MWP

APPENDIX 6-F BIODIVERSITY ENHANCEMENT MANAGEMENT PLAN (BEMP)

Ballynisky Wind Farm, County Limerick.

Ballynisky Green Energy Limited

December 2025

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1 Introduction

This **Biodiversity Enhancement Management Plan (BEMP)** has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Ballynisky Wind Farm (herein referred to as proposed development).

The proposed development comprises six (6) wind turbines with a total overall height of 158m, an on-site 38kV electrical substation and two grid connection options. Option A is an underground electrical connection to an existing 38kV substation at the nearby Carrons Wind Farm which is connected to the National Grid. Option B is to loop into the existing 38kV overhead line that transects the site (see Chapter 2 Project Description, Vol II of EIAR for further detail). Figure 1-1 below outlines the layout of the proposed Ballynisky Wind Farm.

This Biodiversity Enhancement Management Plan (BEMP) has been prepared in order to outline the proposed biodiversity enhancement measures associated with the proposed development. This BEMP also outlines how the proposed development has been designed to offset any loss of habitat.

The proposed development proponent is committed to enhancing the condition and extent of habitats within the habitat management area for the lifetime of the windfarm.

The aim of this BEMP is to improve and future safeguard the habitats and biodiversity of the proposed development site via the implementation and overseeing of appropriate enhancement measures resulting in a Biodiversity Net Gain (BNG) for the area.

Measures outlined in this document will be implemented and managed by the wind farm operator in conjunction with the landowners[1] and monitored by an experienced ecologist during the operational period. Compensation measures will aim to offset habitat loss brought about during the proposed development's construction stage while the BEMP enhancement measures will provide a framework for the conservation and enhancement of ecological features throughout the operational stage and beyond. The proposed wind farm will be managed for nature conservation where the application of appropriate and coordinated measures are likely to have positive impacts on local biodiversity.

1.1 Background

Habitat loss, damage and fragmentation will result from the construction of the proposed development. The habitats within the proposed development boundary and the areas of loss, or, in the case of linear habitats, the length of habitat which will be lost to facilitate construction of the proposed development, are assessed in **Chapter 6 Biodiversity** in Volume II of the EIAR in Section 6.6.1.2, and Tables 6-20 and 6-21. The latter tables are replicated here as **Table 1-1** and **Table 1-2**, below, outlining the predicted loss of habitat during the construction phase.

The majority of infrastructure is proposed is to be located within habitats of low ecological value i.e. improved agricultural grassland (GA1), and buildings and artificial surfaces (BL3).

[1] Legal agreements in place to undertake measures as proposed

Table 1-1. Predicted hectares of KER habitat loss associated with the construction phase of the proposed development.

KER Habitat Type	Area of Habitat Loss (Ha)
Mixed broadleaved woodland/ Scrub (WD1/ WS1)	0.234
Mixed broadleaved woodland/ Wet grassland / Scrub (WD1/GS4/WS1)	0.288
Scrub (WS1)	0.344
Immature woodland (WS2)	0.039
Poor fen and flush (PF2)	0.097
Wet grassland (GS4)	4.89
Wet grassland (GS4)/Scrub (WS1)	0.33

Table 1-2. Predicted length in metres of linear KER habitat loss associated with the construction phase of proposed development.

KER Linear Habitat Type	Length of Habitat Loss (m)
Hedgerows (WL1)	2,835
Treelines (WL2)	717
Drainage ditches (FW4)	1,662

As part of the proposed development, areas of wet grassland (4.89 ha), (see Sections 6.3.4.9, 6.6.1.2 and Figure 6-10 in **Chapter 6 Biodiversity** in Volume II of the EIAR), will be directly impacted as a result of the construction of Turbine T2 and T6 and associated access tracks. This habitat is the most ecological diversity of the habitats recorded within the proposed development area as it supports the Annex II listed Marsh Fritillary (*Euphydryas aurinia*). Therefore habitat compensation is being provided to off-set the habitat loss through the implementation of this BEMP.

Hedgerows loss of 2,835 m due to new access tracks and clearing of vegetation for bat buffers will be required. Compensation for loss of hedging will be provided by a replanting schedule which forms part of this BEMP.

The BEMP described in this report will be implemented in accordance with published guidance and best practice, namely:

- SNH (now NatureScot) "*Planning for development: What to consider and include in Habitat Management Plan – Guidance*" (Version 2, March 2016).
- CIEEM (2023) Briefing Paper on '*Biodiversity Enhancement for New Developments in Ireland*', (the "CIEEM Guidance").

