Ballinlee Green Energy Ltd.

Ballinlee Wind Farm

Appendix 6I: Habitat and Species Management Plan

Woodrow Ref: P00012353

Date: September 2025

COMMERCIAL IN CONFIDENCE

woodrow

APEM Group

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Address:	Station Road, Adare, Co. Limerick
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1	12/05/2025	All	All	D01 First Draft	MMW
2	10/09/2025	All	All	D02 Legal comments	MMW
3	23/09/2025	All	All	D03 Final	JG

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1. INTRODUCTION

1.1. Background

APEM Group Woodrow was commissioned by the client, Ballinlee Green Energy Ltd., to undertake a Habitat and Species Management Plan (HSMP) for the proposed Ballinlee Wind Farm (hereafter the Development). The Development is approximately 18 km southeast of Limerick City and 3 km southwest of Bruff, Co. Limerick.

Habitat enhancement measures are increasingly acknowledged as an important aspect of development and are best aimed at habitat types where ecological function and wider connectivity can be improved, and habitats that have the potential to contribute meaningfully to wildlife conservation in the area.

Individual habitats and species requiring particular management measures to ensure that mitigation is delivered effectively have been included within this HSMP, which sets out detailed strategies for the protection and/or enhancement of each feature. The proposed management measures are within the planning application boundary and landowner consent is in place for the activities which will be carried out.

Habitat features in the Development site that have been identified to provide the most ecological value and therefore, considered in this HSMP are grasslands, wetlands, hedgerows and treelines. These features, and their distribution within the Development site, are provided in Figure 1 and Figure 2 and are described in Section 2. Although the HSMP focuses primarily on these habitats, the measures proposed to be implemented will have overarching benefits for a wide range of local flora and fauna, including invertebrates, amphibians and mammals. The main aim of this document is to maintain and enhance the conservation status habitats of conservation concern within the Development site and to compensate for negative effects on these features arising during the construction of the Development.

This HSMP should be read in conjunction with Environmental Impact Assessment Report (EIAR) Chapter 6 Biodiversity. A Whooper Swan Management Plan (WSMP), cognisant of this HSMP, is provided in Chapter 7 Ornithology, Appendix 7D, and has been developed to minimise population level effects on a local whooper swan population utilising the northern section of the Development site.

1.2. Overview

This HSMP sets out the methods to manage habitats affected by the Development in order to benefit biodiversity, taking into consideration the mitigation measures set out in Chapter 6 Biodiversity. Management measures included in the HSMP are set out to benefit the following habitats and ecological features:

- Habitats – semi-natural grasslands, hedgerows and woodland
    - Sowing a species rich, locally sourced grassland seed mix around the perimeter of the proposed Ballinlee substation using the hay transfer method.

- Planting new native hedgerow and enhancing existing hedgerows within the Planning Application Boundary. Hedgerows will not be planted within bat feature buffers around turbines.
- Planting native woodland south of Turbine 5 in an area of conifer plantation to be felled.

- Amphibians – common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*)
  - Creation of a pond and wetland meadow habitat as suitable amphibian breeding habitat.
- Non-native invasive species
  - Treatment and disposal of invasive plant species not listed on the 3rd schedule of the Habitats Regulations S.I. 477 of 2011.

Although the HSMP focuses on the features outlined above, the measures proposed will have overarching benefits for a wide range of local flora and fauna, particularly birds (e.g. passerines), invertebrates (e.g. pollinators) and mammals (including foraging bats).

Additional management measures are outlined below. The locations will be agreed by an Ecological Clerk of Works (ECoW) based on suitability:

- Installation of cattle drinkers to provide an alternative water source, thereby eliminating the need for livestock to enter watercourses etc.
- Riparian margins along watercourses allowing natural vegetation to protect water quality and aquatic ecosystems.
- No further maintenance of land drains/drainage ditches which will help maintain potential spawning and foraging habitats for amphibians.
- Silt ponds constructed for water quality protection associated with proposed development infrastructure will be retained post construction to allow colonisation by local aquatic flora and fauna.

2. BASELINE ECOLOGICAL CONDITIONS

2.1. Habitats

The habitats recorded within the Planning Application Boundary of the Development are listed in Table 1 and shown in Figure 1 and Figure 2. No Annex I habitats and/or protected flora were recorded. The area/length of these habitats occurring within the Planning Application Boundary are presented in Table 1 and Figures 1 and 2. The area/length to be removed as a result of the Development are presented in Table 2 and illustrated in Figure 3-6.

Given the nature and extent of hedgerows and drainage ditches within the Development, a specific Hedgerow Appraisal System (HAS) assessment was undertaken to assess the quality and condition of hedgerows within the Development. See Section 2.2.

See Appendix 6D Baseline Habitat and Mammal Report for full details of the habitats recorded and Chapter 6 Biodiversity for further details regarding habitat loss within the Planning Application Boundary.

