Letter Wind Farm

Habitat Management Plan (HMP)

Doherty Environmental Consultants Ltd.

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Letter Wind Farm

Habitat Management Plan

Document Stage	Document Version	Prepared by
Draft	Final	Pat Doherty MSc, MCIEEM

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1 Introduction

Doherty Environmental Consultants (DEC) Ltd. have been commissioned by Letter Windfarm Ltd. to prepare a Habitat Management Plan (HMP) for the proposed Letter Wind Farm.

This HMP has been prepared for lands located within the boundary of the Letter Wind Farm site. The location of wind farm is shown on Figure 1.1, whilst Figure 1.2 provides an aerial view of the site.

The land holding occurring within the proposed wind farm site amounts to c. 45 hectares. The lands subject to measures set out within this HMP will comprise:

1. all areas of peatland and wet grassland habitat occurring on peat substrate at or above the c.220m contour line;
2. areas of conifer plantation on peat substrate that will be felled as part of the proposed wind farm development;
3. and all lands occurring on peat substrate above the c. 220m contour that form part of the temporary wind farm infrastructure.

The extent of the above areas that will form part of the lands targeted under this HMP is shown on Figure 1.3. The lands associated with item 1 and 2 above amount to approximately 17.7ha and are labelled as HMP Lands (outside WF Layout) on Figure 1.3 below. The lands associated with item 3 amounts to approximately 1ha and are labelled as HMP Lands (WF Temp Layout) on Figure 1.3 below.

The 220m contour is used as a broad boundary to delineate areas within the wind farm site landholding that are within and outside the lands subject to this HMP. A fence line occurs at this approximate contour height, with lands to the south of this fence line having been subject to more intensive agricultural management with thin peat deposits or mineral soils supporting species-poor grassland habitat. The lands to the north are blanketed in peat substrate of varying depth.

The lands subject to this HMP will be managed throughout the lifetime of the wind farm with a view to improving biodiversity throughout the site and managing Annex 1 peatland habitats. It is noted that none of the lands currently included in the c.45 ha of the wind farm site landholding or the c. 18.7ha of the lands subject to this HMP are managed under any nature conservation schemes, and thus there are no restrictions

to land management practises, which is evident throughout the wind farm site. The implementation of this HMP as part of the overall Letter Wind Farm project provides an opportunity to manage and conserve the peatland and grassland habitats occurring within the lands subject to this HMP for the lifetime of the project.

The wind farm operator will, throughout the lifetime of the wind farm, confirm the implementation of the actions specified within the HMP. Pursuant to the terms and conditions of the lease agreements on site, the landowners must comply with all necessary actions and precautions required by the wind farm operator for the implementation of this HMP.