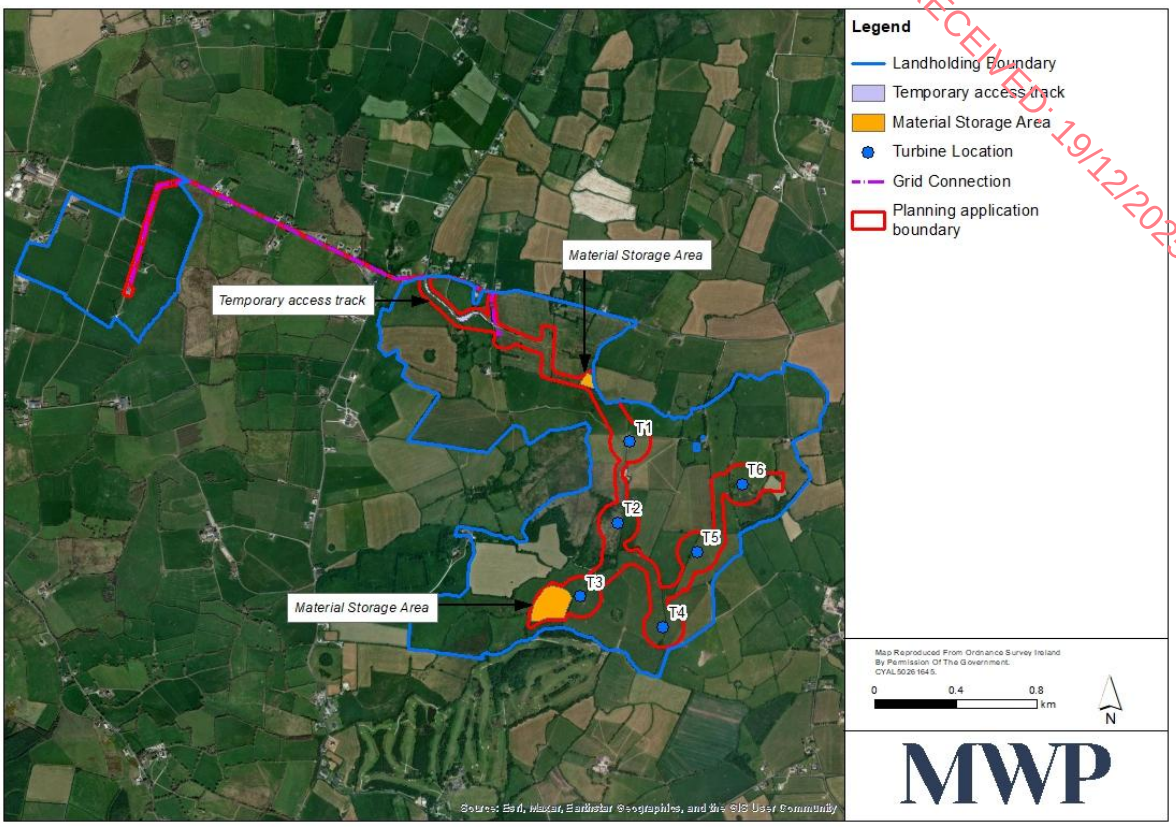

Figure 1-1: Layout of the proposed Ballynisky Wind Farm including turbine locations and material storage areas.

2 Statement of Authority

This Biodiversity Enhancement Management Plan was prepared by Gerard Hayes, a Senior Aquatic Ecologist formerly of Malachy Walsh and Partners (MWP) Engineering and Environmental Consultants. Gerard has over fifteen years' experience in environmental consultancy and is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and the Freshwater Biological Association (FBA). He has a diverse ecological profile - Phase 1 habitat, mammal (including bats), bird, amphibian, macroinvertebrate, and tree survey experience. He has had numerous responsibilities including waste assimilation capacity assessment, report writing (EIS, EIA, EA, AA, NIS) and ecological monitoring. His project involvement has been primarily in the areas of wind energy development, wastewater treatment plants, roads/bridges, water supply, flood defence and hydro schemes. He has co-authored and/or carried out surveys for NPWS Irish Wildlife Manual No. 15, 24, 26, 37, 45.

Additional contributions and review of the BEMP was carried out by Úna Williams (BSc. MSc.), Senior Ecologist and Environmental Scientist at MWP. Úna has worked with MWP for over six years and is an experienced field ecologist. She is familiar with various ecological survey methodologies including habitat/survey mapping and zoological surveys and has worked on research teams both in Ireland and abroad. She has undertaken assessments for a wide variety of projects including for renewable energy developments, and infrastructural and coastal developments. Úna has designed and carried out several Collision Risk Models for proposed wind farms and has authored many ecological reports including Screenings for Appropriate Assessment Reports (Stage 1), Natura Impact Statements (Stage 2), and Ecological Impact Assessments. She graduated from Queen's University Belfast in 2018 with an MSc in Animal Behaviour and Welfare, and from Trinity College Dublin in 2008 with an Environmental Science degree.

3 Habitat Compensation

3.1 Hedgerow Replacement

Hedgerows are important linear ecological features that provide continuous habitat for foraging wildlife and serve as commuting corridors to assist bats, small mammals and birds to safely navigate between habitats, particular those connected to the wider landscape, including woodland habitats.. By strengthening them vegetatively hedgerows can also deter livestock from breaking through features which can damage vegetation, resulting in structural weakness and reduced connectivity.

Hedgerows also play an important role in the attenuation of overland water flow and can reduce silt and nutrient loss to surface water features. There will be hedgerow loss at various locations across the proposed development during the construction stage totalling 2,835 m worst case scenario or 1,065m within the confines of the site layout boundary i.e. the construction corridor. Where such habitat loss occurs, the resultant breaks in the ecological continuum may result in erosion and increased overland flow. The publication '*Irish Hedgerows: Networks for Nature*' (2004)[2] provides an excellent overview of Irish hedgerows and their importance.

In total, it is proposed to plant a total of ca. 1,748 m of linear habitats in the form of hedgerows. To ensure hedgerow continuity and to improve structure and connectivity along and between linear features, native shrubs and tree species including whitethorn (*Crataegus monogyna*), hazel (*Corylus avellana*) and holly (*Ilex aquifolium*) will be planted at selected locations.

A planting programme will be devised following best practice, including guidance from:

- the Department of Agriculture, Food and the Marine Agri-Climate Rural Environment Scheme (ACRES)
- Teagasc (Native Tree Area Scheme)[3]
- Hedgerows for Pollinators[4]
- Pollinator-friendly management of Wind Farms[5]
- Hedgerow Management: Best Practice Guidelines from Farming for Nature[6].
- Irish Hedgerows: Networks for Nature (2004).

The planting programme will be co-ordinated and supervised by an experienced ecologist and undertaken by a registered contractor. All plantings will consist of native Irish species (as listed below) from certified Irish genetic stock. The landscaping contractor will be required to be informed well in advance to allow the acquisition of suitable native stock. Planting will occur within the appropriate season, namely late-autumn and winter.

Subject to planning consent, planting of new hedgerows will commence where possible as a first step of the construction phase of the proposed development. This will allow time for these planted features to become established prior to any significant loss of existing features.