Table 1: Habitats recorded within the Planning Application Boundary

Habitat Classification[1]	EU Annex I Affiliation	Area [ha] or Length [m/km] within the Planning Application Boundary
BL2 Earth banks	None	111.5 m
BL3 Buildings and artificial surfaces	None	0.08 ha
GA1 Improved agricultural grassland	None	182.3 ha
GS4 Wet grassland	None	3.4 ha
FW2 Depositing/lowland river	None	4.1 km
FW4 Drainage ditches	None	12.1 km
WD2 Mixed broadleaved/conifer woodland	None	1.4 ha
WD4 Conifer plantation	None	18.4 ha
WL2 Treeline	None	6.3 km
WL1 Hedgerows	None	9.1 km
WS1 Scrub	None	1.7 ha
WS2 Immature woodland	None	3.5 ha
WS3 Ornamental/non-native shrubs	None	N/A

[1] Habitat classification is in accordance with Fossitt (2000)

Table 2: Habitats identified as Important Ecological Features and habitat loss of these under the footprint of the Development

	Area (ha) or Length (km)		
Habitat Classification	**Planning Application Boundary**	**Permanent habitat loss**	**Temporary habitat loss**
Hedgerows (WL1)	9.1 km	1.9 km	230.3 m
Treelines (WL2)	6.3 km	922.3 m	246.5 m
Drainage ditches (FW4)	12.1 km	1.3 km	236 m
Depositing/lowland river (FW2)	4.1 km	n/a	51.4 m
Mixed broadleaved/conifer woodland (WD2)	1.4 ha	1.1 ha	n/a
Immature woodland (WS2)	3.5 ha	1.8 ha	n/a

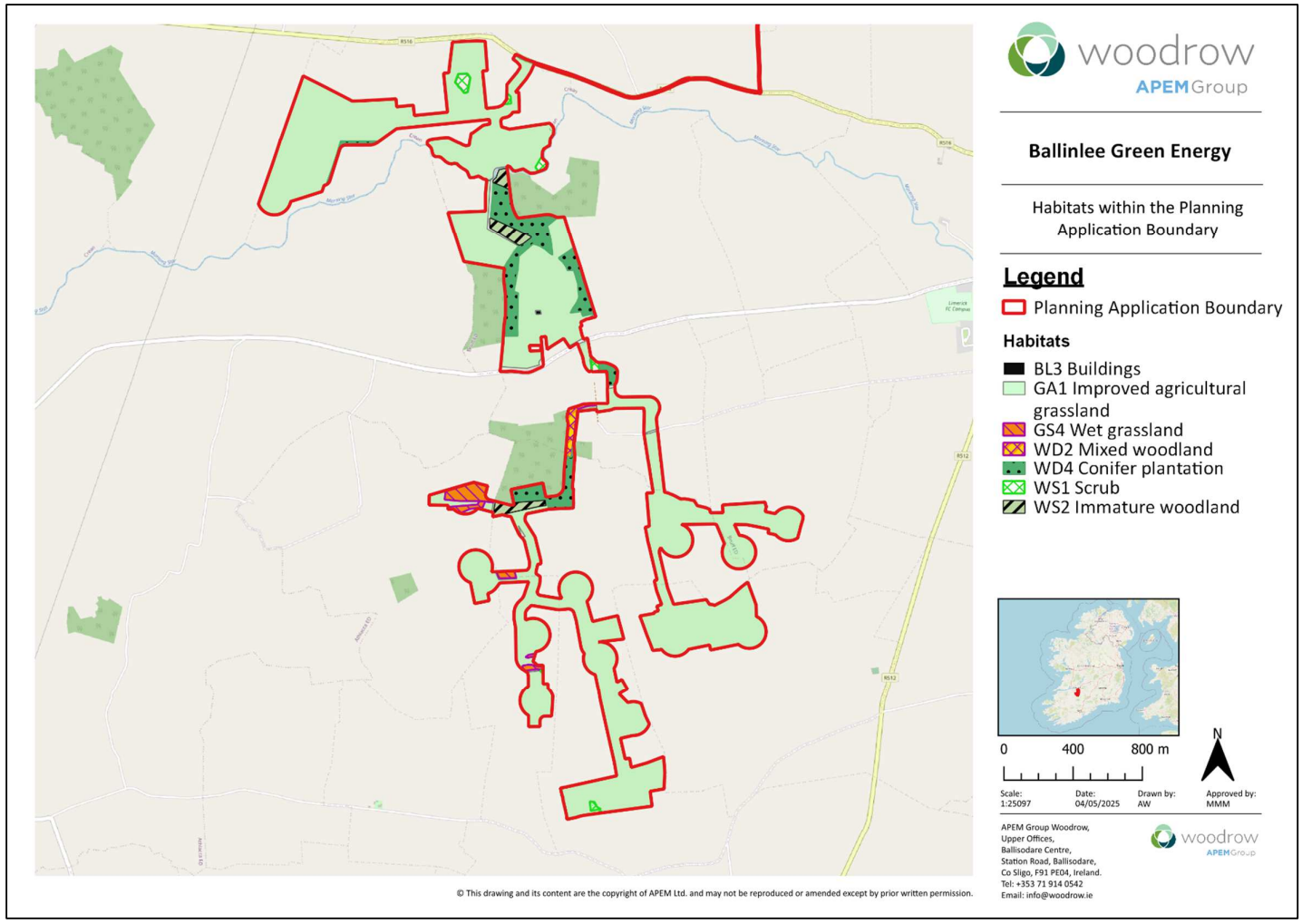

Figure 1: Habitat classification map (not including linear habitats) for the Planning Application Boundary (habitats classified using Fossitt, 2000)

