Bracklyn Wind Farm

Annex 5.6:
Habitat Management Plan

Bracklyn Wind Farm Limited

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Statement of Authority

This report has been compiled by **Mike Trewby** BSc., PGDip., CEEM with guidance and oversight from **Will Woodrow** MSc., MSc. (Arch), CIEEM, CEcol.

Will is a Director and Principal Ecologist at Woodrow Sustainable Solutions Ltd. (Woodrow). He has been studying and working in ecology, since 1985 and has worked as an ecological consultant since 2004. Will has worked on numerous wind farm projects, including over 20 impact assessments and regularly writes management plans for a range of development projects, including wind farms. Will is also has extensive experienced in implementing post-construction management plans for habitats, as well as a range of species including birds and bats on wind farm sites.

Mike is a Senior Ecologist with Woodrow and is full member of CIEEM. He has 20 years fieldwork and research experience in the field of ecology, predominately working the ornithological aspects of projects. Since 2011 he has worked as an ecological consultant and regularly carries out ecological impact assessment and monitoring for a range of development and projects, including construction and post-monitoring for wind farm developments.

1.0 Overview & Rationale

Woodrow Sustainable Solutions Ltd (Woodrow) was contracted by Bracklyn Wind Farm Ltd. to compile a Habitat Management Plan (HMP) for the proposed development of a nine-turbine wind farm at Bracklyn, Co. Westmeath.

As detailed in the **EIAR: Chapter 5: Biodiversity Section 5.4.2.2** the construction and operation for Bracklyn Wind Farm requires the removal of woodland habitats. The majority of the proposed felling involves the removal of lower conservation value commercial conifer and broadleaf plantations to create turbulence reduction buffers and bat features buffers around selected turbines (T4, T5, T6, T7, T10 & T11). Creation of these buffers will also involve the removal of some higher conservation value woodland habitats, including sections of treelines, bog woodland (non-Annex I) and small areas mixed broadleaved woodland (not classified as commercial broadleaf plantation). Felling of higher value woodland and treelines is also required for the construction of the substation and the hardstand for T2.

The targets areas for felling have been designed to avoid impacting on the highest conservation value woodland within the proposed development area, including a small area of Annex I bog woodland south of T10 and thin strip of oak-ash-hazel woodland south of T11.

The rationale for the HMP is derived from requirements set out in **Section 5.5 – Mitigation & Monitoring Measures** of the **EIAR: Chapter 5: Biodiversity** to ensure measures are implemented to:-

- Offset the habitat loss of higher conservation value habitats that will result from proposed felling operations;
- Avoid habitat fragmentation;
- Avoid significant alteration of overall connectivity through the site;
- Avoid damaging the sensitive areas of woodland habitat identified; and,
- Avoid introduction or proliferation of potentially damaging invasive alien species (IAS)

2.0 Objectives

The aims of the HMP are to:-

- **Objective 1** – To clearly define target areas for felling to avoid damage to the sensitive habitats identified on the periphery of the felling zones, including Bracklin Wood and Lisclogher Bog;
- **Objective 2** – To clearly define the optimal timings for felling operations to minimise disturbance to breeding birds, bat roosts and the resting places of mammals;
- **Objective 3** – To outline the suite of pre-construction/pre-felling ecological surveys required to demonstrate due diligence with respect to avoiding disturbance to wildlife and committing offences under the Wildlife Acts 1976 (As Amended);
- **Objective 4** – To provide guidance on the post-felling habitat conditions required for the bat feature buffers and ongoing habitat management of these throughout the operational lifespan of the wind farm;
- **Objective 5** – To ensure areas holding sensitive habitats adjacent to the proposed work corridor are project during construction;
- **Objective 6** – To ensure on-site replacement of equivalent lengths/areas and species compositions of treelines and semi-natural woodland (Local (Higher) Importance) that will be removed during construction and will remain so for operational lifetime of the wind farm;

- **Objective 7** – To define the extent of habitat enhancement area and the actions required to contribute to offsetting the loss of non-Annex I bog woodland at T10 and other areas of woodland, e.g. beech woodland at the substation;
- **Objective 8** – To ensure compensatory planting maximises the ecological function of future woodland, treeline and hedgerow by specifying an appropriate species mix and replacement locations to maximise connectivity;
- **Objective 9** – To provide a monitoring plan and remedial actions for habitats; and
- **Objective 10** – To provide a reporting and remedial action schedule.