Linear features will be planted in the form of hedgerows and riparian buffer zones to compensate for the loss of commuting corridors. This linear planting is proposed to offset the loss of connectivity caused by the installation of bat turbine buffers and access routes. A section of existing hedgerow along the boundary of the Ahacronane River to the north of the proposed development site will be strengthened by planting a 2-metre-wide strip

[2] 02. Networks for Nature 22/10 Accessed: 26th June 2025
[3] Native Tree Area Scheme - Teagasc | Agriculture and Food Development Authority Accessed: 26th June 2025:
[4] How-to-guide-Hedgerows-2018-WEB.pdf Accessed: 26th June 2025
[5] Wind-Farm-Pollinator-Guidelines-2022-WEB.pdf Accessed: 26th June 2025
[6] Hedgerow management - Farming for Nature Accessed: 26th June 2025

adjacent to existing hedgerow with the aim of increasing its favourability for lesser horseshoe bat (*Rhinolophus hipposideros*) to use.

The following measures with regards hedgerow planting will be followed:

- Pre-planting groundwork will break up the soil by inversion, if needed, and remove any competing vegetation which may hinder or prevent hedgerow growth.
- Hedgerows will be planted in double row strips measuring approximately 1.5 metres wide with a 20 to 30 cm spacing of 'whips' measuring 60 to 90 cm high.
- Species composition within the hedgerows will have a minimum of five structural native species and will reflect composition of nearby hedgerows.
- Taller trees will be planted at 15 to 30 metre intervals and will consist of pedunculate oak (*Quercus petraea*) and whitebeam (*Sorbus aria*) with alder (*Alnus glutinosa*) and willow (*Salix* spp.) in areas near watercourses.
- Once the hedgerow is planted, protection from grazing livestock and wildlife will be required in early spring to allow for immature plants to grow. Stock proof fencing may be required if intensive grazing is present.
- Mulch will be spread along the base of the hedge to a 10 cm depth, once applied in summer this can be replaced in subsequent years.
- After establishment, trimming and eventual coppicing cycles can be undertaken to retain consistent biodiversity value across the lifecycle of the hedgerows.

3.1.1 Hedgerow Maintenance and Management

Annual hedgerow monitoring and maintenance will occur for up to five years from planting after the main growing season (i.e. from late September / October onwards) and any individual plants that fail will be replaced on an annual basis ahead of the next growing season. Once established, trimming frequency of hedgerows will reduce to every three years. Hedgerows will increase in size and improve in structure which will allow for structural hedgerow species such as hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) to fruit.

Infrequent trimming management will continue until restarting the coppicing cycle after 20 years of hedgerow growth. The proposed management measures for hedgerow establishment and subsequent maintenance will be conveyed to each landowner and management alterations implemented as required by the wind farm operator to achieve the targets of this BEMP.

3.1.2 Limerick Development Plan 2022-2028: Biodiversity Objective EH 010

Hedgerows, treelines and individual trees are important habitats in the local area, rated Local Importance (higher value) as assessed in Chapter 6 Biodiversity of the EIAR, and support a range of flora and fauna species including breeding and feeding birds, foraging bats, small mammal species and invertebrates.

The Limerick County Development Plan 2022-2028 recognises the importance of trees and hedgerows in Section 6.3.5: "Trees, Tree Preservation Orders and Hedgerows". OEH O10 Trees and Hedgerows notes the following:

It is an objective of the Council to:

a) Retain and protect amenity and biodiversity value of the County and City by preserving as far as possible trees, woodlands and hedgerows, having regard to the significant role that trees and hedgerows play in

local ecology, climate change and air quality and their contribution to quality place making and the associated health and wellbeing benefits.

b) Require, in the event that mature trees or extensive mature hedgerow is proposed to be removed, that a comprehensive tree and hedgerow survey be carried out by a suitably qualified tree specialist to assess the condition, ecological and amenity value of the tree stock/hedgerow proposed for removal and to include mitigation planting and a management scheme. The Council will seek in all cases to ensure when undertaking development, or when permitting development, that the loss of, or damage to, existing trees is minimised.

c) Require the planting of native trees, hedgerows and vegetation and the creation of new habitats in all new developments and public realm projects. The Council will avail of tree planting schemes administered by the Forest Service, in ecologically suitable locations, where this is considered desirable.

The importance of the retention and protection of hedgerows and trees, as well as the planting of new native trees and shrubs, is also highlighted in the Limerick Biodiversity Action Plan 2025 – 2030[7] and in the Limerick City and County Tree Policy 2024 – 2030[8] (specifically Section 11: Trees and Development)

3.2 Mixed Broadleaved Woodland/Scrub

The soil deposition area to the northwest of T1 will be converted to a mixed/broadleaved woodland by planting with a mix of native tree species (refer to **Figure 1-1** for location of T1).

In accordance with Woodland Trust guidance[9], there are three distinct methods which can be deployed to initiate new woods and trees – natural colonisation, direct seeding, and planting – either as the sole method across a site, or in combination. A combination of planting and natural colonisation will be used in areas to be wooded to promote structural complexity. An overall total of approximately 0.33 ha of woodland will be planted.

The woodland structural component to be created will correspond to a grove. Groves are areas of dense canopy, typically in excess of 70% once established. In groves, most trees compete for crown space – creating unique conditions of shade and humidity which support an assemblage of associated species. Stem densities will have spacings generally between one and five metres, so planting will be carried out in cognisance of this. A variety of tree ages will be used. The Woodland Trust's approach emphasises the importance of locally sourced seed and trees and the role of natural colonisation as a critical process that allows natural selection to build adaptation to site conditions. By creating complex habitat mosaics using tree species that are well adapted to site conditions, the resulting woodlands and landscapes are much more likely to have an increased resilience to current and future stresses. Only native Irish trees species sourced and grown in Ireland will be used.

Species composition will include hazel, oak, and smaller tree species such as elder (*Sambucus nigra*) and alder are other suitable native species could be planted at higher densities.

Once construction ceases, the area northwest of T1 can be expected to be colonised by bramble (*Rubus fructicosus*), honeysuckle (*Lonicera periclymenum*), ivy (*Hedera hibernica*) and other ground flora that will generate a scrub habitat in mosaic or as a woodland understory.