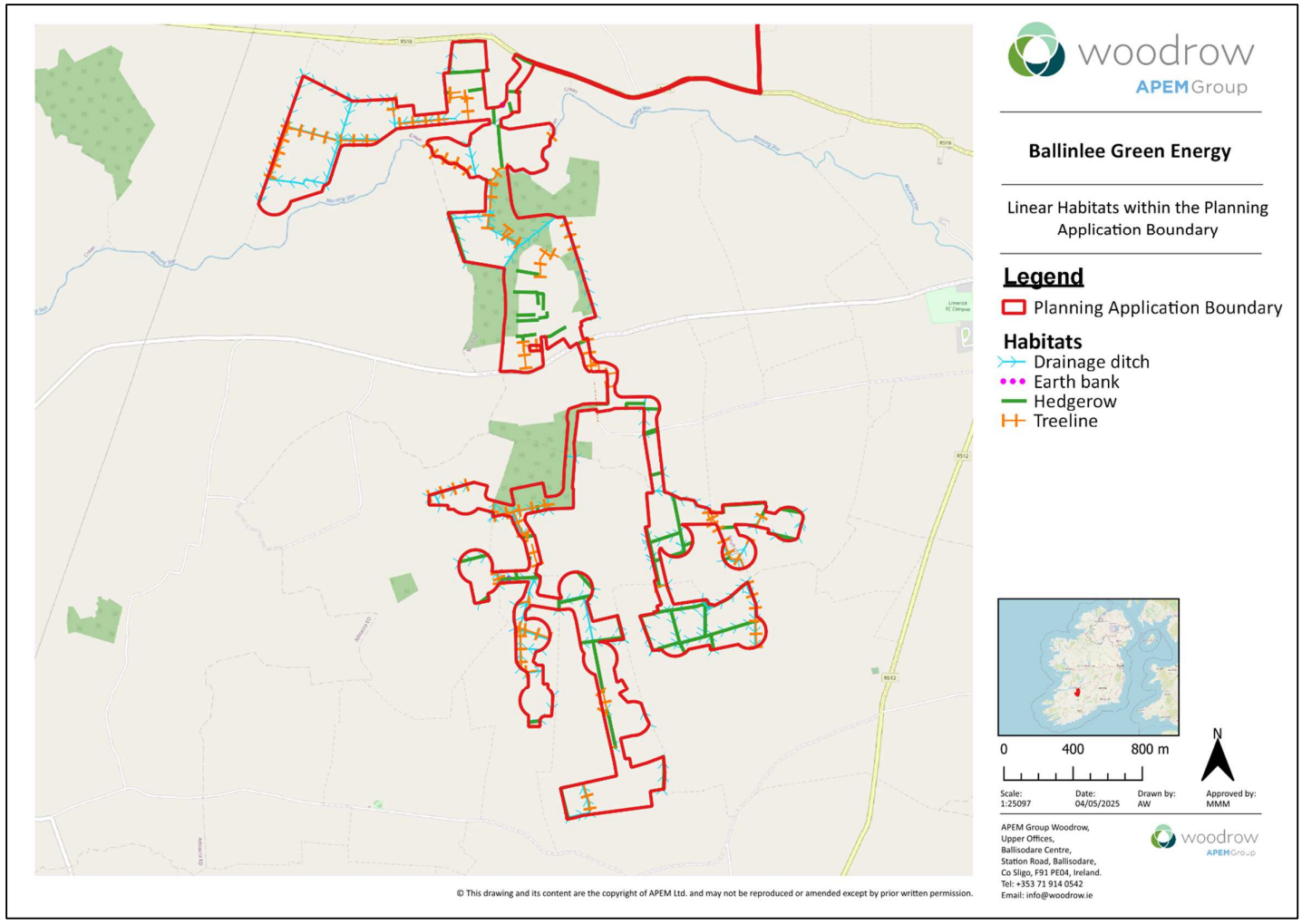

Figure 2: Habitat classification map illustrating the linear habitats recorded within the Planning Application Boundary (habitats classified using Fossitt, 2000

