposed Wind Farm site:

- Pollinator-friendly management of Wind Farms[1], All-Ireland Pollinator Plan[2]
- Hedgerows for Pollinators, All-Ireland Pollinator Plan, National Biodiversity Data Centre Series No.7[3].

This habitat creation will provide a net gain for linear habitats (hedgerows, treelines) once the planting has established. Overall, the proposed replanting will result in a net gain of approximately 2,900m of linear habitats in the landscape. Planting will be of semi-mature specimens to ensure connectivity gains are immediate and will be of local provenance outlined below.

Table 3-1: Proposed planting for Biodiversity Enhancement Options

Biodiversity Enhancement Option Area	Planting Length (m)
Area 1 (Figure 3-2)	
Planting native shrubs	514
Area 2 (Figure 3-3)	
Native broadleaved treelines	748
Area 3 (Figure 3-4)	
Native broadleaved treelines	483
Native hedgerow along field boundaries	424
Establishment of native hedgerow along new and realigned access track	1,190

3.2.1 Proposed Linear Habitat Replanting

Hedgerow, shrub and treelines will be replanted within the three biodiversity enhancement areas as shown in Table 3-1. There is an extensive network of existing linear landscape features in the wider area that will be retained, and the proposed replanting will enhance connectivity across the Proposed Wind Farm site and wider landscape.

A combination of whips and advanced nursery stock (10cm – 12 cm girth trees) will be used for both tree and hedgerow planting across the Proposed Wind Farm site to increase structure diversity and to ensure connectivity gains are immediate.

[1] *https://pollinators.ie/wp-content/uploads/2022/12/Wind-Farm-Pollinator-Guidelines-2022-WEB.pdf*
[2] *https://pollinators.ie/wp-content/uploads/2023/12/All-Ireland-Pollinator-Plan_Annual-Review-2023.pdf*
[3] *https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Hedgerows-2018-WEB.pdf*

3.2.1.1 Hedgerow Planting

Species selected will be indigenous to the local area and will maximise flowering times throughout the year as well as berry availability later in the year as detailed in Table 3-2. For example, species such as guelder rose would be beneficial as this species flowers later in summer. The ideal native hedge is made up of approx. 75% hawthorn and 25% of at least four other species[1]. Four other species will be included from the species list provided in Table 3.2 below.

When planting new hedgerow, plants will be closely spaced (a maximum of 50cm apart) and planted in a staggered row. The new hedgerow will need to be protected from poaching by livestock, through the erection of new stockproof fencing where required, which will be at least 1m away from the hedge, and on each side if required.

Table 3-2 Hedgerow Species and Flowering Periods[4]

Species	Blossoming Period
Willow	March - April
Blackthorn	March - April
Whitethorn/Hawthorn	May - June
Spindle	May-June
Elder	June
Guelder Rose	May - July

3.2.1.2 Tree Planting

Much of the Proposed Wind Farm site is planted with conifer plantation. The Proposed Wind Farm site will benefit from the additional planting of broadleaved native species which will add to the overall species diversity across the Proposed Wind Farm site. Species selected will be indigenous to the local area. Given the prevalence of ash dieback disease in Ireland currently it is recommended that ash is not planted at this time. Teagasc is currently carrying out research[5] to establish a gene bank composed of genotypes of ash tolerant to ash dieback which aims to produce planting stock for forests and hedgerows in Ireland. Hopefully such planting stock will be available in the near future. The following native species are recommended for planting:

- **Oak:** oak trees can grow to a very great size and support hundreds of species of flora and fauna as they mature. Oak is quite a tough tree and will do well in most conditions in Ireland. It is slow growing and needs plenty of light to thrive, give it the sunniest spots when planting and take care not to allow it to be shaded out by other faster growing species.

- **Alder:** alder is fast growing and loves wet ground. It coppices extremely well. It will quite likely outgrow all the other species in the first few years so watch particularly that it isn't shading out oak. If it gets too big, coppice it in the winter and the surrounding trees will get plenty of light while it is busy re-growing.