Ground preparation will be limited to inverted (or scrap) mounding, shallow ripping, pit planting and auger planting. Fertiliser application will not be permitted. The control of competing vegetation is critical for the establishment and growth of young trees. Inadequate vegetation management will result in mortality, loss of growth and vigour and the need for further inputs during the establishment process. Management will be done

[7] Limerick Biodiversity Action Plan 2025-2030 | Limerick.ie Accessed: 25th September 2025.
[8] Tree Policy for Limerick | Limerick.ie Accessed: 25th September 2025.
[9] https://www.woodlandtrust.org.uk/media/50673/woodland-trust-woodland-creation-guide.pdf Accessed: 5th July 2025.

manually using basic tools such as slash hook or bill hook or by pulling away herbaceous material (grasses etc.) by hand.

Monitoring and maintenance will occur yearly for up to five years from planting with tree thinning and coppicing undertaken for between 5 to 15 years. The entire plot will be fenced to protect from stock animals and any trees that fail within the first five years of planting will be replaced on an annual basis.

The proposed management measures for woodland establishment and thereafter maintenance will be conveyed to the landowner and management alterations implemented as required by the wind farm operator to achieve the targets of this BEMP.

3.2.1 Limerick Development Plan 2022-2028: Biodiversity Objective EH 04 and EH 05

The Limerick County Development Plan 2022-2028 recognises the importance of creation new habitats.

EH 04 Creation of New Habitats notes the following:

It is an objective of the Council to:

a) Seek the creation of new habitats by encouraging wild green areas and new water features such as, pools and ponds in new developments.

b) Encourage management plans for green areas to use the minimum of pesticides and herbicides.

EH 05 New Infrastructure Projects notes the following:
It is an objective of the Council to:

a) Require new infrastructure and linear developments in particular, to demonstrate at design stage sufficient measures to assist in the conservation of and dispersal of species and to demonstrate a high degree of permeability for wildlife, to allow the movement of species and to prevent the creation of barriers to wildlife and aquatic life in the wider countryside.

The proposed creation of a new mixed woodland habitat aligns with Objective EH 04 and EH05 therefore a positive effect for biodiversity within the site will accrue over time with maturity of this woodland/scrub mosaic.

3.3 Creation of Wildflower Habitat

The soil deposition area to the west of T3 will be located on wet grassland that has been identified as a KER, and in order to retain the KER status of this area, it will be converted to a wildflower area, since reversion to wet grassland will not be a viable ecological option once the areas are raised by approximately two metres during construction. An area of 2.5 ha proposed for soil deposition to the west of T3 will be allowed to be colonised with local plants through natural dispersion and germination. Another area of ca. 0.2 ha to the south of T2 will also be used for wildflowers.

According to the National Biodiversity Data Centre (NBDC) and the All-Ireland Pollinator Plan[10], encouraging native plants to flourish is the best option for pollinators, and indeed all biodiversity. There will be no seeding using bought seeds whether that's grasses or 'wildflower' mixes. Seeds of local provenance will suffice at the site given the extent of wet grassland habitats. Disturbed ground will not be intentionally compacted by excavator buckets or otherwise to allow seeds of local provenance to establish plants. This approach will support species which are

[10] All-Ireland Pollinator Plan » All-Ireland Pollinator Plan Accessed: 5th July 2025.

naturally occurring, and not to plant in other seeds. Native species are the ones which are adapted to be there, and importantly, those are the species that attract pollinators and other wild animals.

3.3.1 Limerick Development Plan 2022-2028: Biodiversity Objective EH 07

The Limerick County Development Plan 2022-2028 recognises the importance of All Ireland Pollinator Plan via Objective EH 07.

It is an objective of the Council to:

a) Continue to actively support the aims and objectives of the All-Ireland Pollinator Plan 2021 – 2025, by encouraging measures to protect and increase the population of bees and other pollinating insects in Limerick.

b) Support the aims of the National Biodiversity Action Plan and succeeding plans, in emphasising the importance of ecological issues in planning.

The All-Ireland Pollinator Plan aims to make wind farms pollinator friendly. The NBDC, in conjunction with Wind Energy Ireland and Renewable NI have produced a guidance document '*Pollinator-friendly management of wind farms*[11]', which has been used throughout this BEMP to inform enhancement measures for pollinating species. Therefore, the proposed development fully aligns with Objective EH 07.

3.4 Pond Creation

Three ponds will be constructed outside the bat buffer zone (a clearance distance of 91 m around turbines T1, T2, T4, T5 and T6, and a distance of 98.4 m around T3) and allowed to be colonised by local aquatic flora and fauna and/or planted with native aquatic vegetation as per **Table 2-1**. These features will correspond to the habitat 'artificial pond (FL8)' as per Fossitt (2000). The ECoW and site engineer will decide the final pond locations but they will broadly correspond to locations indicated in **Figure 2-1**. These ponds will act as small wetland niches during the operation stage of the proposed wind farm and beyond. Physical variation/heterogeneity is a key influence in biodiversity richness. Therefore, sinuosity in pond outline/plan is preferable to linearity, so pond borders/banks and stone filter beds will be of varied shape/angle. These features can be used by a range of invertebrates, frogs and bird species. They can be expected to act as wetland habitats for aquatic and terrestrial macroinvertebrates, and amphibians.

Table 3-1: Plants Recommended for Inclusion within an Artificial Pond (Species List Generated from Native Plants Known to Occur in the Locality)[12].

Location of plant within pond	Species
Terrestrial – on top of berm	**Grasses and associated flora:** Yorkshire-fog (*Holcus lanatus*), Tall Fescue (*Festuca arundinacea*), Common Bent (*Agrostis capillaris*), Red Fescue (*Festuca rubra*), Red Clover (*Trifolium pratense)*
	Other flowering plants: Primrose (*Primula vulgaris*), Purple-loosestrife (*Lythrum salicaria*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Bluebell (*Hyacinthoides non-scripta*), Agrimony (*Agrimonia eupatoria*), Bloody Crane's-bill (*Geranium sanguineum*), Bittersweet (*Solanum dulcamara*), Common Chickweed (*Stellaria media*), Yellow-rattle (*Rhinanthus minor*), Wood-sorrel (*Oxalis acetosella*), Snowdrop (*Galanthus nivalis*), Pendulous Sedge *(Carex pendula)*

[11] Wind Farms » All-Ireland Pollinator Plan
[12] 10km grid squares R24 and R34, based on NBDC: https://maps.biodiversityireland.ie/Map