3.0 Actions

This section provides the actions required to achieve the objectives set out in **Section 2.0** and deliver the mitigation measures, as prescribed in **Section 5.5 – Mitigation & Monitoring Measures** of the **EIAR: Chapter 5: Biodiversity** where they relate to habitat protection and management/enhancement.

3.1 Objective: Define target areas for felling

Rationale: Clearly define target areas for felling to avoid damage to the sensitive habitats identified on the periphery of the felling zones, including Bracklin Wood and Lisclogher Bog.

3.1.1 Identifying Felling Zones and Protecting Sensitive Habitats

Figure A5.6.1 provides an overview the proposed felling zones in relation to proposed site infrastructure and treelines (linear features, with **Figure A5.6.2** showing the distribution of higher conservation value habitats, within and adjacent to the proposed development site. **Figure A5.6.3** indicates the boundaries of Bracklin Wood and Lisclogher Bog, as published in the County Westmeath Biodiversity Action Plan (2015-2020).

Construction traffic will not be permitted access to the sensitive woodland habitats shown in **Figure A5.6.2**, unless an area is within of a proposed felling zone, such as the non-Annex bog woodland at T10. Where there is risk of construction vehicles entering sensitive habitats, these areas will be cordoned off.

All construction phase habitat protection, including tool-box talks, cordoning-off and routine monitoring of access restrictions will be monitored and reported on by the Ecological Clerk of Works.

3.1.2 Bat Feature Buffers

SNH *et al*. (2019) bat mitigation guidelines require that bat feature buffers achieve a 50 m separation distance between the rotor swept area and the closest feature(s). Based on the dimensions of the turbine model proposed (Vestas V162-6.0MW), **Table A5.6.1** provides the range of turbine tower to feature distance that are required, depending the feature height. Note: Feature heights on site must be taken as the final (maximum) tree height that would be obtained over the life time of the wind farm, i.e. estimated tree heights after 30 years.

The maximum extent to which felling for turbine buffers is permitted has been pre-determined. For all turbines where felling is required an allowance of up to 104 m is provided for by the proposed felling zones. This would ensure 50 m standoffs are meet to a maximum feature height of 40 m, which is considered more than adequate to accommodate all scenarios for this site.

Feature height (fh)	Turbine-feature buffer bl = 81 m hh = 104 m Lowest rotor swept = 23 m
3 m	83 m
5 m	86 m
10 m	91 m
15 m	96 m
20 m	101 m
25 m	104 m
30 m	108 m
40 m	114 m

Table A5.6.1: Turbine tower buffering distances for a range of feature heights

3.1.3 Habitat Protection

The following measures will be implemented to ensure that sensitive habitats are not lost or damaged by implementation of felling zones, which will not:-

- Exceed the proposed development site (redline) boundary;
- Extend into the areas identified as Bracklin Wood or Lisclogher Bog; and
- Impinge on areas supporting Annex I bog woodland and oak-birch-holly woodland, where these habitats have been identified and these areas will be retained within bat feature buffers.

Where habitat features are retained within bat feature buffers, as will be the case at T5, T10 and T11, monitoring will be required to determine if the feature attracts unacceptably levels of bat activity close to turbines – see **Section 5.5** on bat mitigation within the **EIAR: Chapter 5: Biodiversity** for full details. Should this transpire, options of lowering; but not removing the feature's height and retaining its botanical integrity can be investigated.