- **Birch:** birch is a pioneer species. In the wild it colonises fallow or unmanaged ground, often along with willow and oak, and is the first stage of a young woodland establishing. It will grow

[4] *National Biodiversity Data Series 7 – How-to-Guide – Hedgerows for Pollinators – National Biodiversity Data Centre : ISSN 2009-6852*
[5] https://www.teagasc.ie/crops/forestry/advice/forest-protection/ash-dieback/

well in most places, coppices well enough when young but can be sensitive on occasion. Another fast growing tree.

- **Rowan:** Another tough tree which will do well in most places and which coppices well. It produces flowers in spring red berries in late summer providing additional food source for a number of species. The berries in particular provide a food source for birds in the autumn.

The following measures will be followed when planting trees:

- Mark out the area for planting so it is clear exactly where planting will be established.
- Setting back from services infrastructure, roads and boundaries is really important. Keep back 10 metres from power lines and phone cables and do not plant directly beneath them. Keep back 5 metres from small roads and tracks.
- Use thin stakes or sticks to mark the rows or areas of trees to be planted.
- It is recommended that there are 2m spacings between trees. Shelterbelt planting may be applied by planting up two lines of trees as a staggered row.
- Newly planted trees will need to be protected from poaching by livestock, through the erection of new stockproof fencing which will be at least 2m away from the treeline, and on each side if required. Where new trees are being planted along existing conifer plantation fencing on both sides will likely not be possible. In this case tall tube tree guards would also be required to protect newly planted trees from wild animals such as deer.

3.2.2 Maintenance of Newly Planted Hedgerow/Treelines

In order to facilitate the successful establishment of the new hedgerow and trees to be planted within the Proposed Wind Farm site, and to promote biodiversity value of these the following measures are proposed:

- New hedgerow shrub planting will be kept weed and litter free until the new plants are established, particularly from ruderal weeds. Healthy growth will be maintained by allowing the plant to occupy as much of the planting areas as possible to allow them to achieve as close their natural form as possible.
- During spring and autumn maintenance periods all trees and plants will be checked and adjusted/replaced as required, soil firmed, and any dead wood present removed back to healthy tissue and mulch added if required. Where tree guards are no longer required these will be removed to avoid damage to the tree.
- During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April, May, June, July and August). During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.
- Cutting hedgerows annually stops the hedgerow flowering and fruiting. For that reason, once hedgerows are established consideration will be given to cutting them on a 3-5 year cycle, with cutting only taking place between November and February, thus allowing flowers and fruit to develop. If it is necessary to cut more frequently, alternate which side of the hedge is cut each year to allow parts of the hedge to grow and flower.
- Any tree, hedge or shrub that is removed, uprooted, destroyed or that becomes seriously damaged, defective diseased or dead shall be replaced in the same location with another plant of the same species and size as that originally planted. All such replacements shall be carried out within the first planting season following the loss.

3.2.3 Monitoring

Hedgerows and replanted trees will be inspected following the main growing season (i.e. in September) for the first five years of growth, where the requirement for replacement planting will be assessed. If any shrubs are dead or damaged these will be replaced using the same species within the next planting

season. Recommendations for ongoing or remedial management required will be specified within an Environmental and Ecological Report.

3.3 Marsh Fritillary

Biodiversity Enhancement Area 1 as shown in Figure 3-2 is to be managed to maintain and enhance the area for marsh fritillary. The marsh fritillary butterfly is Ireland's only Annex I listed insect species. It is listed as 'vulnerable to extinction' within the International Union for Conservation of Nature (IUCN) Red List in Ireland and is protected under Annex II of the EU Habitats Directive.