Location of plant within pond	Species
Marginal – verges of water garden	Soft-rush (*Juncus effusus*), Blunt-flowered Rush (*Juncus subnodulosus*), Yellow Iris (*Iris pseudacorus*), Water Forget-me-not (*Myosotis scorpioides*), Water Mint (*Mentha aquatica*), Water-cress (*Rorippa nasturtium-aquaticum*), Brooklime (*Veronica beccabunga*), Willowherb (*Epilobium* sp), Amphibious Bistort (*Persicaria amphibia*)
Emergent – planted underwater with leaves under and/or over water	Branched Bur-reed (*Sparganium erectum*), Arrowhead (*Sagittaria sagittifolia*), bulrush (*Typha latifolia*), Pondweed (*Potamogeton* sp.), Yellow Water-lily (*Nuphar lutea*)

Other plants suited to ponds include fool's water cress, Hemlock water dropwort (*Oenanthe crocata*), water horsetail and marsh marigold (*Caltha palustris*).

The design and construction of pond habitats will be based on best available guidance from the BRIDE Project (2023)[13] and Freshwater Habitat Trust (2023)[14].

3.4.1 Limerick Development Plan 2022-2028: Biodiversity Objective EH 04 and EH 05

Ponds act as transition zones between land and water, providing food and habitat for many aquatic, semi-aquatic, and terrestrial species as well as providing an area for breeding amphibians, invertebrates, and birds. Ponds and wetland areas also provide landscape connectivity and, if created and managed correctly, can reduce the impacts of habitat fragmentation on populations.

The proposed creation of three ponds further to completion of construction phase aligns with **Objective EH 04 and EH05.**

3.5 Watercourse Buffering / Riparian Habitat Enhancement

To provide a buffer between the proposed development site and the receiving watercourses within the site i.e. the Riddlestown Stream and the Ahacronane River, a river riparian buffer zone will be created as promptly as possible should permission be granted. The riparian setback zone will be designed to create an intact and permanent buffer area of natural vegetation alongside the aquatic zone[15], in order to protect water quality and aquatic ecosystems from possible overland flow of sediment and nutrient runoff and from both the proposed development and impacts associated with land practices in the site. The riparian setback breaks the 'pathway' between the source of possible pollution and the receiving watercourse.

The riparian buffer zone will create structural diversity and important woodland edge and open habitats for native flora and fauna. The buffer zone will form part of the overall woodland site and will be left largely undisturbed to allow riverbanks develop into well-vegetated areas that support a mosaic of natural ground vegetation and (potentially/likely) pockets of native scrub/ principally for the enhancement of biodiversity at the site.

The minimum riparian setbacks for aquatic zones (as measured from the bank of the watercourse) depend on the gradients/slope leading to the aquatic zone. A set-back distance of two metres will apply. The riparian setback zones will not be used for any purpose which might undermine its protective purpose, or which could damage the aquatic zone. Operations such as cultivation and drainage will not take place.

[13] https://thebrideproject.ie/wp-content/uploads/2025/06/THE-BRIDE-Project-Final-Report_v16_final.pdf Accessed: 25th August 2025.
[14] Creating-Garden-Ponds_2023.pdf Accessed: 26th August 2025.
[15] An aquatic zone is defined as "Any natural river, stream of lake (but not an artificial drain) illustrated on an Ordnance Survey 6-inch map." Other water features are also protected under the "*Environmental Requirements for Afforestation*", i.e. relevant watercourses, hotspots and drinking water abstraction points (See Forest Service Circular 12/2017 for details - Forestry Circulars)

In total, it is proposed to plant ca. 932 m of riparian habitat. This linear habitat will be planted along a maximum fencing setback of two metres from the river bank using native tree and scrub species (willow, alder, aspen (*Populus tremula*) and birch (*Betula* spp.)) where appropriate. This riparian buffer zone, together with the naturally establishing riparian vegetation, will help act as a sump/filter for any nutrients or sediment from farmland overland surface runoff.

To establish riparian corridor trees, it is recommended that newly planted saplings are planted within a livestock proof fence to protect the watercourse i.e. the arrangement is river > riparian zone > treelines > stockproof fence.

3.5.1 Limerick Development Plan 2022-2028: Biodiversity Objective EH 04 and EH 05

The Limerick County Development Plan 2022-2028 Objectives note the following:

Objective EH 015 Ground Water, Surface Water Protection and River Basin Management Plans

It is an objective of the Council to:

a) Protect ground and surface water resources and to take into account the requirement of the Water Framework Directive when dealing with planning and land use issues.

The creation of 932 m of riparian habitat and an associated river setback aligns with Objective EH 015 by simultaneously reducing and filtering overland flow, improving water quality while providing additional valuable foraging habitat for bats and nesting habitat for birds.