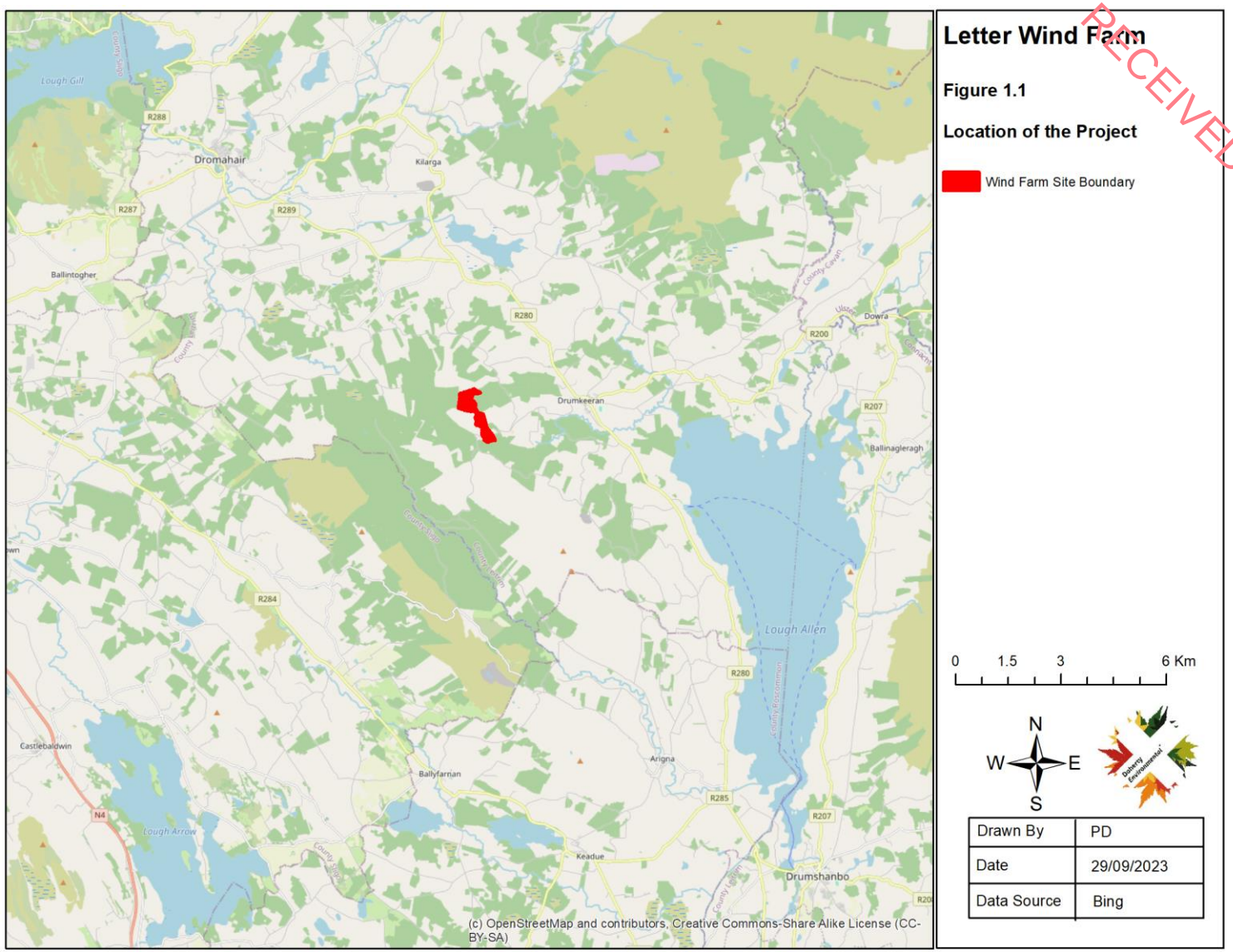

Figure 1.1: Location of the Site

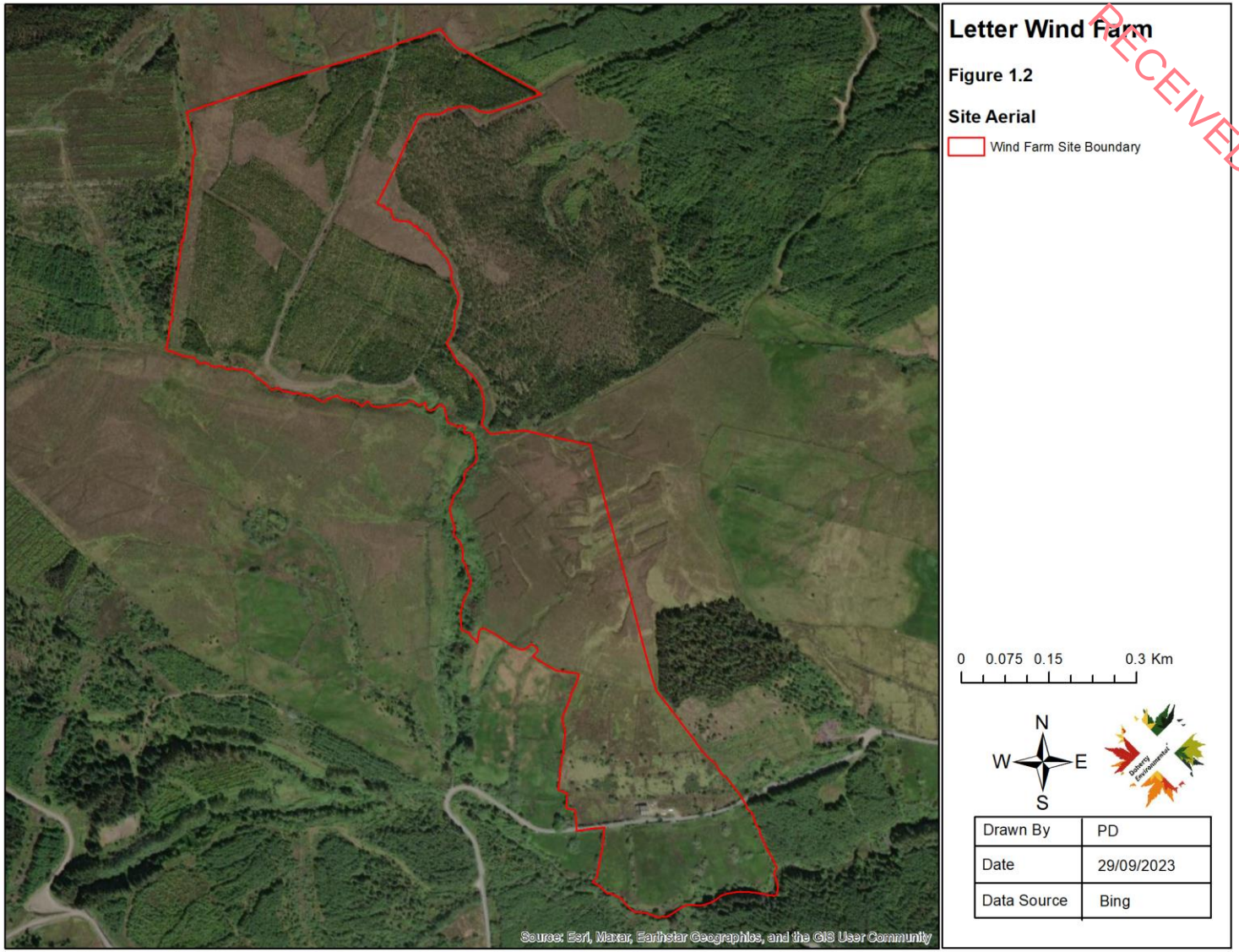

Figure 1.2: Aerial Imagery of the Site

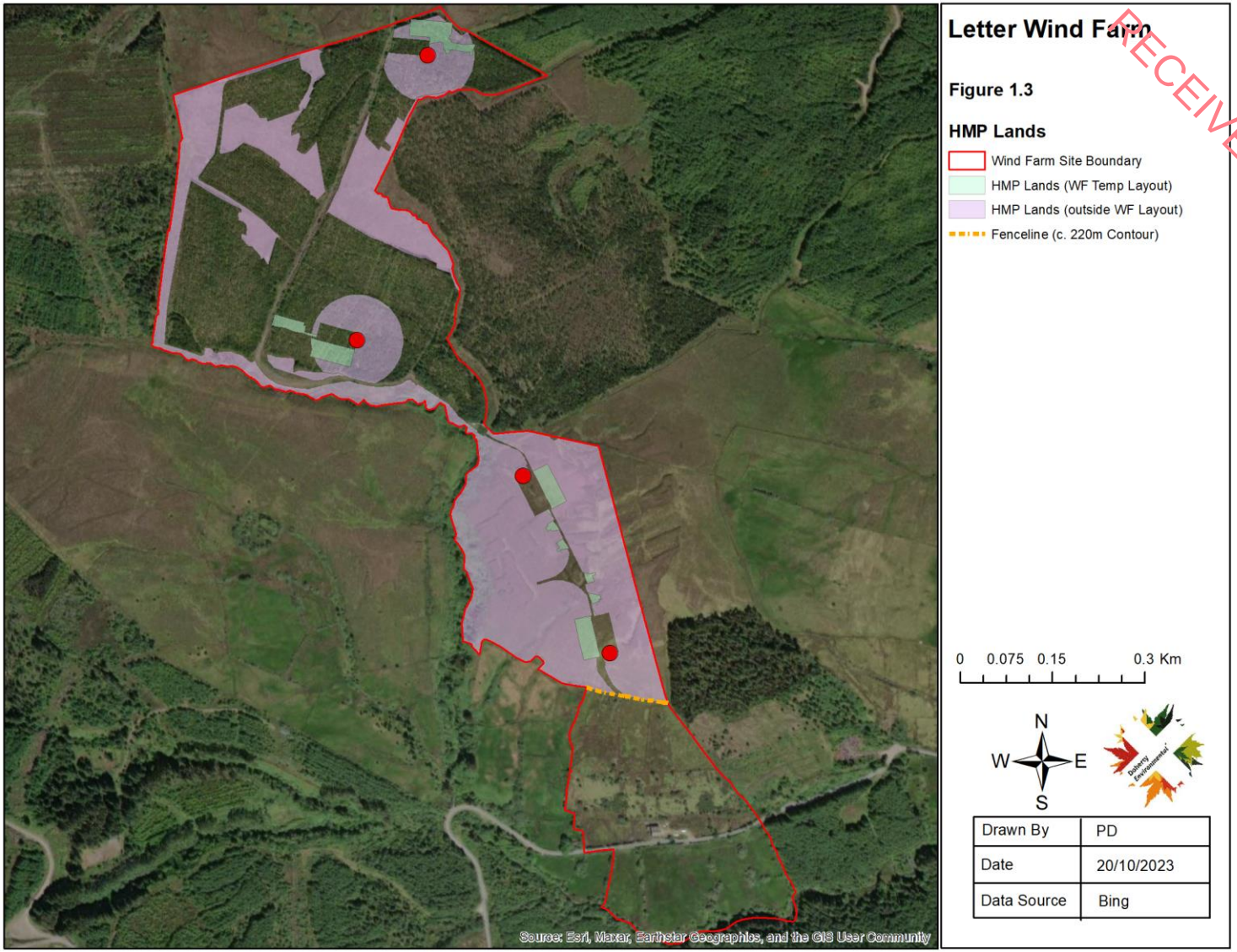

Figure 1.3: Habitat Management Plan Lands

2 Purpose of the HMP

The purpose of this HMP is to provide detailed descriptions of the locations, methods and activities of habitat restoration and enhancement that will:

(a) restore and enhance areas of degraded blanket bog outside of the windfarm footprint but on land within the control of Letter Wind Farm Ltd. These areas are shown on Figure 1.3 above and labelled as HMP Lands (outside WF Layout); and

(b) reinstate peatland habitats around infrastructure elements of the proposed Letter Wind Farm development. These areas are shown on Figure 1.3 above and labelled as HMP Lands (WF Temp Layout).

In order for this HMP to be meaningful, the aims and objectives of habitat restoration and management for each part of the site are described. This is necessary to:

(a) make sure that expectation levels for the quality of legacy habitat are realistic; and

(b) ensure that post habitat restoration monitoring is adequately prescribed.

3 Scope of HMP

The HMP sets out the following:

1. detailed methodology and prescriptions of habitat management measures, including timescales and with defined criteria for the success of the measures;
2. details of the production of regular monitoring reports to be submitted to the Planning Authority at years 1, 3, 5, 10, 15, 20, 25 and 30 which will include details of contingency measures should monitoring reveal unfavourable results.
3. details of regular monitoring of habitat management measures using fixed quadrat locations;
4. appropriate maps, clearly identifying habitat management areas;

4 Description of HMP Lands

4.1 Location Overview

The proposed wind farm Site is located within a cutaway peatland landscape near the Corry Mountains, Co. Leitrim. The Site is located approximately 2.9km west of Drumkeeran Village, Co. Leitrim and approximately 21km southeast of Sligo Town. The Site is located within the townlands of Letter, Boleybaun and Stangaun.

4.2 Topography

The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between c. 170 to 260 metres above datum (mAOD). The site can be broken up into two sections, the north-western section is mostly forestry and has elevations around 250-260mAOD, the south-eastern section is mostly peatland and ranges from 170 – 240mAOD.

4.3 Soils & Geology

The Site consists of lands characterised as blanket bog peatland that has been subject to turbary, mature forestry and areas of semi-improved grassland. Superficial soils, consisting of blanket peat are recorded to mantle the majority of Letter Wind Farm and have been confirmed during fieldwork to be the case at all significant infrastructure. Underlying mineral soils are consistent with tills derived from Namurian Shales recorded in the vicinity, where blanket peat is absent.

Preliminary ground investigation data records that peat is underlain by a natural sequence of glacial soils overlying shale rock. Intact bedrock was encountered during the intrusive investigations at proposed Turbine T1, approximately 2.80m below existing ground level.

Land in the vicinity of the proposed Letter Wind Farm site is predominantly underlain by the Dergvone Shale Formation. The Dergvone Shale Formation contains four main shale facies, arranged in rhythmical order; primarily a dark pyritic, sometimes calcareous shale. In the northern portion of the site the forestry roads have been constructed using this shale rock recovered from existing borrow pits located on site.

The Carraun Shale Formation underlies the Deryvone Formation. This formation consists of grey black shale with minor limestone. The Bricklieve Limestone Formation, consisting of bioclastic cherty limestone is recorded in GSI online mapping to be the

uppermost sequence approximately 3km west of the site. This formation is potentially present at significant depth below Letter Wind Farm.

Consultation with the Geological Survey of Ireland indicates that there are no active quarries within a 5 km radius of the proposed site. Kerrigan Quarries, a limestone quarry supplying a range of crushed stone, sand and chippings, ready-mix concrete and concrete blocks, is located approximately 6km north of the proposed site.

The closest recorded shafts or adits pertain to historic coal mining approximately 4km to the south-west of the site.

4.4 Hydrology

The Site is characterised by a network of non-mapped natural and artificial drainage channels which are often found in forestry plantations and peat turbary areas. Commercial forestry inherently possesses extensive drainage networks. Historic peat cutting activities have left drains present on the site. These can be categorised as both non-mapped significant drains (which feed into the mapped river for example) and minor drains. While some drains were generally dry during site visits, the Site is considered to have a flashy regime with low permeability soils and standing water in some areas. A flashy regime is where intense rainfall periods will raise the levels of the rivers significantly as the groundwater recharge will reach capacity quickly.

The Letter Wind Farm Site and the southern part of the and Grid Connection Route are situated within the Upper Shannon Catchment (ID:26A; Area: 604.47km^2). The Northern part of the and Grid Connection Route is situated in the Sligo Bay Catchment (ID:35, Area: 1605.94km^2). The Turbine Delivery Route passes through the Donegal Bay North Catchment (ID:37, Area: 807km^2), the Erne Catchment (ID:36, Area: 3440.55km^2) the Sligo Bay Catchment (ID:35, Area: 1605.94km2), the Upper Shannon Catchment (ID:26B, Area: 674.13km^2), the Upper Shannon Catchment (ID:26; Area: 604.47km^2) near the red line boundary of the Site.

Surface water runoff associated with the Site drains into two sub catchments and/or three river sub basins, or three no. rivers, 1 no. lough:

- Sub Catchment: Owengar (Leitrim)_SC_10, River Sub Basins: Owengar (Leitrim)_SC_010 and Diffagher_10, Rivers: Owengar (Leirtim)_010, Owengar (Leitrim)_020, Diffagher_010

- Sub Catchment: Shannon Upper_SC_020; River Sub Basin: Shannon Upper_040, Lough: Lough Allen

All of the above sub-catchments are located within the Upper Shannon catchment (Catchment ID26A). The surface waters draining from the Site eventually combine into Lough Allen, from which waters eventually flow to the Upper Shannon, Lough Corry, Tap North and Lough Boderg, Lough Forbes, Lough Ree, the Lower Shannon, Lough Derg, and Shannon Estuary through to the mouth of the Shannon and into the Southwestern Atlantic Seaboard.