The presence of the plant, devil's-bit Scabious (*Succisa pratensis)* is vital for the survival of this butterfly as this plant is the only food source for the caterpillar of the butterfly. Devil's-bit scabious is associated with various types of species-rich grasslands, sand dunes, cut-over bogs and the edges of fens. Marsh fritillary require large areas of suitably managed, well-connected habitat with an abundance of devil's-bit scabious in order to maintain a sustainable population.

Species-rich grassland with the potential to support marsh fritillary is a declining habitat in Ireland. It is therefore of great importance that areas known to support marsh fritillary and devil's-bit scabious are protected and enhanced. The management methods discussed in Section 3.3.2 below have proved to be successful in attracting or maintaining marsh fritillary populations in an area. For example, a project carried out by the Initiative for Nature Conservation Cymru in Wales has attracted marsh fritillary to a grassland site where they had previously been absent. They did so by mowing the site which had become very rank and then allowing cattle to graze on it regularly. This allowed devil's-bit scabious the chance to grow which then attracted the marsh fritillary.

3.3.1 Protection of Area during Construction/Operation

- There will be no access by construction personnel or machinery to this area.
- There will be no temporary storage of materials within this area.
- There will be no unnecessary tracking/ shortcuts taken across this area.

3.3.2 Management of Area

Devil's-bit scabious (DBS) and marsh fritillary larval webs were recorded within the lands shown in Figure 3-2 during surveys for the Proposed Project. Infrastructure associated with the Proposed Wind Farm was subsequently moved to avoid this area (mitigation by design). This area was identified as being of high ecological value within the Proposed Wind Farm site and it was agreed that it will be maintained and enhanced for this species in particular. The following documents have helped inform management recommendations for this species:

- Environmental farming Scheme: Species-specific advice – Managing habitats for Marsh Fritillary, Northern Ireland Environment Agency[6].
- Species-rich grassland with Marsh fritillary in Co. Leitrim: Scoring Guidelines, Byrne, D., Maher, C. and Moran, J. (2018)[7].
- Habitat Management- The Marsh Fritillary Butterfly, Initiative for Nature, Conservation Cymru[8].

The following measures are proposed to manage this area for marsh fritillary:

[6] https://niopa.qub.ac.uk/bitstream/NIOPA/7532/2/EFS%20%28H%29%20Species%20Specific%20Advice%20Marsh%20Fritillary%20-%20NEW.pdf
[7] https://rbapseu.files.wordpress.com/2018/07/rbaps_sg01_srg-mf_v5.pdf
[8] https://www.natureconservation.wales/wp-content/uploads/2021/02/INCC-Habitat-Management.-The-Marsh-Fritillary-Butterfly-Eng.pdf

- Maintain and increase the cover of DBS plant – marsh fritillary habitat should have three or more DBS plants per square metre, across more than 20% of the habitat.
- Stocking levels will be reduced mid-August to mid-October (flowering season), and it is recommended to remove sheep as they selectively feed on the plant. If required, rush cutting will only be carried out prior to march or after the devil's bit scabious flowering period has ended (flowering period June-October).
- Extensive grazing, especially by cows, is recommended as it prevents the build-up grasses which can dominate and shade out DBS.
- Propagation of DBS plants (through collection of seed on site) could be undertaken to establish more plants throughout the Proposed Wind Farm site if required.
- Increase variation in vegetation structure and terrain - extensive grazing of lighter grazing is essential to maintain a varied vegetation structure. It is recommended to only have cattle grazing as they are lighter less selective grazers than other livestock such as horses or sheep. Suitable areas for marsh fritillary have a patchwork of vegetation height between 5-60cm.
- Increase shelter: plant native shrubs and/or allow the establishment of scrub along field boundaries to provided sheltered areas to help protect the marsh fritillary from harsh conditions.
- It is proposed to plant approx. 500m of native shrubs within this enhancement area. The exact location of shrub planting within this area will be discussed with an ecologist following initial detailed baseline surveys of DBS across the Proposed Wind Farm site (discussed in Section 3.3.3 below).
- Shelter is especially important on the western, south-western, north-western sides of the area (prevailing wind is south-westerly).