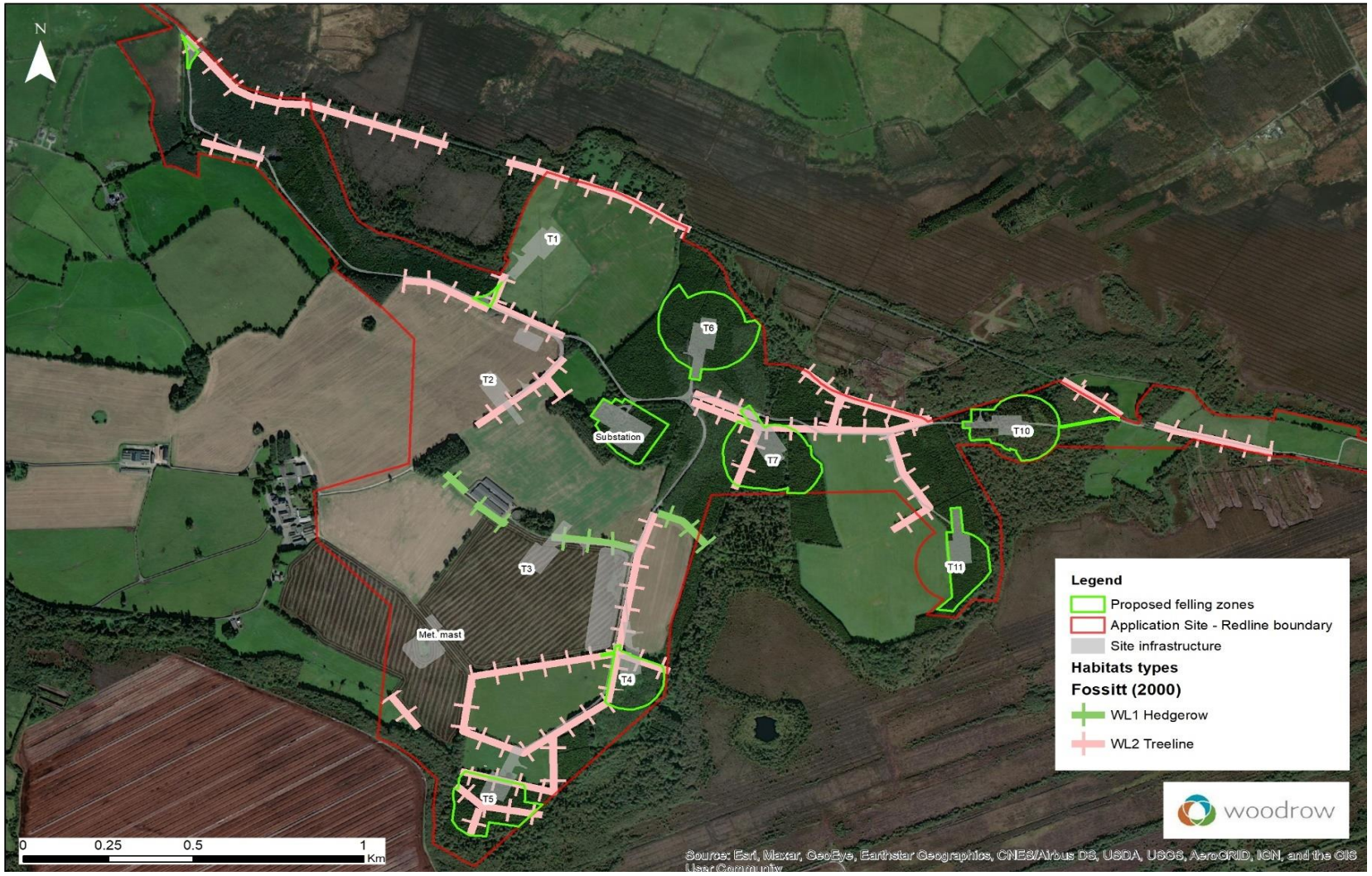

Figure A5.6.1: Felling zones and linear habitats – treelines and hedgerows

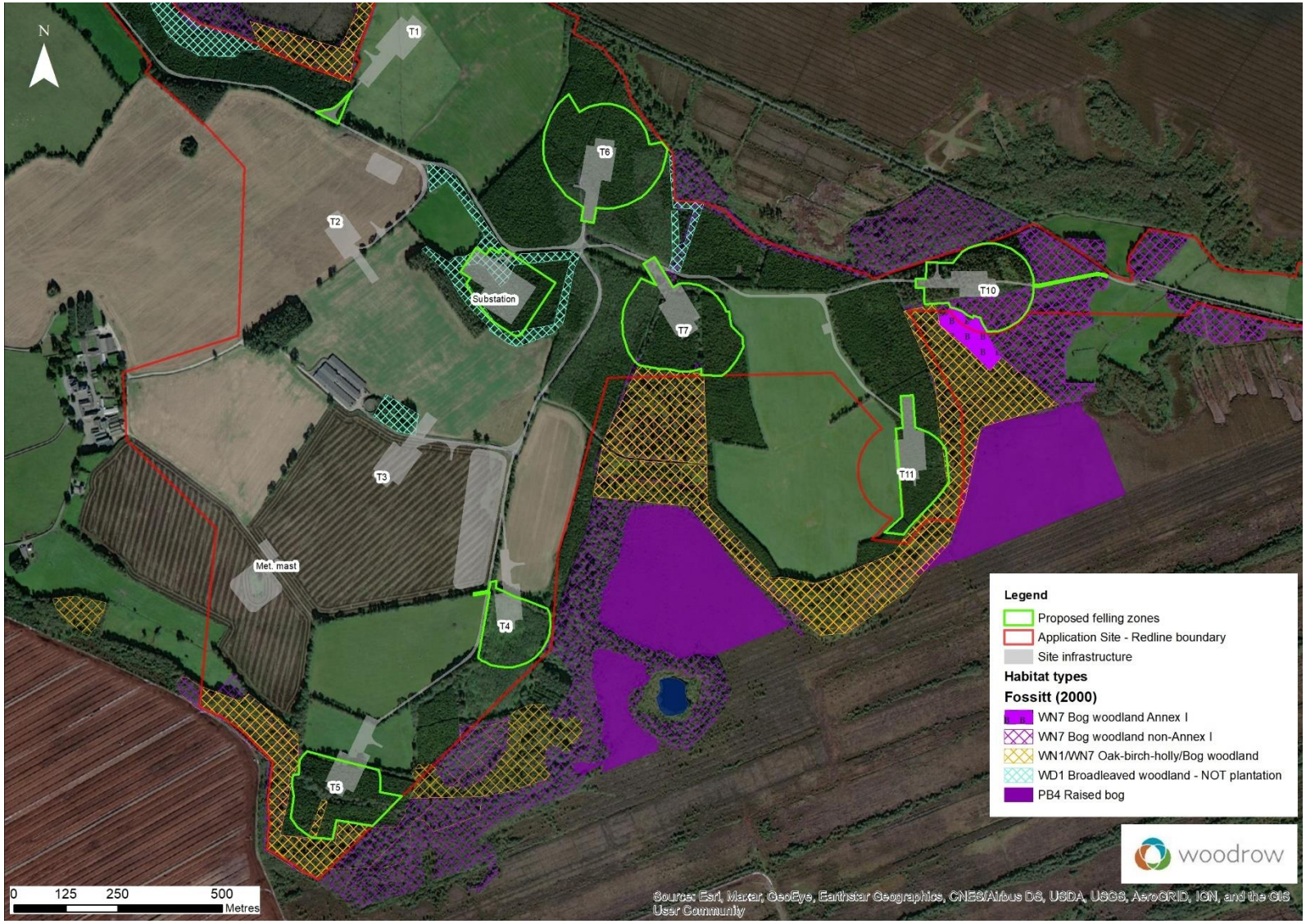

Figure A5.6.2: Felling areas and higher value woodland habitats

Figure A5.6.3: Felling zones in relation to Bracklin Wood and Lisclogher Bog

3.2 Objective 2: Timing of felling operations

Rationale: Clearly define the optimal timings for felling operations to minimise disturbance to breeding birds, bat roosts and the resting places of mammals.

3.2.1 Optimal Timing

At most locations the optimal timing for felling has been identified as September to February, which is out of the bird breeding season. However, several ecological constraints have been identified that will place further limits on timings of felling operations at certain locations, including to avoid disturbance to the badger main sett adjacent to the proposed substation, tree felling will not be undertaken during the badger breeding season (December to June inclusive).