The WFD status (2016-2021) for surface water bodies / rivers and streams directly draining the Site range are Good.

4.5 Biodiversity

4.5.1 Habitats

The habitats occurring within the project site are dominated by conifer plantation and previously cutover blanket bog to the north. Moving south through the site peat depths decrease and blanket bog gives way to wet heath, which in turn gives way to semi-improved agricultural grassland. The upper Owengar River, which is characterised as an upland eroding stream, flows along the boundary of the wind farm site and is crossed at one location by the proposed access track. Other linear habitats in the form of hedgerows occur to the south of the site in conjunction with semi-improved grassland field boundaries. A Habitat Map of the proposed wind farm site is provided as Figure 4.1.

4.5.1.1 Current Site & Peatland Condition

As noted above the Letter Wind Farm site consists of a hill topography that slopes to the south. The upper section of the wind farm site, above the c. 230m contour line, is clothed in blanket peat of varying depths that is representative of degraded and cutover blanket bog as well as wet heath. The majority of the site has been subjected to drainage and peat cutting in the past. Forestry drainage has occurred to the north under existing stands of conifer plantation. Pockets of unplanted deeper blanket bog remain amongst the conifer plantations. There are areas of historic hand cut peat across the entire site, stretching from the conifer plantation in the north to the grassland habitat to the south.

The degraded nature of the underlying peat is evident from the results of Von Post field testing at the proposed turbine locations, with values ranging from H5 to H7 which is the upper end of the Von Post peat humification scale indicating higher levels of decomposition and aeration.

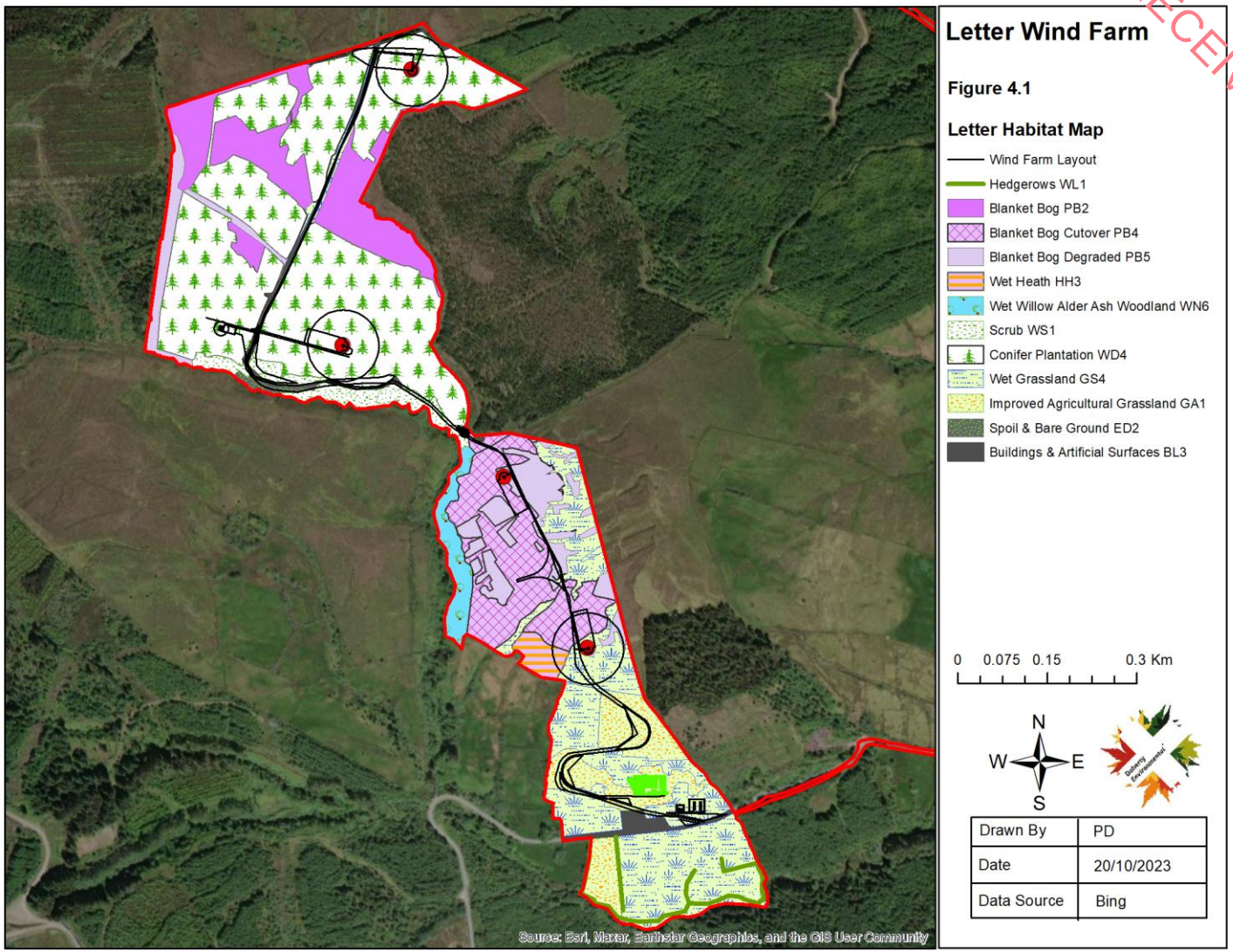

Figure 4.1: Letter WF Habitat Map

4.5.2 Non-volant mammals

Irish hare was observed at the proposed wind farm site during field surveys and evidence indicating the presence of red deer was also observed. No evidence indicating the presence of badgers was observed during field surveys.

No otter holts or couches were observed along the Owengar River draining the proposed wind farm site. The Owengar River downstream of the project site provides suitable foraging habitat for otters. No otter activity was recorded along this stretch of the river during field surveys.

4.5.3 Bat Species

In general, the landscape that the development is a part of, is of low to moderate suitability for bats where the turbines are located in the upland areas. The landscape is of moderate to high suitability for bats where the turbines are located in the lowland agricultural areas.

Eight species of bats have been recorded as present at the development during the bat surveys. All are listed as 'Least Concern' on the Irish Red List, and Annex IV of the EU Habitats Directive.

No lesser horseshoe bats have been recorded at the project Site and the project Site is located outside of the known distribution range of this species in Ireland.

4.5.4 Bird Species

Bird surveys completed for the proposed Site recorded a total of 4 target species, one of which, namely hen harrier, is considered to be an ecologically sensitive species with respect to wind farm (Percival, 2003); two of which are Red-list status under the BoCCI (Gilbert et al., 2021), namely kestrel and snipe; and one of which, namely buzzard, is of low conservation concern.

During bird surveys no hen harrier roost was observed but suitable habitat exists on and near the Site. During breeding wader surveys, no waders were observed breeding on Site.

Table 3.2 lists the bird species that have been identified as key ornithological receptors for the assessment of ornithological impacts (see **Chapter 7: Ornithology**). The sensitivity of species as outlined on **Table 3.2** are as per Percival (2003).

Table 4.2: Key Ornithological Receptors

Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
None Recorded: Any bird species that were recorded during bird surveys that are listed as special conservation interests of SPA are not considered to form part of an SPA population.	Hen harrier	Kestrel Snipe	Buzzard

4.5.5 Invertebrates

There are records held for the presence of marsh fritillary near the northern end of Lough Allen within the hectad G92 approximately, approximately 8km to the east of the proposed wind farm site.

A dedicated survey examining the suitability of the site for supporting marsh fritillary was completed during baseline surveys between 2020 and 2023. The presence of the marsh fritillary larvae foodplant *Succisa pratensis* is rare on site and the site is not considered to offer suitable habitat for this species. Where *Succisa pratensis* does occur, it was searched during the autumn (September 2020; 2021 & 2023) for the presence of marsh fritillary larvae. No larvae were found during such searches.

4.5.6 Aquatic Fauna

The Owengar River and the Diffagher River are the principal watercourses draining the wind farm site. The Diffagher River is a salmonid watercourse with its upper reaches traditionally supporting important wild brown trout spawning grounds whilst its lower reaches are trout nursery areas. The fish stocks of the Diffagher River were affected by the landslide near its source at Greaghnaglogh in June 2020. The Owengar River is known to support stocks of brown trout.

The Owengar River draining the wind farm site is representative of a high-energy eroding small stream with cascading sequences flowing over siliceous rock. The meandering channel is dominated by small boulder substrata with large cobble. The cobble is characterised by a more slate-like form which was largely unstable. The channel is 0.5m to 0.75m wide. The channel is shallow at 0.2m deep with the deepest areas c. 0.3m. The stream flows through a steep V-shaped valley with a bankful height of 2.5-3m. The instream river habitat is dominated by fast riffle with occasional glide and pools.

The upper reaches of the Owengar flowing through the wind farm site offers poor trout nursey habitat given the shallow, small nature of the channel. The high energy upland environment and dominance of large substrata reduces the spawning value of this stretch of the river to poor. Localised pockets of coarse gravel may provide some spawning habitat for trout. Recent fisheries surveys of the upper Owengar River (to the southwest of the proposed turbine T4) recorded an absence of salmonids along this stretch of the river. There is a general absence of suitable pool holding habitat along the upper stretch of the river. The river is of no importance for lamprey species and is of low potential habitat value for European eel.