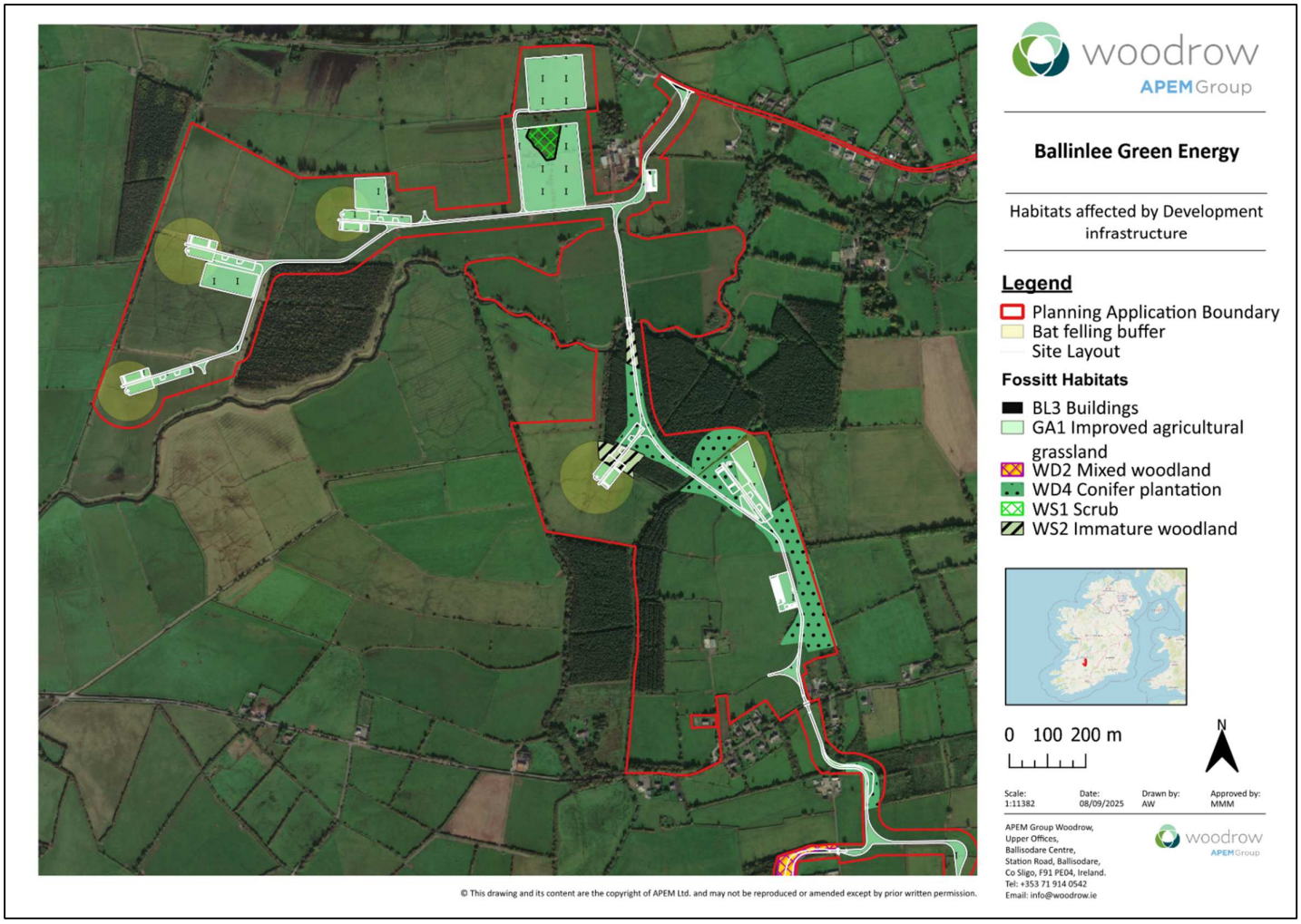

Figure 3: Fossitt (2000) non-linear habitats within the Planning Application Boundary, directly affected by the Development footprint (Northern section)

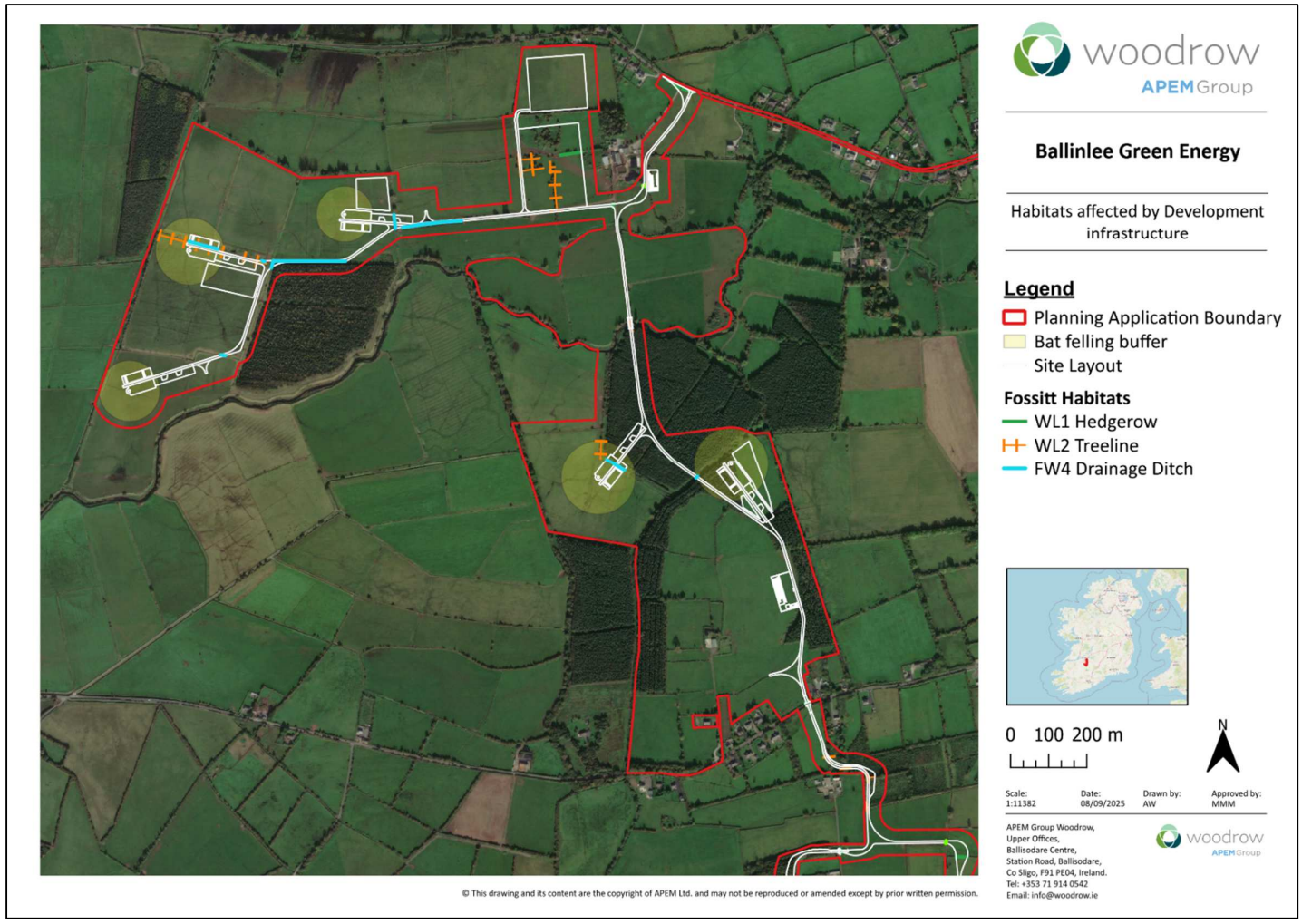

Figure 4: Fossitt (2000) linear habitat within the Planning Application Boundary, directly affected by the Development footprint (Northern section)