Therefore, all felling for the substation will be undertaken in July to November inclusive. Any felling occurring in July or August this must be preceded by a breeding bird walkover. If any nesting birds are identified appropriate exclusion zone buffers appropriate to the species will be implement

Preferably all tree felling will be undertaken outside the bird breeding season (March to August inclusive) to avoid disturbance to nesting birds. Any felling operations proposed during the breeding season will be preceded by a nesting bird survey to ensure nest site are protect from disturbance; as detailed in **Section 5.5.1.4** of the **EIAR: Chapter 5: Biodiversity**.

3.3 Objective 3: Pre-construction/pre-felling ecological surveys

Rationale: Outline the suite of pre-construction/pre-felling ecological surveys required to demonstrate due diligence with respect to avoiding disturbance to wildlife and committing offences under the Wildlife Act 1976 (As Amended).

- In order to avoid accidental disturbance to mammal resting placing during felling operations, prior to felling commencing this will be preceded by a due diligence ecological walkover survey of the proposed works corridor. surveys will cover all suitable habitat for protected mammals including within 50 m of the works corridor for badgers and red squirrel, 100 m for pine martin and 150 m for otter. The aim of the surveys is to identify the resting sites of protect mammals and implement appropriate exclusion zone buffers, if required; and
- For all trees identified within **Annex 5.5**: Bat survey report as holding moderate or high roost potential, pre-felling surveys will be undertaken in order to ascertain any change in status, as detailed within **Section 5.5.1**.6 of **EIAR: Chapter 5: Biodiversity**.

3.4 Objective 4: Maintenance of post-felling habitat conditions

Rationale: Provide guidance on the post-felling habitat conditions required for the bat feature buffers and ongoing habitat management of these throughout the operational lifespan of the wind farm.

Specific post-felling ground conditions are required to limit the number of bats foraging or commuting in close proximity to turbines. Manging habitat structure will firstly aim to limit features within the buffer and secondly reduce the availability of prey items food source, e.g. insects emerging from damp drains. The following habitat management of bat turbine buffer will be required throughout the operational lifespan of the wind farm:-

- The area where trees/scrub is cleared to create the turbine buffers for foraging/commuting bats must be rendered as unsuitable as possible, and

maintained as such over the lifetime of the wind farm;
- Felled timber and branches must be removed, with stumps brashed to ground level;
- Some excess spoil from excavation works during construction will be broadcast to cover over any ground stumps to create a more homogeneous surface around these felled areas and reduce suitability for foraging bats; and
- To prevent the area scrubbing up, the areas will be restored to grassland and a mowing or grazing regime will be implemented and monitored will be implemented and monitored as detailed in **Objective 9 - Section 3.9.2**.

3.5 Objective 5: Habitat protection measures

Rationale: Ensure areas holding sensitive habitats adjacent to the proposed work corridor are protected during construction.

Within the lands-made-available for the proposed development (blue-line boundary) there are several areas supporting important habitats, which are largely encompassed within two areas known as Bracklin Wood and Lisclogher Bog (see **Figure A5.6.3**). These areas are recognised in the Westmeath Biodiversity Action Plan (2014-2020) as being of county importance for native woodland and alkaline fen. In addition, beyond the areas delineated as Bracklin Wood and Lisclogher Bog, between T10 and T11, a thin block of abandon cutaway bog has transitioned into a good example of Annex I bog woodland.

These areas will be protected during construction by the following:-

- Annex I bog woodland at T10, oak-birch-holly woodland at T11 and Bracklin Wood at T5 where it falls within the proposed bat feature buffers, will be excluded from the felling area (and will be subject to additional post-construction monitoring for bats), and will be marked out prior to felling by the Ecological Clerk of Works.