Fisheries habitat further downstream along the Owengar improves from low to moderate with riffle habitat occurring along a stream substrate characterised by boulder, cobble and coarse gravel. Recent fisheries surveys completed along this section of the Owengar recorded an absence of Atlantic salmon with only brown trout being recorded.

No field signs indicating the presence of otters were recorded along the Upper stretches of the Owengar River flows through the wind farm site and downstream of the wind farm site. Similarly, no field signs indicating the presence of otter were recorded along the Diffagher River downstream of the project site. The upper stretches of both watercourses in the vicinity of the offer sub-optimal foraging habitat for otters. Notwithstanding this both watercourses offer suitable commuting habitat for otters.

4.6 HMP Target Habitats

The HMP target habitats, that occur outside the footprint of the proposed wind farm layout include all peatland and heathland habitats occurring within the wind farm site, excluding the areas of conifer plantation that will remain in-situ following the construction of the wind farm site. In addition, areas of wet grassland, wet willow-alder-

ash woodland, scrub and spoil and bare ground along the upper Owengar River will also be targeted for action under this HMP. The extent of each of these habitats occurring within the HMP Land Holding are outlined in Table 4.1 below.

Measures in the HMP will be specified for the target habitats and those specific to different types of peatlands (i.e. lowland blanket bog, cutover blanket bog habitat etc.) will be clearly specified. A description of the measures to be applied to these target habitats is provided under Table 4.1 below.

The HMP targets for the lands and existing habitat occurring under the footprint of the proposed wind farm temporary infrastructure are set out in Table 4.2 below.

Project design and construction phase management measures to protect eroding upland rivers are also specified in Section 4.3 of this HMP.

Table 4.1: Extent of Target Habitats (polygons) occurring within the HMP Lands

Existing Habitat Type	Area (Ha)	Overview of Habitat Enhancement
Blanket bog PB2	4.25	• Ditch blocking of drainage ditches No grazing
Cutover blanket bog PB4	3.55	• Ditch blocking of drainage ditches. Remove cattle grazing. Sheep only grazing at a livestock unit (LU) rate of 0.25 Lu/Ha • Re-seed with *Eriophorum* seed where bare peat is present. *Sphagnum* inoculation where bare peat is present. • Overseeding with *Calluna* brash or seed to thicken up the proportion of *Calluna* in the sward.

Existing Habitat Type	Area (Ha)	Overview of Habitat Enhancement
Degraded blanket bog PB5	2.65	Remove cattle grazing. Sheep only grazing at a livestock unit (LU) rate of 0.25 Lu/Ha • Re-seed with *Eriophorum* seed where bare peat is present. Sphagnum inoculation where bare peat is present • Overseeding with *Calluna* brash or seed to thicken up the proportion of *Calluna* in the sward.
Wet heath HH3	0.44	Grazing control
Wet Grassland	2.3	• Ditch blocking of drainage ditches
Wet willow-alder-ash woodland	0.97	Grazing Restriction
Scrub	1.1	Grazing Restriction
Conifer plantation	2.33	• Ditch blocking of drainage ditches. Forestry Brash Removal • Re-seed with *Eriophorum* seed where bare peat is present. Sphagnum inoculation where bare peat is present.
Spoil & Bare Ground	0.11	Native species tree planting
Total Area	**17.7**	

Table 4.2: Target Areas for Habitats

Existing Habitat Type	Area (Ha)	Overview of Habitat Enhancement
Blanket bog Cutover	0.21	Restore to wet heath/blanket bog depending on post construction peat depth
Blanket bog Degraded	0.21	Restore to wet heath/blanket bog depending on post construction peat depth
Conifer plantation	0.6	Restore to wet heath/blanket bog depending on post construction peat depth
Wet grassland	0.05	Restore to wet heath
Wet heath	0.01	Restore to wet heath
Total Area	**1.1**	

5 Habitat Restoration & Enhancement

In addition to prescribing methods for restoring peatland vegetation around infrastructure after construction (as per Table 4.2 above), this HMP discusses three main habitat enhancement and management activities, based on our inspections and assessment of bog and heathland conditions during the baseline surveys, as follows:

- Ditch blocking to raise water table levels.
- Overseeding areas of degraded and bare peat, using locally collected heather brash or seed from areas of cutover blanket bog where the heather is mature to over-mature; and
- Landowner agreements on stock removal/management and to avoid damaging land management practices.

Each of the above activities is described in more detail below, after a description of general good working practices which will be followed throughout all works and phases of the development.

5.1 Good Working Practices During Construction and Habitat Restoration

During construction and habitat restoration works a number of good working practices are proposed, to make sure that areas which are to be protected are not damaged during habitat restoration of other parts of the HMP lands and to ensure that the measures in this HMP are correctly implemented. The following sections describe standard good working measures which will be implemented as part of the development's habitat restoration works.

5.1.1 Ecological Clerk of Works

An Ecological Clerk of Works (ECoW) will be appointed to supervise the works and to ensure that more valuable areas are protected and avoided during the construction phase to ensure that habitat restoration and enhancement activities are implemented as planned, and to advise on any environmental or ecological aspect of the works. The ECoW will inspect habitat and ditches/water courses during the habitat restoration works and will be in charge of water quality monitoring throughout. The ECoW will be the first point of contact with the NPWS if required. A full description of the role and responsibilities of the ECoW is provided below under Section 7.

5.1.2 Access and egress

The existing site entrance at the south of the site will be used to access the site and the existing access track will be upgraded and widened and used for access and egress during the construction and operational phase. The track will be left *in situ* after habitat restoration.

The route of the access track will provide a designated controlled route for vehicles and plant and a permissible construction corridor will be designated within which vehicles and plant can operate during the construction works. This corridor will be marked with temporary fencing. The purpose of the controlled construction corridor is to prevent unnecessary vehicle and plant trafficking across parts of the site that support valuable (priority and non-priority Annex 1) habitats that are to be protected.

5.1.3 Laydown and temporary storage of materials

Laydown and temporary storage of materials will take place only within designated areas (which are generally on constructed hard stands, access tracks, etc.). There will be no laydown of any type of materials without first consulting with the ECoW.

Both access and egress routes and laydown of materials will take place only within the construction corridor around the infrastructure footprint and at the temporary construction compound.

5.2 Habitat Restoration and Enhancement

For the purposes of this HMP, the terms ‘habitat restoration’ and ‘habitat enhancement’ will be used in a specific manner, as follows:

Habitat restoration is used for restoring areas of vegetation that have been impacted by wind farm construction activities, such as the restoration of vegetation in areas of temporary wind farm infrastructure and along access track verges and around hardstandings.

Habitat enhancement is a benefit of the development, and this term is used for activities that are designed to improve the quality of existing degraded habitats on land that is within the control of Letter Wind Farm Ltd. Habitat enhancement principally targets the blanket bog and heathland communities that have been degraded or damaged by past land management activities. At the wind farm site these damaging activities are: drainage, peat cutting, conifer plantation, stock grazing and dunging.

5.3 Restoration of vegetation around the development footprint after construction

In all areas where vegetation is stripped ahead of the construction of access tracks, turbine bases, crane hard standings, and cabling for the Letter Wind Farm, there is the need to restore vegetation after the construction activities have been completed. The prime aim of the restoration of vegetation within the wind farm footprint is to re-vegetate bare soil and peaty surface soils to stabilise them, prevent erosion and to reinstate peatland or heathland vegetation.

5.3.1 Methods of peatland Vegetation Restoration

Peatland vegetation cover around the construction footprint will be restored by re-turfing with intact vegetated peat turves, saved at the time of turf stripping. If required, for example if there are areas of bare peat, this can be supplemented by over-seeding using locally collected heather brash or heather seed. The decision on where overseeding of re-turved peatland areas might provide useful enhancement will be made by the ECoW once the initial turf replacement has been completed.

Careful stripping and replacement of turf is usually the best option for restoring around infrastructure because it permits restoration of a near full range of plant community species and possibly elements of the invertebrate fauna. It may also produce more rapid results as it largely involves vegetative regrowth of established plants. The quality of vegetation restoration depends very much on the quality of turf storage and the care taken during the replacement of turves.

Four main activities will be carried out to ensure that the restoration is effective, and that vegetation is restored as quickly as possible. These are:

- Careful stripping of vegetation turves;
- Storage of intact turves close to their point of origin for as short a period of time as possible;
- Careful reinstatement of turves, with additional heather seeding where suitable; and
- Monitoring of reinstated vegetation.

Each activity is described in more detail below. Monitoring is described in Section 6.

5.3.2 Careful Stripping of Vegetation Turf

Ahead of the construction of turbine bases and cut sections of access tracks, the vegetation will be stripped in intact turves, ideally in large sections using plant such as the bucket of a tracked excavator. The turves shall be large in area (ideally around 0.5m x0.5m) and as deep as the surface soil organic horizon (peat), but not less than 30cm to ensure that the turves stay moist and intact during handling and storage. This will also assist their successful reinstatement. To ensure careful work, it is proposed that an experienced driver is used for this task and that all drivers are trained to meet this requirement.

For the excavation of cable trenches, the method for turf stripping and peat excavation will ensure that sections of cable trench (e.g., 500m sections) are excavated, laid and restored as quickly as possible and that the cable trench is not left open across the site and restored in one activity. This will allow the most rapid reinstatement of peatland (and other) vegetation and will prevent drying out of both the stored turves and areas of vegetation adjacent to the trench.

5.3.3 Storage of intact turves

Stripped turves shall be stored as close to their point of origin and for as short a period of time as possible. In the case of turbine bases this is likely to be of the order of weeks, but for cable trenches it will be in the order of days.