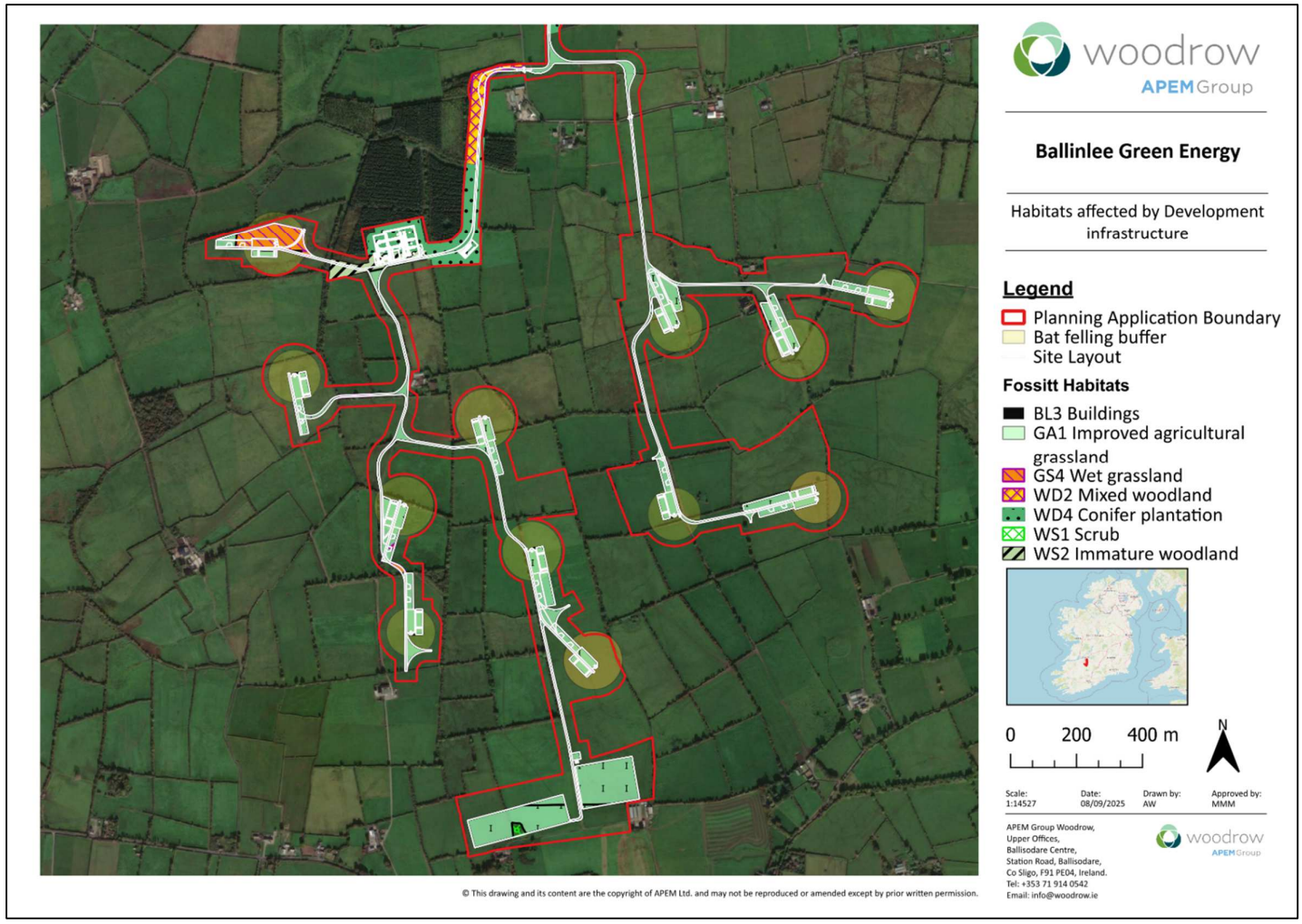

Figure 5: Fossitt (2000) non-linear habitats within the Planning Application Boundary, directly affected by the Development footprint (Southern section)