In order to protect other sensitive habitats during construction:-

- Access within the construction site will be restricted to the footprint of the proposed works corridor where possible. Access routes will be agreed on site and no access between different parts of the infrastructure will be permitted, except via the proposed works corridor. An Ecological Clerk of Works (ECoW) will be employed from the commencement to completion of construction works and will be tasked with monitoring work practices, which will ensure that construction activities are tightly constraint within the works corridor;
- A 5 m root protection buffer will be implemented to avoid construction damage from excavation or compaction to the roots of plants in hedgerows, treelines and woodlands adjacent to newly proposed access track running through improved grassland to T10/T11 and from T4 to T5. No excavation work, tracking of heavily plant or storage of materials. Measures required to protect watercourses (e.g. erection of silt fence) will be permitted within the buffer. If for unforeseen circumstances during the course of construction works any of these activities are required to occur within the buffer an appropriately qualified arboriculturist will undertake a pre-construction assessment to ensure impacts to vegetation are avoided; and
- Results of the monitoring of avoidance of sensitive habitats during construction will form part of the Ecological Clerk of Work's construction phase report.

3.6 Objective 6: Compensatory (offsetting) measures – re-planting

Rationale: Ensure on-site replacement of equivalent lengths/areas and species mixes of treelines and semi-natural woodland (Local (Higher) Importance) that will be removed during construction and will remain so for operational lifetime of the wind farm.

Figure A5.6.1 and **Figure A5.6.2** show the extent of woodland, treelines and hedgerows that will be lost as a result of felling associated with the proposal. **Table A5.6.2** provides the lengths/areas of habitats that will be lost due to the proposed development and the require offsetting through compensatory planting or enhancement measures.

Overall, within the proposed development area there is a maximum provision of 28 ha for tree felling/scrub clearance. (Note: The discrepancy between this value and those in **Table A5.6.2** are due to linear features being account for as lengths in the table, whereas the overall loss just considers area). As detailed in **Section 5.4.2.2** of **EIAR: Chapter 5: Biodiversity**, direct habitat loss due to the infrastructural footprint of the proposed development will result in the loss of 0.4 ha of mixed broadleaved woodland (not classified as commercial broadleaf plantation), 459 m of treelines [WL2] and 67 m of hedgerow [WL1]. Apart from short sections of hedgerow/treeline at T2 and T3, the majority of the infrastructural footprint is encompassed within the proposed felling zones and inclusive of sections beyond the felling zones compensatory measures are required for the following areas/lengths of habitat:-

- 67 m WL1 Hedgerow:
  - *Action*: Compensatory re-planting
- 1,392 m WL2 Treeline
  - *Action*: Compensatory re-planting
- 0.70 ha WD1 Mixed broadleaf woodland (not plantation)
  - Action: enhancement to compensate for area lost for substation (Note: This habitat is avoided at T5 an d will be retained within bat feature buffer)
- 1.53 ha WN7 Bog woodland non-Annex I
  - *Action*: Compensation through enhancement (see Objective 7)
- 0.09 ha WN7 Bog woodland Annex I
  - *Action*: Avoidance – areas to be retained within the felling zones
- 0.45 ha WN1 Oak-birch-holly woodland
  - *Action*: Avoidance – areas to be retained within the bat feature buffer

The species make up of these habitats, is detailed in **Section 5.4.2.2** of **EIAR: Chapter 5: Biodiversity**, with species composition listed as follows († indicates non-native species):-

- Mixed broadleaved woodland (not classed as plantation) on the site includes: beech (*Fagus sylvatica*)†, hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*), Scots pine (*Pinus silvestris*), bramble (*Rubus fructicosus*) and ivy (*Hedera helix*);
- Treelines are generally dominated by non-native beech† trees, but include: ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*), birch (*Betula spp.*), hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), Scots pine (*Pinus sylvestris*), sycamore (*Acer pseudoplatanus*) †, spindle (*Euonymus europaeus*), oak (*Quercus* spp.), elder (*Sambucus nigra*), dog rose (*Rosa canina*), bramble (*Rubus fructicosus*), holly (*Ilex aquifolium*), and ivy (*Hedera helix*); and
- Hedgerows include: dog rose (Rosa canina), hawthorn (Crataegus monogyna), blackthorn (Prunus spinosa), privet (Ligustrum vulgare), bramble (Rubus

fructicosus), elder (Sambucus nigra), ash (Fraxinus excelsior), spindle (Euonymus europaeus) and willow (Salix spp.).