Locations chosen for the storage of vegetated peat turves shall be located away from any areas of target peatland habitat (blanket bog habitats and wet heath as indicated on Figures 4.1 above, within the Letter Wind Farm site boundary, as agreed by the ECoW. Turf storage areas will be designated in advance and contained so that no soil erosion can runoff the storage area. The method of storage will be such that:

(a) turf stripped from areas of lowland blanket bog; cutover blanket bog; degraded blanket bog; or wet heath and associated mosaic habitats is stored vegetation side up to a maximum of two turf heights, and

(b) turves stripped from areas where the vegetation has been degraded by overgrazing, which are likely to be less intact and more easily broken up, are more carefully stripped, transported and stored, vegetation side up, to no greater than two turf layers high. Turf storage areas shall be managed so that the turves can be deposited and lifted with minimal impact on underlying vegetation.

To ensure good conservation and to retain moisture status of turves during storage, particularly in dry weather when desiccation can occur rapidly, they may require periodic watering, or they will be covered (plastic sheeting) as determined by the ECoW, particularly if storage includes any longer spells of hot, sunny and windy weather.

5.3.4 Habitat restoration using stored turves

The aim will be to restore habitat around all construction areas to their original vegetation type using stored turves initially stripped from these areas.

Where the access track is constructed as a 'cut' track, it will be ensured that the access track verges and the cable trench will be constructed in such a way as to minimize the disturbance of stripped vegetation and excavated peat. This approach will involve vegetation restoration on the road verge and over the cable trench as a single process after all the construction work has been completed.

Habitat restoration around batters of turbine bases, crane hardstandings and sections of cut access track will be achieved by

(a) ensuring sufficiently shallow batter gradients to prevent peat or soil erosion;

(b) careful levelling and firming of subsoil to the correct density to minimise the risk of uneven settlement; and

(c) by careful replacement of turves, butted close together and well tamped into place, so that they will not easily erode. Any unavoidable gaps shall be filled with loose peat and well tamped.

The quality of restored areas will be checked by the ECoW immediately after completion to confirm that turf reinstatement has been carried out correctly. Subsequent checks and monitoring of restored areas are described in Section 6.

Should there be a requirement to dress batters with stored peat and/or mineral soil in addition to peat turves; the stored peat and/or mineral soil will be replaced first in a layer, with peat typically of approximately 0.3-0.5m, well tamped into place and levelled in order to reduce the potential for peat erosion. Peat turves will then be carefully placed on top, closely butted, and further tamped into place. The peat and turf replacement process will be carried out as one activity and in no case will any replaced loose peat be left as an exposed layer without turf cover, unless under the guidance of the on-site ECoW. In such cases, revegetation of bare peat will be according to the methods to reseed using heather brash or seed, outlined in Section 5.4.3.

Habitat restoration of cable trenches will be completed as soon as sections of trench, 500m long, are completed and backfilled. To ensure successful restoration of vegetation along cable trenches, and to ensure that trenches do not become routes of preferential flow for drainage waters, trenches will be designed with cross dams and backfilling and re-turfing will take place immediately after cables have been laid. Appropriate scale plant will be used for these activities to minimise as much as possible the trafficking of adjacent peat.

Should areas of replaced turf require overseeding to thicken up vegetation regeneration, the method will follow that described in Section 5.4.3 below.

5.4 Habitat Enhancement

5.4.1 Introduction

A number of agricultural land management practices have damaged and caused the degradation of both blanket bog and heathland habitats at the Letter Wind farm site and blanket bog habitat occurring at the wind farm site. In addition to preventing the occurrence of these damaging management practices in the future, there are a number of habitat enhancement and improvement activities that will be implemented as part of the HMP.

Letter Windfarm Ltd. will work with the current landowners to manage areas of blanket bog and heathland within the wind farm site so as to return it to good conservation status for at least the lifetime of the Letter Wind Farm Development, which is predicted to be at least 40 years.

The techniques for habitat enhancement and improvement that will be implemented will comprise:

- **Ditch blocking.** Opportunities for blocking drainage features resulting in water loss from peatland habitats have been identified within the wind farm site. The blocking of ditches will reinstate higher water table levels which would have been present before artificial drainage and peat cutting.
- **Reinstatement of blanket bog vegetation community.** Areas of degraded blanket bog, badly damaged through drainage, mechanical peat cutting, and compaction caused by heavy vehicle trafficking, are targeted for reinstatement.
- **Control stock grazing.** Letter Windfarm Ltd. will work with landowners to improve general land management and grazing regimes, particularly within areas of blanket bog habitat.

- **Fencing.** Fencing will be provided both during the construction and decommissioning phase and the operation phase of the wind farm site to promote peatland restoration and ongoing management.
- **Agreements with landowners** to prevent any ongoing damaging land management practices.

5.4.2 Ditch blocking and infilling

Opportunities for blocking drainage features resulting in water loss from peatland habitats have been identified within both the proposed wind farm site. Areas where water loss from blanket bog habitat is occurring either through artificial drainage ditches, erosion gullies or peat cuttings have been identified during a review of orthophotography, satellite imagery and site walkover surveys undertaken between August 2020 and November 2022. Blocking these features will have the potential to reinstate a high-water table and promote rewetting of blanket bog occurring within the proposed wind farm site.

The drainage and seepage features shown in Figure 5.1 are artificial and/or a result of erosion brought about from excessive grazing and are causing water loss from peatland habitats. The drainage features that will be selected to be blocked include artificial drainage ditches, informal drainage channels that have become established along the base of cut peat face banks and drainage pathways through peat cutting on sloping ground.

It is predicted that, with the blocking of these drainage features the water table in the surrounding area will rise and promote optimal conditions for the maintenance and enhancement of peatland habitats.

5.4.2.1 Methodology of Ditch Blocking

Ditch blocking has been shown in numerous studies to be a highly effective method of raising water tables as a pre-cursor to blanket bog restoration. See, for example, Armstrong *et al.* (2009a) who review the results of 32 ditch blocking programmes in England and Scotland and also provide a drain-blocking best practice guide which advises on methodology (Armstrong *et al.,* 2009b). Typical methods for ditch blocking involve the use of plastic or wooden piling, often accompanied by infilling/backfilling the blocked ditch with peat or heather bales. In some places, for example areas where drainage ditches intercept mineral substrate below, stone dams have been used.

A number of techniques can be used for ditch blocking. These include the use of decomposed peat and the creation of “wave dams” or the use of plastic sheet piling; coir roles or netting. Peat turves are often the most widely used method for damming drainage ditches, since turves are available on site and the method is cheap. The wave damming approach using decomposed peat either side of drains has proved an effective method for drain blocking on wind farms in Scotland.

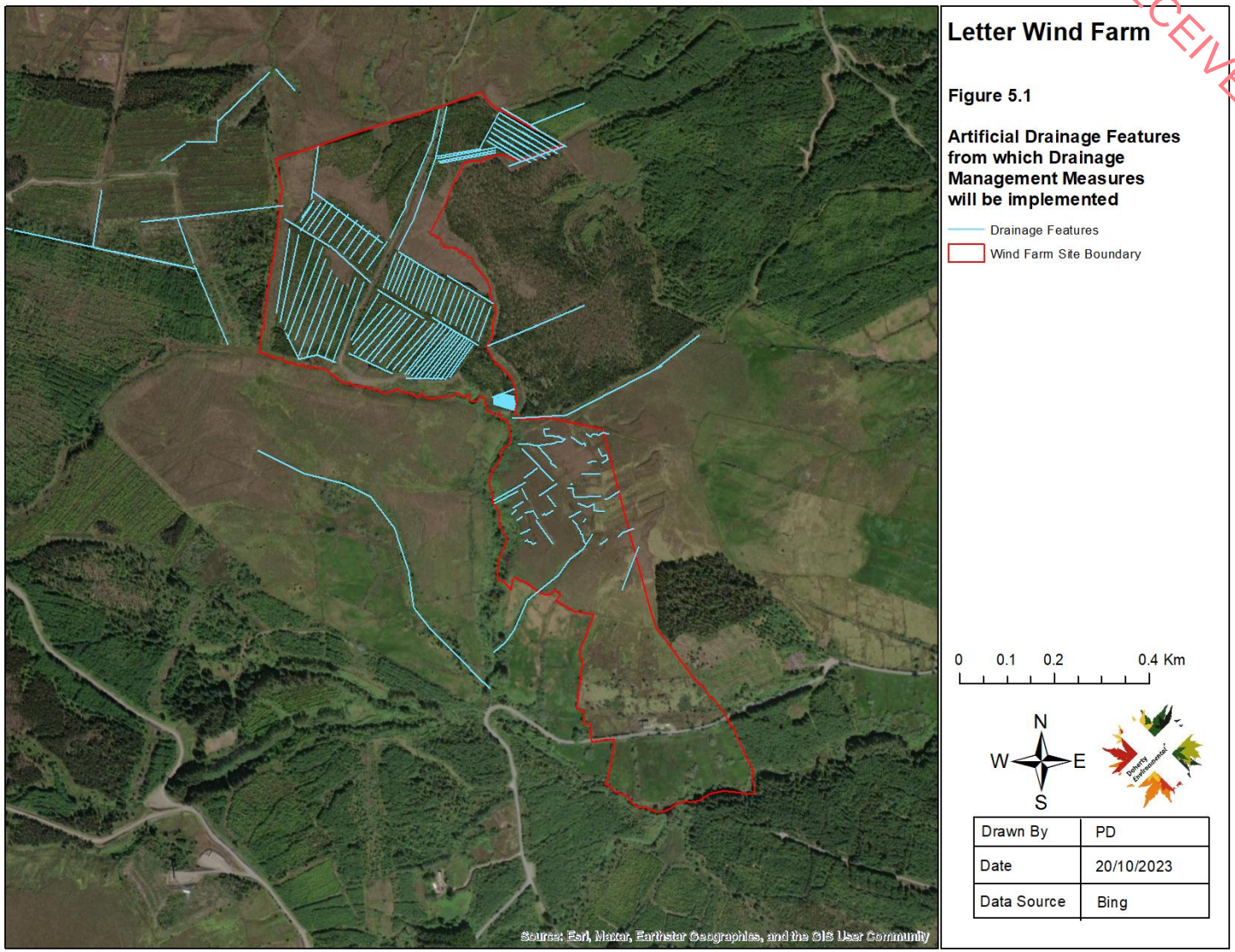

Figure 5.1: Letter WF Artificial Drainage Features

Plastic piling has been the most widely recommended method for ditch blocking, particularly where there is sufficient peat below the ditch in which to secure the piling. The method for inserting dams to block ditches at Letter will consist of very simple, manually installed plastic piles in addition to backfilling ditches with peat turf. This is the most simple and effective method. The methodology for this is explained in detail in Scottish Natural Heritage's (SNH) (2014) document entitled "Guidance for land managers installing plastic piling dams" (at http://www.snh.gov.uk/docs/A1268171.pdf). While a brief summary is provided in Appendix A, personnel installing plastic piling dams at Letter will refer directly to the SNH (2014) document. Useful information is provided in that document on: selection of where to put each dam, method of pile insertion, checking that the dams are properly installed, post installation monitoring and repairing dams if they are found to be damaged or not working properly.