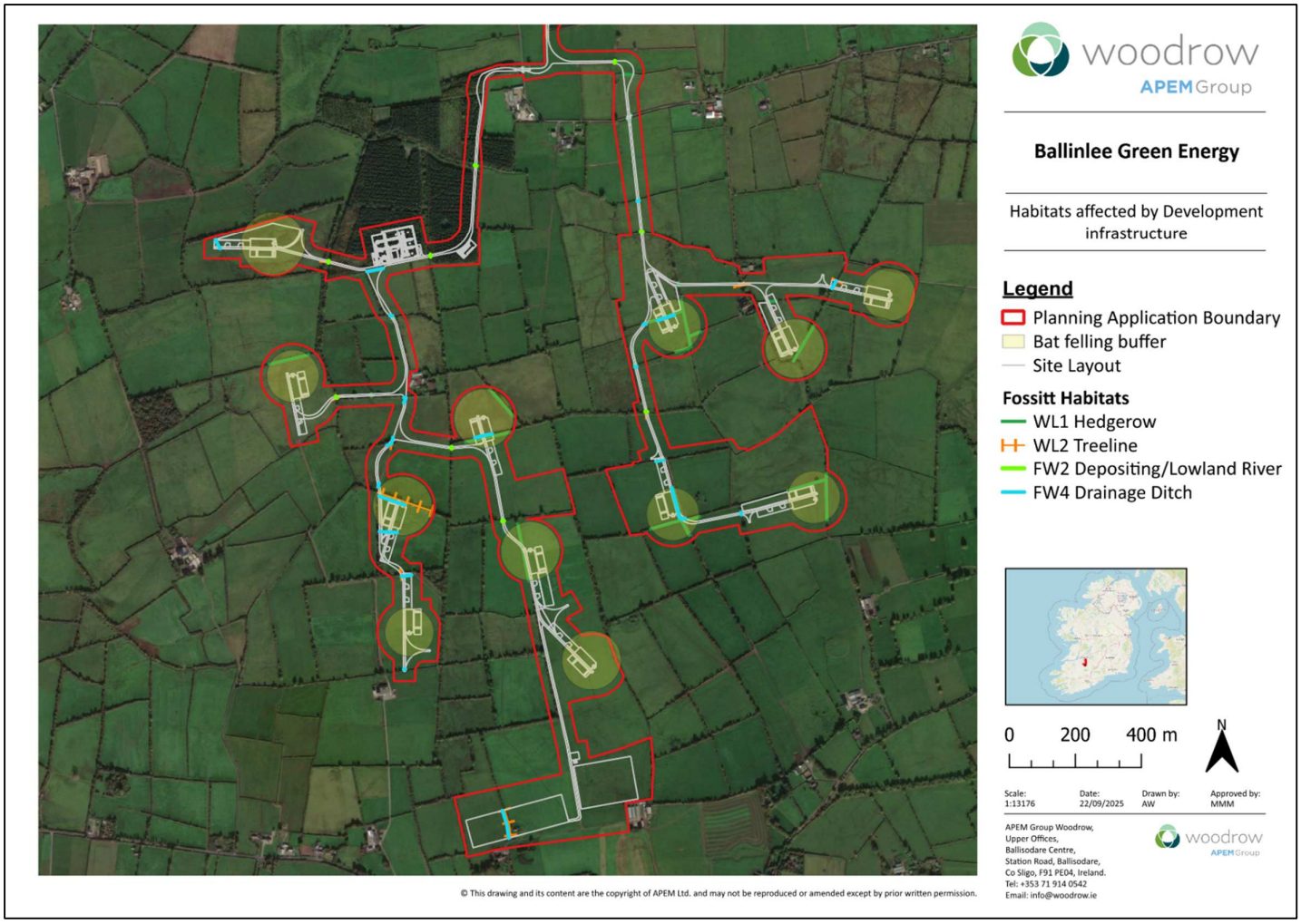

Figure 6: Fossitt (2000) linear habitats within the Planning Application Boundary, directly affected by the Development footprint (Southern section)

2.2. Hedgerow Appraisal System

In total there were 34 hedgerows recorded within the Planning Application Boundary which have each been assessed in line with the Hedgerow Appraisal System (HAS). Of these, two rated as high significant hedgerows, six rated as moderate, 21 as slight and five as low. The two that rate high were due to one hedgerow (no. 6) being along a stream/river, and the second (no. 33) forms a townland Parish boundary. Reference should be made to Table 3 for the full list of hedgerows assessed and their significance rating as per HAS, and Figures 7 and 8 for their locations within the Planning Application Boundary.

Table 3: Hedgerow Appraisal System (HAS) results within the Planning Application Boundary

ID	Historical Significance[2]	Species Diversity[3]	Ground Flora[4]	Structure, Construction & Associated Features[5]	Habitat Connectivity Significance[6]	Landscape Significance[7]	Overall Hedgerow Significance
1	Low	Low	Low	Moderate	Slight	Low	Low
2	Slight	Low	Low	Slight	Moderate	Low	Low
3	Slight	Low	Low	Slight	Moderate	Low	Low
4	Slight	Slight	Low	Low	Slight	Low	Slight
5	Slight	Low	Low	Low	Moderate	Low	Low
6	Moderate	Low	Low	Highly significant	Significant	Moderate	High
7	Slight	Low	Low	Low	Significant	Moderate	Slight
8	Moderate	Slight	Low	Low	Significant	Moderate	Moderate
9	Slight	Low	Slight	Slight	Significant	Slight	Slight
10	Slight	Low	Low	Moderate	Moderate	Moderate	Moderate
11	Slight	Low	Low	Moderate	Moderate	Slight	Slight
12	Slight	Slight	Low	Moderate	Moderate	Slight	Slight
13	Slight	Slight	Low	Moderate	Moderate	Slight	Moderate
14	Slight	Low	Low	Slight	Low	Low	Slight
15	Slight	Low	Low	Moderate	Moderate	Low	Slight
16	Slight	Slight	Low	Moderate	Moderate	Moderate	Moderate
17	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate
18	Slight	Low	Low	Moderate	Moderate	Low	Slight
19	Slight	Slight	Low	Significant	Moderate	Moderate	Moderate
20	Slight	Low	Low	Slight	Moderate	Slight	Slight
21	Slight	Low	Low	Slight	Moderate	Slight	Slight

[2] Low - Recently established (0-25 years); Slight - Internal field boundary; Moderate -Roadside/Rail/Canal Boundary, Farm Boundary, March ditch, Mearing; Significant - Boundary appears on 1st Edition O.S; Highly significant - Townland Parish / County Boundary: Area shown as, or connected to, woodland on 1st Edition O.S. map: Connects to feature recorded on Sites and Monuments Record

[3] Low - 1-3 listed species/30m strip; Slight - 4/5 species / 30m strip; Moderate - 6/7 species / 30m strip; Significant - 8/9 species / 30m strip; Highly significant - 10+ species / 30m strip

[4] Low - <2 listed sp./30m and dominated by ruderal species nettle/dock/thistle/cleavers; Slight - 2-3 species / 30m strip; Moderate - 4-5 species / 30m strip; Significant - 6-7 species / 30m strip including 3-5 species; Highly significant - >7 species / 30m strip and >5 species

[5] Low - No associated features; Slight - Wall/Bank <0.5m height/dept; Moderate - Wall/Bank 0.5-1m, Dry ditch, Badger Sett, Green Lane; Significant– wall/bank >1m, wet ditch/drain; Highly significant - Double ditch, Stream/River