3.3.3 Monitoring

- A five year monitoring programme is proposed. Each year surveys will be undertaken to establish the success of measures proposed.
- As noted above marsh fritillary habitat should have three or more DBS plants per square metre, across more than 20% of the habitat. Surveys will be undertaken on a yearly basis to gather information on the abundance of DBS across this area including detailed surveys in year 1 to establish a baseline which to monitor against.
- Carry out surveys for larval webs Mid-August to mid-September.

3.4 Pine Marten/Red squirrel

Pine marten and red squirrel were recorded on camera in the vicinity of Turbine 1, other incidental records of these species occurring within the Proposed Wind Farm site and wider study area were also noted in the Biodiversity chapter. No breeding sites for either species were recorded by surveyors and no significant loss of supporting habitat for these species is expected as a result of the Proposed Project. However, the Proposed Project presents an opportunity to provide enhancement measures for these species in the form of artificial breeding sites. These den/nest boxes act to provide artificial breeding sites facilitating the raising of young during the spring and summer, in addition to providing shelter from environmental conditions and predators.

In relation to pine marten, these boxes have proved to be a very successful conservation tool in Scotland, with many boxes being occupied continuously over a number of years and were used by breeding females to raise their young (Croose et al., 2016). A similar study carried out in Scotland in relation to red squirrel also showed that nest boxes can be a useful conservation tool to mitigate the impacts of forest operations (de Raad et al., 2021).

3.4.1 Proposed Nest/Den Box Installation

It is proposed to erect two pine marten den boxes and two red squirrel nest boxes within biodiversity enhancement area 2 (see Figure 3-3). These will be erected immediately post construction (to avoid disturbance to these species during construction). They will be erected along existing mature tree lines within this area and in suitable locations where future tree felling (associated with forestry) will not occur. Indicative locations are shown on Figure 3-3. The following boxes should be used:

- Pine marten - https://www.nestbox.co.uk/products/pine-marten-den-box
- Red squirrel - https://www.nhbs.com/red-squirrel-nest-box

The proposed number of boxes has been informed by woodland habitat types within the Proposed Wind Farm site and information provided by the Vincent Wildlife Trust (Constructing, erecting, and monitoring Pine Marten Den Boxes[9]).

3.4.1.1 Tree Selection

Boxes will not be installed until after the Proposed Project has been constructed, this will allow an optimal location to be identified. Selection of a suitable tree will require the installer to seek out a tree that they deem to be fit for the purpose. Although these guidelines were provided in relation to pine marten den boxes the same would apply in relation to the installation of red squirrel nest boxes. The following guidelines will aid the installer in selecting a tree that is suitable for installation:

- Ensure the boxes are installed on a tree a suitable distance from human roadways and paths, and away from areas targeted for woodland management or harvesting in the near future, to avoid disturbance of the box.
- Locating the box near pre-existing animal trails may increase the likelihood and speed with which the box is discovered
- The boxes are likely to produce the greatest benefits is they are installed in large, undisturbed, prey-rich woodlands where natural den sites such as tree cavities are scarce or absent.
- The tree itself must be a living tree with a straight trunk and a minimum DBH (diameter at breast height) of 20cm.
- Typical trees within the conifer plantations that pine marten boxes are usually hung on include the following species: Sitka spruce (*Picea sitchensis*), Scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*), lodgepole pine (*Pinus contorta*) or Larch (*Larix sp.*).
- Finally, when choosing a site for a box bear in mind the future requirement to view the boxes for signs of use or to check their condition.