The spacing between dams will be determined by the slope of the land, the width of the ditch and the rate of water flow. No generic criteria can be provided for damming in terms of spacing aside from the general rule that the spacing between dams should exhibit a 'top to toe' effect whereby the raised water table stretches from one dam up to the next one upslope. Dam location will be finalised by the ECoW in consultation with a peat/hydrology expert during the construction phase.

There will be a number of key requirements imposed on the construction contractor during ditch blocking and dam construction, including:

- planning access and egress routes to minimise as much as possible the compaction of peat around drainage ditches;
- use of plant (if required, since much of this work can be done by hand) with low pressure bearing tyres or suitably wide tracks to reduce compaction around the construction areas;
- careful backfilling with originally excavated peat from ditches, so as to cause as little disturbance to the ditch banks as possible and to leave original underlying bankside vegetation intact; and
- peat must be carefully and sufficiently tamped and keyed into the bottom and sides of the drain and dam to avoid undercutting or leakage. This is particularly true where piles intercept both peat and underlying mineral substrates.

Monitoring of the success of drain blocking will be undertaken by:

a. vegetation analysis using quadrats immediately adjacent to blocking locations.

b. the monitoring of dipwells/piezometers adjacent to blocking locations; and
c. also, through a detailed photographic log of the blocking location during ongoing operation phase monitoring.

5.4.3 Heather Seeding

The wind farm site supports a Calluna-dominated vegetation community that is comprised of mature heather. These areas will also act as donor areas of heather seed for re-seeding and over-seeding other habitat enhancement areas within the wind farm site.

Under the guidance of the ECoW, small areas with mature *Calluna vulgaris* will be selected for mowing. This will involve an inspection of the area to select the best and most easily accessible areas as donor locations for collection of heather seed for re-seeding elsewhere. These areas will display signs of mature and 'leggy' heather stands in need of regenerating and display good seed production.

Heather seed is very small and can be produced in great abundance. Heather seed does not ripen until about October, depending on weather conditions. Germination requires light, warmth and moisture, so seed collected in the autumn is best sown in the spring. Most germination usually occurs in mid to late summer. If conditions are unsuitable, seed will remain dormant and can persist in the seedbank for decades although viability varies greatly according to site conditions.
In order to use locally sourced heather seed for both revegetating areas of bare peat and enhancing re-turved areas, a programme of heather seed collection, using brush harvesters, will be conducted on suitable areas of heather moorland in the north-eastern part of the site. Brush harvesters can be deployed as rear and side-mounted brush harvesters, tractor-trailed, ATV-trailed and pedestrian brush harvesters. For the purpose of heather seed collection at Letter, the equipment to be deployed will be a combination of either quad-bike ATV-trailed harvesters and pedestrian harvesters. This will avoid the used of heavy machinery on site and the compaction of underlying peat enroute to donor locations.

A number of component tasks will be carried out and managed by the ECoW. These tasks will include as a minimum:

- Inspection of all areas of heather moorland in the north-east of the site to identify and select suitable donor locations for heather seed. Likely areas suitable for

seed collection will be accessible and will display signs of mature and 'leggy' showing good flowering characteristics. This inspection and selection will be carried out by the ECoW;

- Plan suitable storage facilities for both heather brash and heather seed (if required) so that harvested materials can be suitably conserved until it is deployed in habitat restoration works; and
- If there are any bare patches in restored areas within the Letter wind farm site boundary, implement heather seed spreading on a location-by location basis, as indicated below and as directed by the ECoW.

Ahead of peatland habitat restoration/enhancement works elsewhere on site, the ECoW will plan and supervise a targeted heather seed collection programme in the northeast of the site in line with the requirements of the Wildlife Act and the breeding bird season heather flailing must not be carried out during the period 1st March to 31st August to protect ground-nesting birds.

Donor seed will be harvested at the optimum time of year, from October through to December.

Suitable dry storage facilities for both heather brash and heather seed will also be planned so that harvested materials can be suitably conserved and protected from wet conditions until they are deployed in habitat restoration works.

5.4.3.1 Seed Application & Management

Heather reseeding shall take place in late spring (late April to May) to allow warmth and moisture conditions of early summer to optimise germination. A sowing rate of 15 – 17kg per hectare, with repeated applications over several years, will be required as part of the habitat restoration.

Regrowth of competitor vegetation must be reduced during the establishment phase by one or a combination of the following management actions:

- Topping
- Controlled grazing; and/or
- Weed wiping.

The areas within the wind farm site that will be treated with heather seed will be areas of bare peat occurring within the temporary construction footprint, that will be treated for the reestablishment of heath habitat as part of the construction phase landscaping

close out works. Seeding of these areas with heather seed, along with the combined treatment of stock reduction will contribute towards the re-establishment of heath vegetation in these areas of the Letter Wind Farm site.

5.4.4 Stock management

Stock management of both sheep and cattle will be agreed between Letter Wind Farm Ltd and landowners. The whole site will benefit from stock management, particularly in the western part of the wind farm site, and to the west of the southwest to northeast orientated fence line that bisects the wind farm site.

5.4.4.1 Cattle Management

The complete removal of cattle will occur during the construction phase of the development and for the first three years following light overseeding. Thereafter, the rate of grazing will be restricted to a stocking rate of 0.075 livestock units per hectare between 1 March to 31 October. No grazing will be permitted outside of this period.

Over the period of the wind farm lifetime (40 years) it is considered that stock removal followed by reduction in grazing density will result in a very significant improvement of sward structure and biodiversity of degraded blanket bog/heathland in this area.

5.4.4.2 Sheep

The complete removal of sheep will occur during the construction phase and for the following three years. Thereafter, the rate of sheep stocking will be restricted to a sheep-only stocking rate of 0.25 livestock units per hectare between 1 March to 31 October. No grazing will be permitted outside of this period.

Records will be kept of initial habitat condition, current and historical stocking densities will be compiled and maintained throughout the operational life of stock management and grazing restrictions.

5.4.5 Management agreements with landowners

A number of land management practices are damaging to blanket bog and peatland. Under the terms of their lease with the respective landowners, Letter Wind Farm Ltd. will prevent ongoing damaging land management practices during the lifetime of the development. In this respect, there will be:

- no peat cutting;

- no overgrazing (grazing on site will be in line with the stocking rates specified in Section 5.4.4 above);
- no new drainage and no maintenance of existing drains, with the exclusion of drains designed to protect the development's infrastructure;
- no flailing or mowing (with the exception of any flailing or mowing designed specifically for habitat enhancement as part of the wind farm development); and
- no burning.

5.4.6 Protection of Restored & Enhanced Peatland Areas

Since stock management at Letter will remove grazing animals from the site during construction and for the first three years after habitat restoration and enhancement activities, restored and enhanced areas will not require any special protection against livestock grazing. It may, however, be necessary to use heather brash or other brash to secure applied heather seed, to protect seedling growth and to prevent surface peat erosion. The ECoW will routinely inspect enhanced areas and will instruct any necessary action that may be required for the ongoing protection of areas that are subject to restoration and enhancement by way of seedling application.

5.4.7 Woodland Habitats

This HMP also includes measures to maintain and/or enhance the existing cover of woodland habitats occurring within the HMP lands. These woodland habitats comprise wet willow-alder-ash woodland and scrub. The existing areas of wet willow-alder-ash woodland and scrub habitat that are shown in Figure 4.1 occur within the HMP lands and these will be target of woodland habitat HMP actions. In addition, the area of spoil and bare ground habitat occurring along the upper Owengar River, as mapped on Figure 4.1 wind farm habitat map and occurring within the HMP lands will be targeted for the establishment of a riparian scrub woodland.

The habitat management measure that will be implemented for areas of existing scrub and wet willow-alder-ash woodland will be the provision of stock proof fencing and the restriction of grazing from livestock or wild deer.

The slopes of the Owengar River will be targeted for scrub woodland landscaping. The species to be used will be in keeping with those already occurring within wet willow-alder-ash woodland and will comprise *Salix cinerea, Salix aurita, Salix caprea, Alnus glutinosa, Sorbus acuparia* and *Betula pubescens*. Trees will be planted as saplings

along the currently exposed bankside of the Owengar River. The spoil and bare ground habitat that is subject to planting will be fenced so as to restrict grazing from livestock and wild deer.

The establishment of riparian woodland vegetation in areas of current bare ground cover will also provide indirect benefits for the upper Owengar River, water quality and water management.