The indicative locations for new woodland areas, treelines and hedgerows to be planted are shown in **Figure A5.6.4**. Note – this figure is to be updated prior to completion of works at the site, with total replacement being on a like-for-like basis of final areas and lengths lost.

- The species mix used for woodland, treeline and hedgerow replacement will be taken from those listed above, with the exception of ash, which should not be specified due to the potential loss of planted trees as a result of ash dieback. Beech, a naturalised species, is a part of the landscape but should only be specified as an occasional 'standard' in treelines and should not be specified in woodland or hedgerow replacement; and
- All planted woodland areas, hedges and treelines will be protected from stock, other grazing animals and competition from other plants until they are established (with potential measures including fencing and individual sapling guards).

3.7 Objective 7: Habitat enhancement area

Rationale: Define the extent of habitat enhancement area and the actions required to contribute to offsetting the loss of non-Annex I bog woodland at T10 and other areas of woodland, e.g. beech woodland at the substation.

It can be seen in **Figure A5.6.3** that Bracklin Wood and Lisclogher Bog, as published in the County Westmeath Biodiversity Action Plan (2015-2020), surround the southern border of the Application Site (and Bracklin Wood falls partly within the Application Site in the vicinity of T5). It can also be seen that an extent of bog woodland and oak-birch-holly woodland (see **Figure A5.6.2**) borders the Application Site in the vicinity of T10-T11, that is not included within Bracklin Wood or Lisclogher Bog Biodiversity Areas. To the south of T10, this includes Annex I Bog Woodland.

It is intended to bring this area (as shown in **Figure A5.6.4**), into positive conservation management, as well as undertaking positive management of the area of Bracklin Wood that falls within the Application Site in the vicinity of T5. This will result in an area of 13.3 ha of bog woodland and oak-birch-holly woodland being management for positive conservation benefit for the lifetime of the project, and contributing to the objectives of Westmeath Biodiversity Action Plan (2015-2020).

Habitat management actions in these areas will include:-

- Removal of Invasive Alien Species (notably cherry laurel);
- Implementation of appropriate hydrological conditions suitable for the management and enhancement of bog woodland, notably with respect to encouraging suitable conditions for the generation of the bryophyte understory typical of Annex I bog woodland. This will include:-
  - No new drainage with potential to affect the bog woodland for the lifetime of the proposal; and
  - Implementation of measures to impede drainage where it is considered to be affecting the ability of the habitat to achieve good conservation status; and
- Taking account of the potential for conditions to change prior to construction year, a survey of the above areas will be undertaken in the year prior to the commencement of construction, including a full survey of Invasive Alien Species and hydrological conditions, including drainage. Following this, management actions will be detailed in the form of a Woodland Management Report to be agreed with the Planning Authority prior to the commencement of construction.

Any required actions for impedance to drainage will be undertaken during the construction year and all actions will be expected to be in place for the lifetime of the wind farm.

Fossitt (2000) code	Habitat types	Site entrance	Turn to T1	Substation	T10 grid route	T02	T03	T04	T05	T06	T07	T10	T11	Total habitat alteration for felling	Compensatory measures
		Length (m) of linear features in felling zones													Yes/ no
WL1	Hedgerow						31							**31 m**	**Y**
WL2	Teeline	56	73			21		383	512		347			**1,392 m**	**Y**
		Area (ha) of habitats in felling zones													Yes/ no
WD1	Broadleaf - plantation							2.19		1.19	1.03			4.41 ha	**N**
WD1	Broadleaf - not plantation			0.70					Avoid					**0.70 ha**	**Y**
WD4	Conifer plantation	0.11	0.13	2.12				0.03	2.88	4.59	3.97		2.49	16.31 ha	**N**
WN1	Oak-birch-holly												0.45	**0.45 ha Avoided**	**N**
WN7	Bog woodland Non-Annex I				0.09							1.45		**1.53 ha**	**Y**
WN7	Bog woodland Annex I											0.09		**0.09 ha Avoided**	**N**
WS5	Clearfell											2.44		2.44 ha	**N**
Felling Footprint (ha) Note: Excludes area of linear features & sensitive habitats that are avoids		0.11	0.13	2.82	0.09			2.21	2.88	5.78	5.00	3.91	2.49	**25.3 ha**	

Habitat rows shaded in grey indicate important habitat types (Local (Higher) Importance or above) which require avoidance, compensatory planting or offsetting by enhancement

Note: For the grid connection there is small section which crosses through an area of WN1 oak-birch-holly woodland, however the impact is considered temporary and compensatory measures are not necessary.