[6] Low - No connection with other semi-natural habitat; Slight - Single link with semi-natural habitat including hedgerow; Moderate - Multiple links with semi-natural habitats, including hedgerows; Significant - Link with woodland/forest habitat; Highly significant (score 4) - Link with designated area, particularly woodland

[7] Low; Slight - Wind shaped; Moderate - Mature Hedgerow Trees, including hedgerows; Significant; Highly significant - Area covered by Landscape designation (Landscape Conservation Order, Tree Protection Order, Amenity Area Order)

ID	Historical Significance 2	Species Diversity3	Ground Flora4	Structure, Construction & Associated Features5	Habitat Connectivity Significance 6	Landscape Significance 7	Overall Hedgerow Significance
22	Slight	Low	Low	Slight	Slight	Low	Slight
23	Slight	Slight	Slight	Slight	Slight	Moderate	Slight
24	Slight	Low	Low	Low	Slight	Slight	Slight
25	Low	Low	Low	Slight	Moderate	Low	Slight
26	Slight	Low	Slight	Low	Low	Low	Slight
27	Slight	Low	Low	Moderate	Moderate	Low	Slight
28	Slight	Low	Low	Moderate	Moderate	Low	Slight
29	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight
30	Slight	Slight	Slight	Moderate	Moderate	Low	Slight
31	Low	Low	Low	Low	Slight	Low	Slight
32	Low	Low	Low	Low	Moderate	Low	Low
33	Highly Significant	Moderate	Moderate	Moderate	Moderate	Low	High
34	Slight	Low	Moderate	Moderate	Moderate	Low	Slight

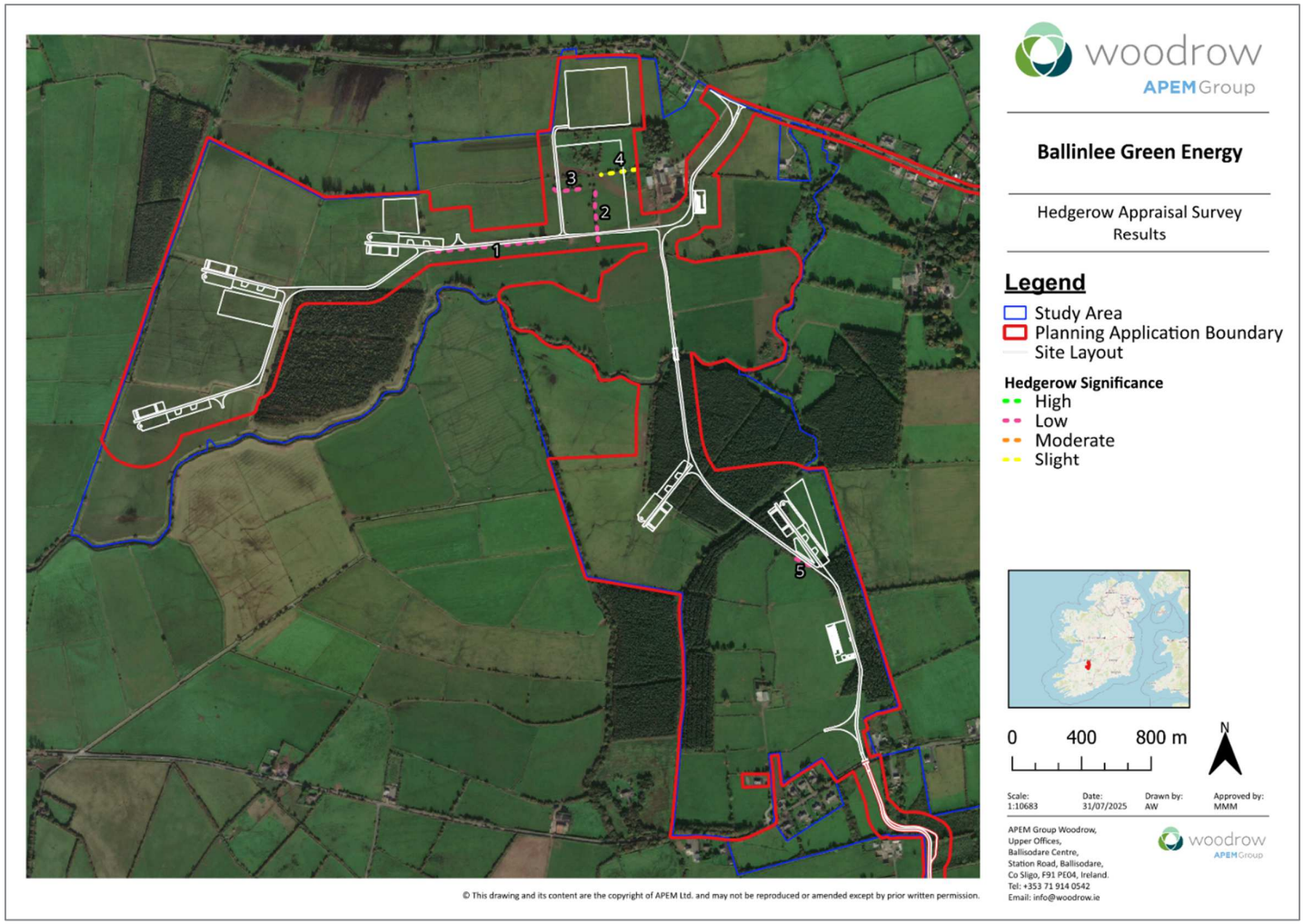

Figure 7: Hedgerow Appraisal System (HAS) results within northern section of Development