6 Habitat Management Action Plan

Table 6.1 outlines an Action Plan for the promotion and implementation of management actions to manage and enhance peatland habitats within the HMP Area.

The responsibility for the completion of actions is outlined in Table 6.1. The implementation of actions during the construction phase will be completed by the main civil contractor.

6.1 Monitoring

To ensure that management actions outlined in Table 6.2 are achieving the required objectives for each target, regular monitoring is required. Table 6.2 below lists the monitoring required for each target, the measurement to be recorded, timing and frequency of monitoring and the personnel who shall carry out each task.

This monitoring programme covers the construction period in addition to (as a minimum) years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 following the completion of the construction period. Baseline surveys exist for the entire site, and these will be complemented by confirmatory surveys completed through the construction phase.

Habitat monitoring will be undertaken using quadrats, fixed point photography and dipwells/piezometers.

Monitoring during the early years of the operation phase will be particularly important for evaluating the success or otherwise of management actions to achieve favourable conservation status for peatland habitats.

The Favourable Conservation Status of Peatland Habitats will be based upon the attributes and targets outlined in Table 6.1.

Table 6.1: Attributes, Measurements and Targets for Achieving Favourable Conservation Status

Attribute	Measurement	Target
Blanket Bog		
Vegetation Composition	Relevé	Number of positive indicator species present ≥ 7.
	Relevé	Cover of bryophyte or lichen species, excluding Sphagnum fallax ≥ 10%
	Relevé	Bare peat cover <10%
	Relevé	Cover of each of the following species: *Calluna vulgaris, Eriophorum vaginatum, Eriophorum angustifolium, Molinia caerulea, Schoenus nigricans, Trichophorum germanicum, Eleocharis multicaulis* individually < 75%
	Relevé	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Pteridium aquilinum, Ranunculus repens* collectively < 1%
	Relevé	Cover of non-native species < 1%
	Local vicinity	Cover of non-native species < 1%
	Local vicinity	Cover of scattered native trees and scrub < 10%
Vegetation Structure	Relevé	Crushed, broken and/or pulled up *Sphagnum* species < 10% of Sphagnum cover
	Relevé	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)
	Local vicinity	No signs of burning into the moss, liverwort or lichen layer or exposure of peat surface due to burning
	Local vicinity	No signs of burning inside boundaries of sensitive areas
Physical Structure	Relevé	Cover of disturbed bare ground < 10%
	Local vicinity	Cover of disturbed bare ground < 10%

	Local vicinity	Area showing signs of drainage resulting from heavy trampling or tracking or ditches or peat cutting < 10%
	Local vicinity	Cover of erosion gullies and eroded areas within the greater bog mosaic‡ < 5%
Hydrology	Dipwell/Piezometer	Water table is less than 15cm below the surface at monitoring points.
Heath		
Vegetation composition	20m radius	*Calluna vulgaris* and/or other ericoid species (*Erica tetralix, Erica cinerea*) present
	Relevé	Cover of positive indicator species ≥ 50%
	Relevé	Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and *Pleurocarpous* mosses ≥ 10%
	Relevé	Cover of ericoid species and/or *Vaccinium myrtillus; Empetrum nigrum* ≥ 15%
	Relevé	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%
	Relevé	Cover of non-native species < 1%
	Local vicinity	Cover of non-native species < 1%
	Local vicinity	Cover of scattered native trees and scrub < 20%
	Local vicinity	Cover of *Pteridium aquilinum* < 10%
	Local vicinity	Cover of *Juncus effusus* < 10%
Vegetation Structure	Relevé	Crushed, broken and/or pulled up Sphagnum species < 10% of Sphagnum cover
	Relevé	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (assess a minimum of 10 shoots distributed across the plot)
	Local vicinity	No signs of burning into the moss, liverwort or lichen layer or exposure of peat surface due to burning
	Local vicinity	No signs of burning inside boundaries of sensitive areas

Physical Structure	Relevé	Cover of disturbed bare ground < 10%
	Local vicinity	Cover of disturbed bare ground < 10%
	Local vicinity	Area showing signs of drainage resulting from heavy trampling or tracking or ditches or peat cutting < 10%

Management Actions and techniques outlined in Sections 5 above aim to achieve favourable conservation status of peatland and heathland habitats within the HMP area.

Where management actions are not deemed to be successful in achieving the targets for favourable conservation status of peatland and heathland habitat, as outlined in Table 6.1 above, then the implementation of remedial measures will be required. Examples of these remedial measures are provided in Section 5 above. It is noted that the nature of the remedial action to be applied will be dependent upon which attributes are not meeting the targets of favourable conservation status.

6.1.1 Ongoing Monitoring – Meeting Targets

If a habitat fails to meet one of the targets, then management action as listed in Table 6.2 will be undertaken.

6.2 Reporting of Monitoring

Table 6.2 specifies the timing of monitoring for each HMP Action.

The ECoW will produce a final report documenting the implementation of Habitat Management Plan Actions (as well as environmental and ecological effects – see Section 7) of the construction period. The report will be made available to the Owner, Contractor, Planning Authority, NPWS and other external agencies where appropriate (e.g., Inland Fisheries Ireland).

A report detailing the results of all actions requiring implementation during the construction phase will be furnished to the Planning Authority within 12 months of the completion of construction activity, and subsequently in years 2, 3, 5, 7, 10, 15, 20, 25 & 30.

6.2.1 Quadrats & Fixed-Point Photography

Habitat surveys during the monitoring programme will be based on fixed quadrat surveys. Each quadrat will be surveyed using the DOMIN Scale so that individual

vegetation communities are identified. Fixed quadrat monitoring locations will be identified by the ECoW during the construction phase.

Quadrats will be located within all areas of the proposed wind farm site that are subject to the habitat management measures outlined in Section 5 above.

Fixed point photographs will be taken of the vegetation at all quadrats and of the surrounding area during each round of monitoring. The grid reference of the initial fixed point photograph location will be recorded during the initial round of monitoring and the direction of view of photographs recording the surrounding area will also be recorded.

6.2.2 Water Level Monitoring

Monitoring of water levels within blanket bog habitat will also be undertaken using dipwells/piezometers. The location of dipwells/piezometers will be selected by the ECoW during the construction phase. A quadrat will be posited at each dipwell/piezometer location.

Table 6.2: Habitat Management & Monitoring Action

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
1.	**Protect Water Quality in Eroding Upland Rivers**	No decrease in water quality in eroding upland rivers during the construction phase.	Implementation of all project design and construction phase management measures as specified in the EIAR for the proposed development.	ECoW to review and monitor construction phase to ensure implementation of design measures and construction phase management measures.	Throughout the construction phase	Construction Contractor
2.	**Grazing Control**	Promote grazing regimes as outlined in Section 5	Implementation of livestock numbers specified in Section 5	Monitor grazing and liaise with landowner to check that livestock numbers and grazing regime are adhered to. The success of the grazing regime in terms of contributing to peatland and heathland restoration will be monitored using permanent fixed quadrats. A photographic log of all quadrats and areas subject to grazing control will be maintained.	Throughout lifetime of the HMP. Monitor during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 of the operation phase	Operator
3.	**Block Drainage Ditches**	Improve water balance in areas adjacent to Drainage Ditches	Drainage blocking will follow the techniques outlined	The success of drainage blocking will be monitored using permanent fixed quadrats and	Install blocking during construction phase.	Construction Contractor /Operator

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
			in Section 5.4.2 above.	dipwells/piezometers to measure water table depth. A photographic log of all quadrats and areas subject to drainage blocking and re-wetting will be maintained.	Monitor during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 of the operation phase	
4.	**Sensitive removal of peatland vegetation from areas of the construction footprint as turves**	Sensitively remove peatland vegetation as turves under the footprint construction site, maintain turves in good condition so that they can be reinstated in temporary construction areas.	Remove peat as turves excavated to a depth of at least 50 cm, thus allowing for full protection of the roots. This layer will be stored as turves and kept viable by irrigation if necessary because peat is prone to shrinkage and drying.	Construction Contractor's ECoW monitoring of peatland turving and condition during the construction phase.	Construction phase – vegetation clearance.	Construction Contractor
5.	**Re-instate turves in Re-instatement Areas**	Re-instate turves and restore peatland vegetation in the re-instatement areas.	Re-instate turves following the management techniques outlined in Section 5.3.4	The success of turve re-instatement and peatland restoration will be monitored using permanent fixed quadrats and dipwells/piezometers. A photographic log of all quadrats and areas subject to	Re-instate turves during the Construction stage. Monitor during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 of the operation phase.	Construction Contractor

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
				turve reinstatement will be maintained.		
6.	**Restore Active Blanket bog at the wind farm site**	Restore active blanket bog conditions within the wind farm site	Restore condition in line with the methods set out under Section 5.4.7 above.	The success of turve re-instatement and peatland restoration will be monitored using permanent fixed quadrats and dipwells/piezometers. A photographic log of all quadrats and areas subject to turve reinstatement will be maintained.	Complete restoration works during the Construction stage. Monitor during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 of the operation phase.	Construction Contractor
7.	**Control competitive non-indicator peatland species**	Non-indicator peat species should be kept to a minimum of <10% of the vegetation in the HMP area priority habitats	Removal of Competitive Species. Remove spreading conifer trees.	Quadrat monitoring and photographic log will be undertaken to measure the extent of non-indicator species.	Control on an annual basis. Monitor during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30 of the operation phase.	The Construction Contractor /Operator
8.	**Restrict turbary**	No commercial turbary extraction throughout the lifetime of the HMP	Restrict turbary activity as outlined under Section 5.4.5	Monitoring of site for any signs of turbary activity. Liaise with landowner to ensure no commercial turbary activity is undertaken throughout the lifetime of the plan.	Throughout the lifetime of the HMP	Operator