Table A5.6.2: Lengths and areas of habitats affected

Figure A5.6.4: Indicative compensatory replanting and enhancement areas

3.8 Objective 8: Maintaining habitat connectivity

Rationale: Ensure compensatory planting maximises the ecological function of future woodland, treeline and hedgerow by specifying appropriate replacement locations to maximise connectivity.

A significant amount of the compensatory planting is required in response to the need for bat buffers between turbines and features likely to be used by foraging and commuting bats. Because of this, it is important that the planting contributes to connectivity of foraging and commuting features for bats.

In addition, there is a main badger sett and several outlier setts within the site, and it is important that planting takes account of the need to provide continued appropriate feeding habitat around these areas as well as connectivity between them.

Taking account of the above, an indicative replanting plan is provided in **Figure A5.6.4**. While this is currently considered provisional, any changes made must be fully justified in terms of ensuring ecological connectivity and integrity (notably taking account of the needs to bats and badgers at the site) and must be agreed in writing with the Planning Authority prior to finalisation.

3.9 Objective 9: Monitoring plan and remedial actions

Rationale: Provide a monitoring plan and remedial actions for to protect and enhance habitats throughout the operational life time of the proposed development.

3.9.1 Habitat Monitoring of Annex I Bog Woodland – Pre-construction, Construction and Post-construction

- Pre-construction eight permanent quadrats (10x10 m squares) will be set up within the area of Annex I bog woodland between T10 and T11 for long-term vegetation monitoring. To ensure quadrates can be relocated on subsequent visits, accurate grid references on the south west corner of the square will be taken and these will be marked using permanent metal pins. Quadrats will be distributed through the habitat to sample central areas and areas around the edge of the bog woodland;
- Baseline conditions will be established pre-construction and for each quadrat:-
  - Photographs will be taken to visually document any changes in site conditions over time;
  - Vegetation type will be recorded;
  - All species present will be listed, together with an indication species abundance, both in terms of % cover and rating on the DOMIN scale;
  - The presence of both positive and negative indicator species for the habitat type will be noted;
  - Other factors including peat depth, vegetation height, ground conditions and management will be recorded; and
  - Assessment criteria for bog woodland will follow those detailed in Cross & Lynn (2013);
- During construction, surveys will be repeated to ensure that the habitat is not impact by constructions works, especially by any drainage in the vicinity of T10 and the track leading to T11;
- Post-construction surveys will be undertaken in Years 1, 2, 3, 5 and 10; and
- Surveys must be undertaken by a suitable qualified botanist and at the optimal time of year for surveying bog woodland.

3.9.2 Post-construction Monitoring of Habitat within Bat Feature Buffers

The aim for bat feature buffers around turbines is to ensure that habitats are as

featureless as possible to discourage foraging bats, as well as potential prey species for kestrels. Initially this will require regular monitoring in Year 1, 2 & 3 to ensure vegetation clearance measures and ongoing management result in the desired habitat conditions. Once the optimal conditions have been created (after year 3) the habitat will continue to be maintained in this manner.

3.10 Objective 10: Reporting and remedial action schedule

Rationale: Provide a reporting and remedial action schedule that will demonstrate compliance with requirements under the HMP.

A reporting schedule will be agreed with the Planning Authority. Typically, as evidence of compliance, a HMP implementation report should be compiled at the end of each monitoring year detailing the findings of all management and monitoring activities, and is submitted to the Local Planning Authority. The report should present a summary of the activities undertaken over the course of each year, stating whether these activities meet the requirements of the HMP and relevant planning conditions. The HMP is considered a dynamic document, to be informed by ongoing monitoring and habitat management measures. It should be reviewed regularly and modified as required, pending submission to and approval by the Local Planning Authority and other stakeholders.

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