3.4.2 Monitoring and Maintenance

Monitoring will take place yearly after installation of the boxes. It is proposed to install the boxes immediately after construction is complete and the wind farm is in operation. The boxes will be checked yearly after this for five years. Resting sites of pine marten and red squirrel are protected by law under the Wildlife Act (1976 to 2023) as such checking of the boxes will be undertaken from the ground using binoculars to minimise disturbance. The boxes shouldn't require any maintenance; but may need replacing after time. The following checks will be undertaken on a yearly basis:

- Boxes should be checked for signs of use by either species from the ground (for example in relation to pine marten the box lid made be covered in scat).
- The condition of the attaching line should be checked to ensure it is not damaged or that the tree is not growing into it. If either of these is the case the attaching line should be replaced.

[9] https://www.vwt.org.uk/wp-content/uploads/2015/04/constructing-erecting-and-monitoring-pine-marten-den-boxes-2014.pdf

- The general condition of the box itself should be checked. If the boxes have significantly deteriorated replacement boxes should be installed.
- If the boxes need to be replaced this will be done under supervision of an Ecologist

4. MONITORING

Monitoring will be undertaken on a yearly basis over 5 years as prescribed in this report and summarised in Table 4.1 below. This will be undertaken in partnership between the Developer, the Project Ecologist and the Landowner. The proposed management actions will be conveyed to each of the landowners and management alterations implemented as required to achieve the targets of the management plan.

Monitoring results will be reported by the Project Ecologist within an Annual Environmental Report. Any criteria failures identified and corrective actions will be implemented. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared. The enhancement plan will be updated and amended where required to improve the efficacy of the enhancement work.

Table 4-1 Monitoring

Feature	Biodiversity Enhancement Area	Frequency	Measure
Hedgerow, shrub and tree planting	All areas (see Figure 3-1)	Every year for 5 years	› Hedgerows and replanted trees will be inspected following the main growing season (i.e. in September) for the first five years of growth, where the requirement for replacement planting will be assessed. › If any shrubs are dead or damaged these will be replaced using the same species within the next planting season. › Recommendations for ongoing or remedial management required will be specified within an Environmental and Ecological Report.
Marsh fritillary	Area 1 (Figure 3-2)	Every year for 5 years	› Each year surveys will be undertaken to establish the success of measures proposed in Section 3.3.2). › Surveys will be undertaken on a yearly basis to gather information on the abundance of DBS across this area including detailed surveys in year 1 to establish a baseline which to monitor against. › Carry out surveys for larval webs Mid-August to mid-September. › Recommendations for ongoing or remedial management required will be specified within an Environmental and Ecological Report.

Pine marten/red squirrel	Area 2 (Figure 3-3)	Every year for 5 years	Resting sites of pine marten and red squirrel are protected by law under the Wildlife Act (1976 to 2023) as such checking of the boxes will be undertaken from the ground using binoculars to minimise disturbance. The boxes shouldn't require any maintenance; but may need replacing after time. The following checks will be undertaken on a yearly basis: › Boxes should be checked for signs of use by either species from the ground (for example in relation to pine marten the box lid made be covered in scat). › The condition of the attaching line should be checked to ensure it is not damaged or that the tree is not growing into it. If either of these is the case the attaching line should be replaced. › The general condition of the box itself should be checked. If the boxes have significantly deteriorated replacement boxes should be installed. › If the boxes need to be replaced this will be done under supervision of an Ecologist › Recommendations for ongoing or remedial management required will be specified within an Environmental and Ecological Report.

5. CONCLUSION

This BEMP sets out the measures to be implemented to ensure that the Proposed Project will result in a net gain in biodiversity, specifically, proposed replanting will result in a net gain of approximately 2900m of linear landscape features within the Proposed Wind Farm site which will be of benefit to a number of species including bats, small mammals and pollinator species. Measures set out in the plan will also provide biodiversity gains in the form of enhancement measures for marsh fritillary, pine marten and red squirrel. This Plan has set out measures to be implemented during establishment and management phases to ensure that the measures are successful, as well as regularly monitoring by an ecologist to ensure the success of the measures outlined in the BEMP.

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