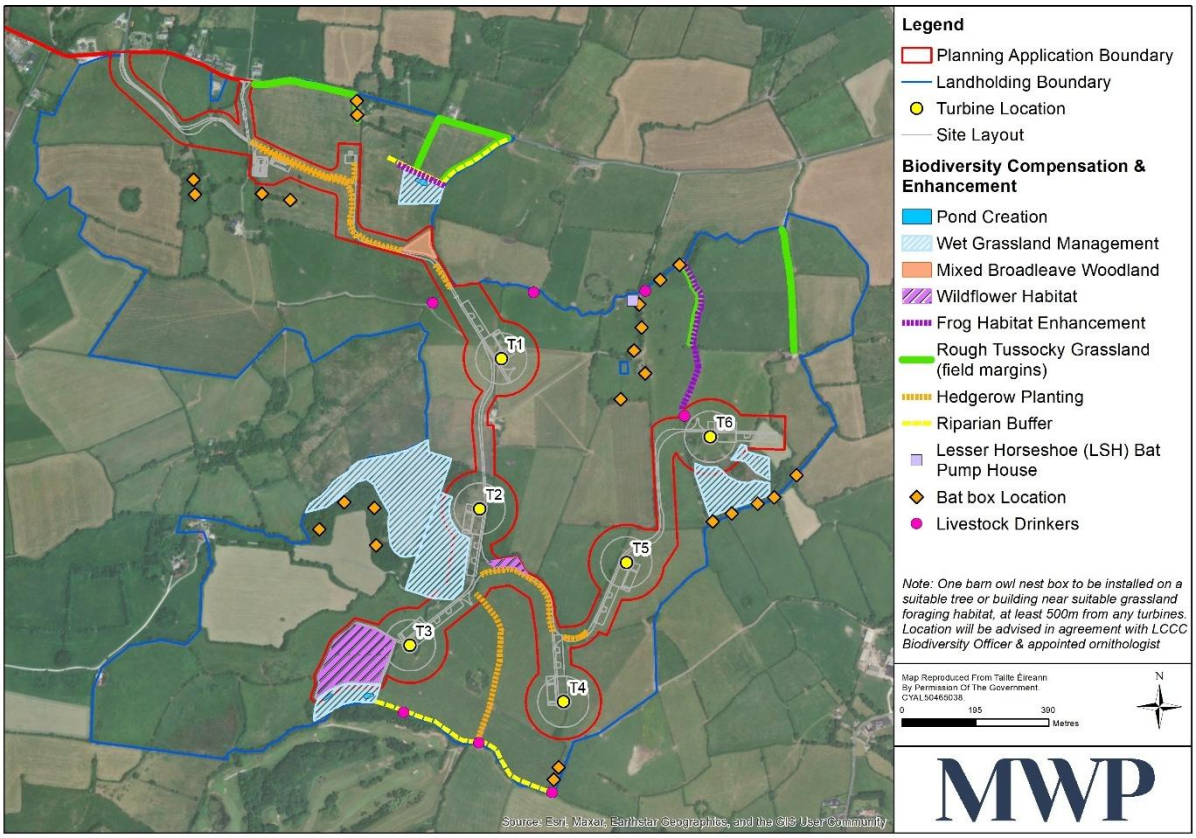

Figure 3-1: Compensation and Enhancement Map.

3.6 Dead Wood

Where tree felling maybe required, trees felled will be stacked in piles to create habitat for small mammals such as pygmy shrew (*Sorex minutus*) and for invertebrates such as beetles. Dead wood creates a damp habitat for invertebrates and their larvae which can be a nutritious food source for birds and mammals. These features will be constructed under ECoW supervision and will be placed in areas where their benefits can be maximised i.e. near trails and suitable habitats.

4 Enhancement

4.1 Wet Grassland Management

There will be a loss of ca. 4.484 ha of wet grassland from within the proposed development site associated with the proposed development of T2 and T6.

This open wet/damp grassy habitat is comprised of a purple moor grass (*Molinia caerulea*) dominated wet grassland (GS4) community type (e.g. purple moor grass – tormentil – creeping bent GL1D, purple moor grass – devils-bit Scabious GL1C, see Perrin 2021; NBDC online IVC database), which is generally unmanaged, grass-dominated, and rank in parts.

Other flora recorded for this wet grassland (GS4) community include occasional soft rush, creeping bent (*Agrostis stolonifera*), carnation sedge (*Carex panicea*), red fescue (*Festuca rubra*), meadowsweet (*Filipendula ulmaria*), tormentil (*Potentialla erecta*), Devil's-bit scabious (*Succisa pratensis*) and, rarely, water mint (*Mentha aquatica*). The moss (*Calliergonella cuspidata*) is frequent, with occasional *Rhytidiadelphus squarrosu*s and *Scleropodium purum* recorded. Further south, purple-loose strife (*Lythrum salicaria*), meadow thistle (*Cirsium dissectum*) and wild angelica (*Angelica sylvestris*) are present (but rare) in the sward.

Good condition wet grassland provides considerable biodiversity value for botanical, invertebrate and bird species. The area is currently grazed by livestock, which impedes the establishment of further wet grassland habitat within the nearby improved grassland.

As noted, the baseline botanical assessment identified the frequency within the sward of the foodplant of the Marsh Fritillary butterfly (Annex II listed), Devil's-bit scabious, located southwest of turbine T2. Consequently, a survey of the field for larval webs of Marsh Fritillary was carried out in September 2023 and again in August 2025. Evidence of larval webs was recorded in three locations within fields 1, 2, and 6 (see extract from **Appendix 6E** Figure 3-1 below). In the field containing proposed T2 and associated access track, the wet grassland to the west was found to support one larval web. Results were comparable between years.

Mitigation has been proposed to safeguard any larval webs encountered during the construction phase of the proposed development within the confines of the construction corridor (see **Chapter 06 Biodiversity**, Section 6.8.3.5).

Wet grassland is also of some value to frogs and of significant value in the process of filtration of sediment run-off from agricultural lands.

The principal aim of this measure is to enhance an area of ca. 10 ha of wet grassland habitat, by maintaining an appropriate level of grazing during the lifetime of the Plan. This will be achieved by following best guidance for the creation of suitable habitat for the Marsh Fritillary butterfly.

Management of retained habitat around T2 and proposed new areas of wet grassland (see **Figure 3-1**, above) will be undertaken to enhance this habitat for Marsh Fritillary, to compensate for any loss of vegetation containing

Devil's-bit scabious that may be required to facilitate the build out of T2 and access track. This should be undertaken by grazing, with the aim of preventing scrub encroachment within areas of wet grassland, and to maintain the overall sward height of the vegetation at 12 to 25 cm tall, such that the habitat improves or continues to be of 'good condition' for Marsh Fritillary. Care should be taken not to permit overgrazing of the fields, as livestock may damage larval webs and their supporting vegetation.

While the management will be focused on grazing levels, no other land use activities will be allowed within the plot, such as insertion of new drains or tracks, or the planting of trees.