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
9.	**Prevent certain land use practices**	Prevent certain land use practices to ensure favourable conservation status of peatland habitats.	Prevent the following activities throughout the lifetime of the HMP: • The reclamation, fertilisation or drainage of the HMP area will be restricted. • The application of slurry, lime, herbicides, pesticides, insecticides, fungicides will be restricted. • Scrub will be prevented from establishing on peatland and heathland habitats through ongoing removal.	Quadrat monitoring Photographic log	Implement throughout lifetime, and monitor/report 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30.	Operator
10.	**Identification of Areas within the Wind Farm Site**	Actively re-seed areas of the wind farm site where surface turves have failed to knit	Collect seeds/brash from priority peatland habitats during the autumn of the year when	The success of seeding/brashing (if required) will be monitored using permanent fixed quadrats and dipwells within remedial	Identification of areas requiring seeding during the ongoing monitoring. Areas requiring seeding/brashing as a	Operator

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
	Requiring Remedial Active Re-Seeding/ Brashing	together or where peatland vegetation has failed to establish.	any areas of the wind farm site are identified as failing and seed/brash identified areas during the next spring season.	areas as described above. It is noted that as areas that may require seeding/brashing are as yet unknown, additional quadrats, will be required to monitor areas subject to this HMP Action. A photographic log of all quadrats and areas subject to seed/brash remediation will be maintained.	remedial measure will be monitored during the summer months following the application of seed/brash. Further monitoring will be undertaken in the subsequent year.	
11.	**Install Fencing around Woodland Habitats to Restrict Grazing**	Woodland habitats and areas to be treated for the creation of riparian woodland along the Upper Owengar River are to be fenced to restrict livestock and wild deer grazing.	Contractor to install fencing.	Fixed woodland releves, based on a 4m x 4m quadrat. A minimum of one releve in each woodland plot. Vegetation to be dominant by native woody plant species. Photographic log to be taken.	Fencing to be installed during the construction phase. Planting of woodland in riparian area along the existing bare ground slope of the Upper Owengar River to be completed by Contractor during the construction phase. Monitoring to be completed during Years 1, 2, 3, 5, 7, 10, 15, 20, 25 & 30.	Contractor & Operator

HMP Action Ref. No.	Management Measure	Target	Method	Measurement	Timing	Entity Responsible
					Requirement for continued stock proof fencing need to be reviewed during each round of monitoring by ecologist. Remedial woodland planting, where failure of planting is identified in the woodland habitat creation area along the Upper Owengar River will be the required of the Operator.	

7 Ecological Clerk of Works

7.1 Background

An appropriately qualified Environmental/Ecological Clerk of Works (ECoW) will be employed for the duration of the Civil Works Contract. This person will be known as the Letter Wind Farm ECoW. The ECoW must be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) or equivalent body. The ecologist performing the ECoW role will attend the site on a weekly basis to ensure that all works are being completed to the appropriate standards.

As the delivery of this HMP is highly dependent on the roles and responsibilities of the ECoW, some detail is provided here regarding this position.

7.2 Term of Appointment

The ECoW will be on site for minimum 1 day per week during the construction works; provision will be made for an initial briefing to all contractors, and a final visit to report on the ecological aspects of construction. Some office time is also required for weekly reporting.

7.3 ECoW Tasks

Overview

The provision of an ECoW helps to ensure that ecological protection aspects of the Environmental Statement, HMP, Construction Environmental Management Plan (CEMP) and Construction Method Statements (CMS) are fully adhered to during construction. It also allows any issues arising to be dealt with in an appropriate manner. Taking account of the requirements set out in this HMP, the following are deemed to be required services of the ECoW:

a) Construction surveys.
b) Monthly measurement of water levels in dipwells.
c) Selection of sites for blanket bog re-wetting, supervision of dam installation, monitoring of works.
d) Monitoring SuDS stilling pond construction to ensure appropriate wildlife habitats are incorporated into their design (including briefing of digger drivers).
e) Maintaining records of checks and issues.
f) Providing a report detailing the implementation of the HMP Management Actions during the construction phase.

g) Survey the site for sensitive and protected species prior to construction (due diligence survey).

Pollution Prevention Plan

a) Review, agreement and approval of Contractor's pollution prevention plan prior to commencement of work.

b) Conduct weekly inspection of site pollution prevention measures (silt traps, etc.) and visually assess their effectiveness. This will include inspection of water management measures installed by Contractor such as excavation pumping and diversion channels, as well as containment of silt away from watercourses and advice on micro-siting of mitigation measures.

c) Maintain a Pollution Prevention Measures Register of the weekly inspections, to include an inventory of all measures on the site, their effectiveness, as well as any advice provided.

d) Collation of water sampling results (collected and analysed by third parties) for presentation in weekly reports.

e) Suspension of work where potential risk from pollution is identified and agreed safeguarding measures, as specified in the CEMP or method statements are not in place, or where construction methods and mitigation measures are not specified in construction method statements and/or plans as agreed at commencement of works.

f) Provide advice and recommendation to the wind farm owner and its contractors regarding the above.

Waste Management

a) Review, agreement and approval of the Contractor's Site Waste Management Plan

b) Review of the Contractor's records for all inspections of fuel, oil or chemical storage areas, including the integrity of storage facilities.

Drainage Management

a) Review, agreement and approval of the Contractor's Site Drainage Management Plan

b) Inspection of drainage management works.

c) Liaison with Planning / NPWS inspecting the works.

d) Agreement of monitoring standards to be applied by Contractor's personnel.

e) Confirmatory survey in advance of habitats and species for ground to be affected by drainage management.

f) Review of Contractor's records for plant inspections, evidence of contamination and checks made after extreme weather conditions.

g) Liaison, field discussion and agreement of drainage management works with Planning Authority, IFI, NPWS when required by consultees and when considered necessary by ECoW.

h) Agreement of frequency and location of drainage ducts installed beneath floated roads.

i) Agreement of drainage management associated with temporary peat storage and reinstatement works in advance of such works commencing.

Watercourse Crossings

a) Review, agreement and approval of the Contractor's Site Watercourse Crossing Plan.

b) Confirmatory survey in advance of watercourse condition and protected mammals for all ditch and stream crossings, using established specialist if necessary.

c) Review the Contractor's records for plant inspections, evidence of contamination and checks made after extreme weather conditions.

Water Quality Monitoring

a) Review, agreement and approval of the Contractor's and independent Site Water Quality Monitoring Plans where undertaken.

b) Inspection of Contractor's records for water environmental monitoring and comparison of those records with independent records.

c) Presentation of independent water environmental monitoring results at weekly site meetings.

Excavated Materials and Reinstatement

a) Review, agreement and approval of the Contractor's Spoil Management and Reinstatement Plan.

b) Marking working areas and route corridors, in consultation with the Geo-technical/Civil Designer and/or Archaeologist as necessary.

c) Granting permission to work off hard ground using low ground pressure machines, including specification points for entry and return, and the route to be taken.

d) Agreeing proposals for side casting and temporary storage areas as development proceeds.

e) Agreeing timing of restoration and reinstatement of access track sides.

f) Monitoring the condition of stored turf.

g) Agreeing any required hydroseeding specification, including seed mix and fertiliser quantities.

h) Issuing instruction to cease work if unexpected risks arise, until an agreed alternative solution is identified, and risks are avoided or minimised.

7.4 Recording

The ECoW will keep a record of the following:

a) notable animal sightings and signs (including birds, in addition to other site ornithological monitoring);

b) The Pollution Prevention Measures Register (as detailed above);

c) The habitats and soil (including peat depth) of ground to be developed via survey at least a week in advance of construction work;

d) record of tasks carried out;

e) written record of all oral advice given

The ECoW will maintain a GIS database of key recordings made during the construction period. ECoW weekly site visit notes will be made available for all personnel on site to consult and will incorporate the following:

- Monitoring of requirements listed under HMP
- Monitoring of requirements listed under the CMS
- Pollution Prevention Measures Register

7.5 On-Site Communication

The success of ECoW appointment is largely dependent on well-defined lines of communication. In theory, robust construction method statements will incorporate many of the areas of ECoW concern into the daily activities of construction personnel. However, the ECoW will always inform the Civil Contractor and their Designer of areas of particular concern, who will then make a decision as to the subsequent action.

The ECoW will be involved in the delivery of biodiversity-related Toolbox Talks as part of the site induction process Toolbox talks will be given to the work force at regular intervals to highlight the environmental issues that are unique to the wind farm located at Letter. The ECoW will inform the staff of the following:

All staff working onsite and personnel visiting the site are briefed on the importance of the protection of key biodiversity receptors occurring onsite.

All staff will be informed of obligations to restrict construction operations to the construction footprint.

Restrictions on plant machinery traversing into sensitive habitats outside of the construction footprint.

The responsibility of all construction staff to ensure that sensitive peatland habitats occurring outside the construction footprint are not tampered with, removed, damaged or breached by any field operators or others visiting the site.

7.6 Incident Response

If an ecological incident occurs on site, the following protocol should be implemented:

- The ECoW shall be contacted immediately;
- Ensure appropriate corrective measures are put in place;
- Implement actions to prevent reoccurrence/further incidents; and
- Identify responsibilities and timescales for implementation.

7.7 Liaison with Consultees

The ECoW will provide a liaison between NPWS and IFI if this is required.

7.8 Final Report

The ECoW will produce a final report documenting the environmental and ecological effects of the construction period. The evidence for effects will be based on findings included in the minutes of weekly meetings, together with other recording information maintained by the ECoW. The report will be made available to the Owner, Contractor, the relevant Planning Authority, NPWS and other external agencies where appropriate (e.g., IFI).