Best practice management of grasslands for marsh fritillary is detailed by Byrne & Moran (2018)[16] in '*Lowland Species – Rich Grassland Marsh Fritillary Grassland Habitat Best Practice Guidelines*'.[17]

Figure 4-1: Marsh Fritillary Larval Web Locations

4.2 Livestock Control

Livestock in some fields at the proposed development site currently have access to watercourses at various locations. Animals accessing the Ahacronane River and Riddlestown Stream for drinking water have the potential to damage both in-stream and riparian areas due to riverbed disturbance, defecation, poaching and associated denudation and erosion. This is likely impacting aquatic life quality and negatively affecting water quality primarily via siltation. Watercourses bordered by improved agricultural grassland will be fenced off to prevent livestock access to the watercourses, with cattle drinkers installed (8 No.).

[16] Best practice guidelines from managing lowland species-rich grasslands and marsh fritillary grassland habitat in north-west Ireland. Report prepared for the European Commission, DG Environment, Agreement No. 07.027722/2014/697042/SUB/B2.
[17] (PDF) RBAPS Lowland Species-rich Grassland & Marsh Fritillary Grassland Habitat. Best Practice Guidelines.

Cattle drinkers will be installed at the locations shown in **Figure 3-1** or at additional sites if required by the landowner. There are a range of products available that can utilise stream water for this purpose, from pasture pumps[18] to troughs fitted with pumps connected to solar panels. This measure can be expected to improve bed conditions in these watercourses and increase biodiversity.

4.3 Drain Enhancement for Frogs

A drainage ditch at the proposed development site was found to be used by spawning frog during 2022. At least two lengths of drainage ditch within the site will be slightly deepened at intervals and no further maintenance of these take place during operation stage. Maintenance of drainage ditches can be harmful to breeding frogs through habitat destruction and/or degradation. Drainage from the area south of T6 will be blocked to improve hydrological functioning with respect to wetland requirements.

Translocation efforts will include the capture and removal of frogs, frogspawn, and tadpoles from any affected habitat to the nearest available and suitable habitat. These efforts will be undertaken in advance of construction works commencing. Any works to a frog breeding habitat or works that could affect same will require acquisition of a derogation licence in advance.

4.4 Field Margin Creation / Habitat Enhancement for Barn Owl (*Tyto alba*)

If deployed in conjunction with hedgerows, the introduction of Field Margins extends the wildlife corridor and reduce fragmentation. Insertion of field margins of tussocky grass or wildflowers greatly benefits rural wildlife and provides a valuable soft barrier between agricultural practices and enhancement habitat.

In total ca. 1,748 m of rough tussocky grassland that is at least 4 m wide with a litter layer of dead grass that is at least 7 cm deep will be created predominantly to the north and northeast of the proposed development boundary in proximity to confirmed barn owl (*Tyto alba*) nest locations (to the northeast) and in proximity to riparian habitat and mature hedgerows to the north of the proposed development.

Rough tussocky grassland provides the optimal habitat for small mammals such as voles, and so providing additional areas of such habitat will provide enhancements for barn owls and raptors. Margins will be created in sunny areas next to hedges, ditches, and waterbodies. Areas selected for field margin management are shown in Figure 3.1, above.

When creating rough tussocky grassland a native grass/seed mix should be used which best suits the local conditions, and most closely resembles the original unimproved grassland in the area. Tall, tussock-forming species (e.g. cocksfoot, false-oat and timothy) as well as softer, shorter grasses (e.g. Yorkshire fog, fescue and bent species) are best.

No management during the first year is required as the new grass should be left to grow tall and collapse in the autumn to form the 'litter layer'. Following establishment, areas should be topped or lightly grazed in the autumn every second or third year. There will be complete avoidance of herbicides, and the field margins will be fenced off to prevent grazing.

The creation of field margin habitat for barn owl will follow best practice guidance (Birdwatch Ireland: Barn Owl Information and Conservation Advice booklet[19]; BRIDE Project, 2023[20]).

[18] Pasture Pump with suckler side bowl - O' Donovan Engineering Accessed: 5th July 2025
Pasture pump c/w foot valve & connections | McCabe Feeds Accessed: 5th July 2025
[19] Barn Owl Booklet 210 x 210 (BirdWatch Ireland)
[20] Field Margin – The Bride Project Accessed: 26th August 2025

4.5 Lesser Horseshoe Bat (*Rhinolophus hipposideros*) Pump House

While minimal recordings of Lesser Horseshoe bat were noted during the survey period, the range of the species in Ireland is, for the most part, limited to six western counties – Clare, Cork, Galway, Kerry, Limerick and Mayo. The Vincent Wildlife Trust (VWT) launched the Lesser Horseshoe Bat Conservation Project, an EIP (European Innovation Partnership) that was administered by Mulcair Catchment Ltd which is known as the 'Farm and Community Biodiversity Initiative'. This initiative sought proposals for the development and implementation of actions to enhance local on-farm biodiversity. While acknowledging that all nine Irish bat species are found on farms, the lesser horseshoe bat is likely to be the most dependent on the structures and habitats usually found on agricultural land.

In line with the aims of Lesser Horseshoe Bat Conservation Project, a Lesser Horseshoe bat house will be constructed south of the Ahacronane river, northeast of the proposed development, see Figure 3-2 below for location and Appendix 6D Bat Report for Pump House Design). This location was chosen to complement other measures already proposed for bats in general i.e., the riparian corridor at this location will also be strengthened by planting an adjacent 2m wide strip with the aim of increasing favourability for Lesser Horseshoe bat usage. This measure is one of enhancement only, given the clear lack of records of Lesser Horseshoe bat throughout the survey period. These measures are designed to aid both bats in the locality as well as promoting principles in the Lesser Horseshoe Species Action Plan (VWT, 2022).

Section 4 of the Lesser Horseshoe Species Action plan suggests the following practical measures:

- Section 4.2c incentivise farmers to plant suitable hedgerows habitat creation
- Section 4.2d Promote appropriate planting along watercourses
- Section 4.2f Provide night roosting facilities
- Section 4.3c Implement a programme to enhance landscape connectivity between lesser horseshoe bat roosts and foraging grounds

This enhancement measure aligns with the Limerick City & County Council Biodiversity **Objective EH02**[21] which states that:

It is an objective of the Council to require all developments in areas where there may be Lesser Horseshoe Bats, to submit an ecological assessment of the effects of the development on the species. The assessment shall include mitigation measures to ensure that feeding, roosting or hibernation sites for the species are maintained. The assessment shall also include measures to ensure that landscape features are retained and that the development itself will not cause a barrier or deterrent effect on the species.

In addition to the proposed Lesser Horseshoe pump house, a total of 17 No. bat boxes will also be erected at suitable locations in woodland/treelines within the wider environs of the proposed development.

Bat boxes will be installed and maintained by an Ecologist according to manufacturer's instructions. All boxes installed will be robust and cater for a range of species. Guidance for installation of bat boxes will follow:

- Bat Conservation Ireland (BCI) Guidance Notes for Agri-environmental Schemes (2015)[22]; and
- Bat Mitigation Guidelines for Ireland (Marnell *et al*, 2022).

See **Figure 4-2**, below, for indicative locations of the various bat compensation measures including hedgerow/woodland planting and erection of seventeen bat boxes. Also, refer to **6D Bat Survey Report** in **Volume III** of the EIAR for further details.

[21] Limerick Development Plan 2022 – 2028 – Appendix 6H Limerick Development Plan 2022-2028 | Limerick.ie
[22] BCIrelandGuidelines_BatBoxes.pdf Accessed: 5th July 2025

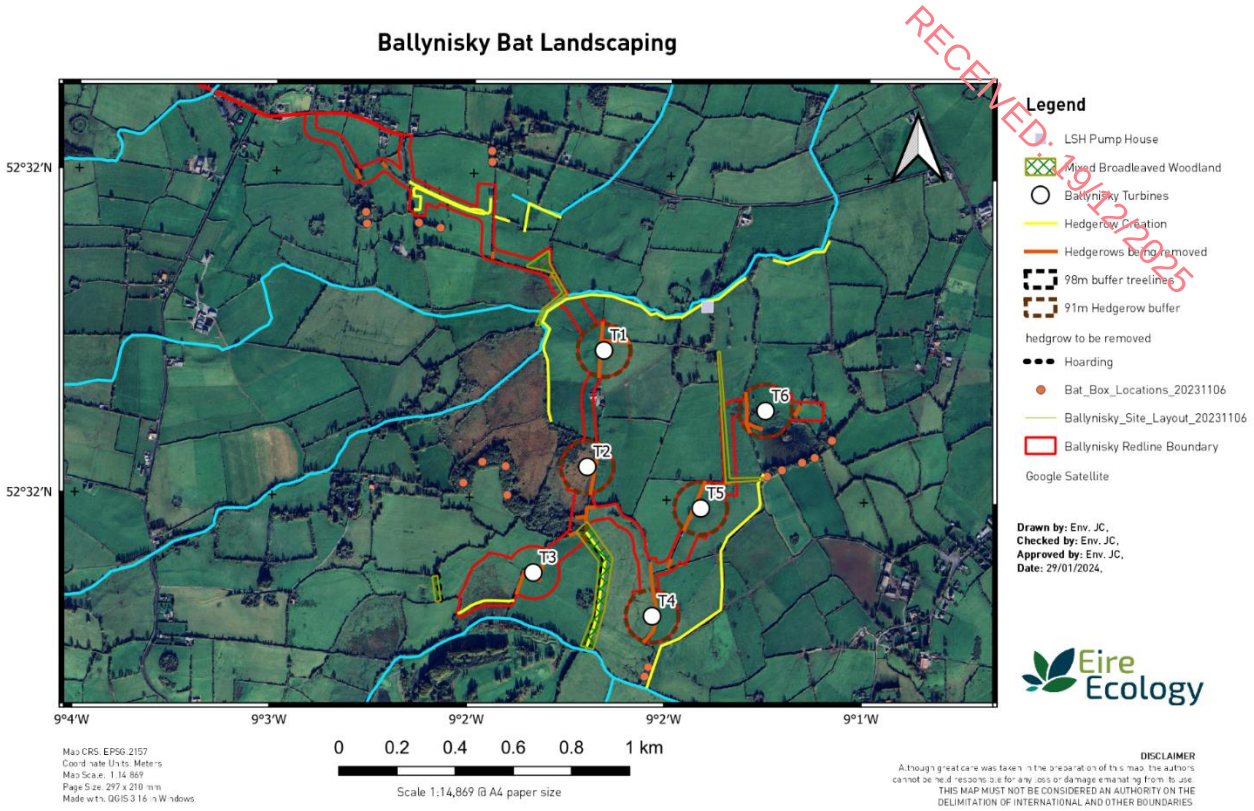

Figure 4-2: Indicative locations of the proposed bat compensation sand enhancement measures [extracted from the Bat Survey Report in Appendix 6D prepared by Eire Ecology].

5 Monitoring and Reporting

Enhancement measures will be monitored for effectiveness over Years 1, 2, 3, 4 and 5 and based on the results, alterations and/or further enhancements will be made. Monitoring thereafter will be every five years for the lifetime of the wind farm.

Following on from this initial period, the BEMP lands will be routinely assessed as part of a programme of habitat surveys carried out in line with the BEMP to be discussed and agreed with Limerick City & County Council Biodiversity officer.

A report detailing the works carried out and associated monitoring will be prepared in each monitoring year of the plan. The report will include a review of the success of the planting and enhancement schemes along with any suggestions for amendments to the BEMP (if required). Reports will be submitted to Limerick City and County Council for review.

Note that this BEMP should be considered as a live document to be reviewed and modified as required, pending submission to and approval by Limerick City and County Council.

Implementing and managing the plan will be the responsibility of the wind farm operator. It is the wind farm operator's obligation to uphold the measures included in this management plan, to be accountable for the maintenance of the habitats that will be created and monitoring of the species as specified in **Chapter 6: Biodiversity**, Section 6.10. and **Chapter 7: Ornithology**, Section 7.7.3.1.

6 References

Fossitt, J. A. (2000). *A Guide to Habitats in Ireland*. The Heritage Council of Ireland, Kilkenny.

Gilbert, O.L. and Anderson, P. (1998). *Habitat creation and repair*. Oxford University Press.

Marnell, F., Kelleher, C. and Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.