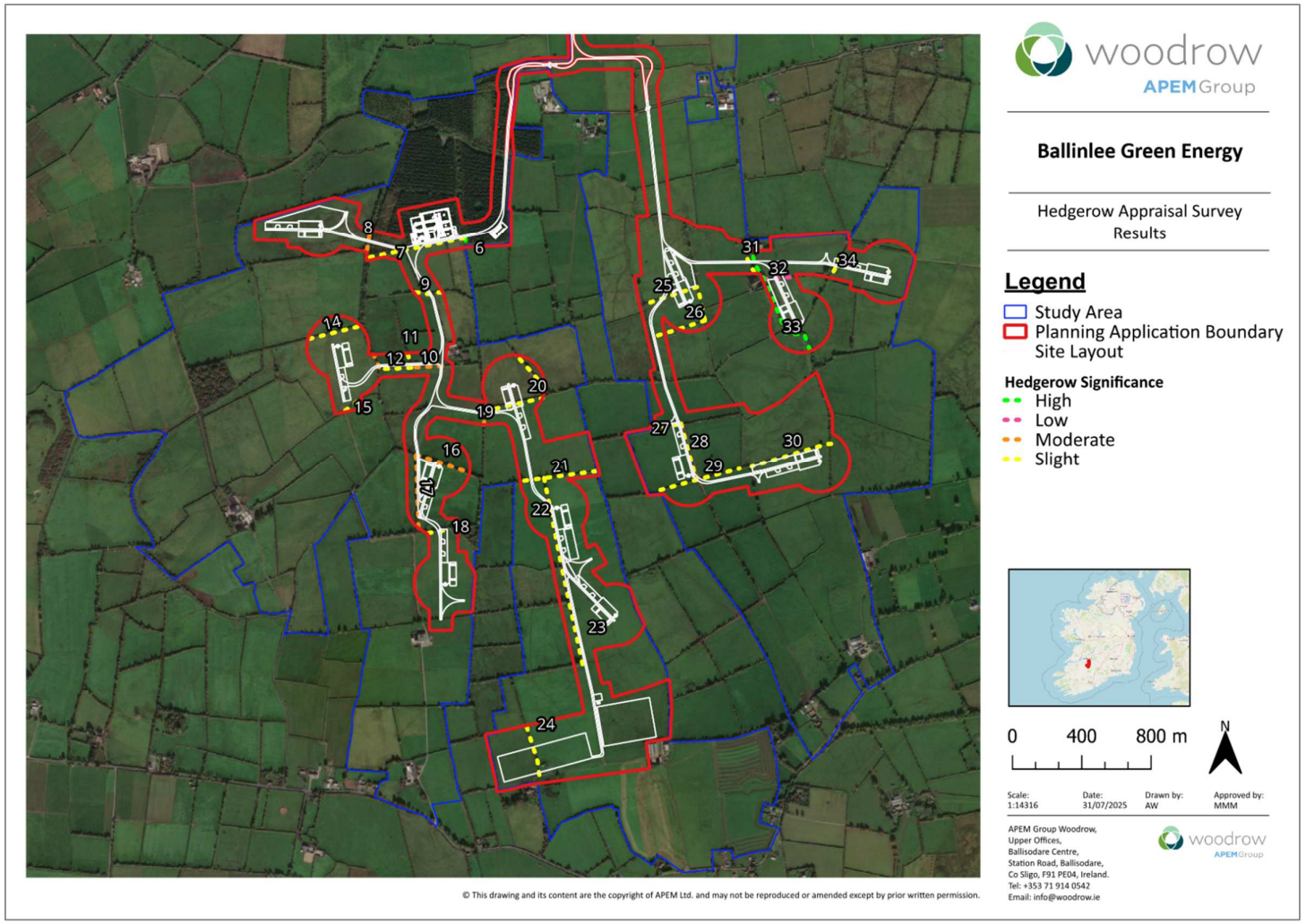

Figure 8: Hedgerow Appraisal System (HAS) results within southern section of Development

2.3. Protected Fauna

Protected fauna species recorded within the Development site with the potential to be affected are outlined below (see also EIAR Chapter 6 Biodiversity and Chapter 7 Ornithology for further details).

Habitats will be managed for the following species to re-establish connectivity, provide additional foraging and shelter opportunities, and support key life cycle stages such as breeding, dispersal, and overwintering.

- Foraging and commuting terrestrial mammals
    - Badger (*Meles meles*)
    - Otter (*Lutra lutra*)
    - Pine marten (*Martes martes*)
- Foraging and commuting bat species using the Site including
    - Common pipistrelle (*Pipistrellus pipistrellus)*
    - Soprano pipistrelle (*Pipistrellus pygmaeus*)
    - Leisler's bat (*Nyctalus leisleri*)
    - *Myotis* species
    - Nathusius' pipistrelle (*Pipistrellus nathusii)*
    - Brown long-eared bat (*Plecotus auritus*)
    - Lesser horseshoe bat *Rhinolophus hipposideros*)
- Amphibians
    - Common frog (*Rana temporaria*)
    - Smooth newt (*Lissotriton vulgaris*)
- Birds
    - Range of passerine species including the Red-listed[8] species as outlined in Chapter 7 of this EIAR.
    - A specific Whooper Swan Management Plan (WSMP) is included as Appendix 7D and is not repeated in this HSMP.

3. MANAGEMENT AREAS

Within the lands available for the Development, there are several areas of ecologically important habitats. The Development site encompasses the following habitats that are considered for habitat management measures:

[8] Refers to birds on the Red List (high conservation concern) of Birds of Conservation Concern in Ireland (Gilbert and Lewis, 2021).

- recolonising bare ground following the felling of conifer plantation.
- an extensive network of hedgerows/treelines.

Five key ecological management areas have been identified:

- Area 1 (14.3 ha) – proposed for management of lands for whooper swan (see Whooper Swan Management Plan for further details (APEM Group Woodrow, 2025)
- Area 2 (27.5 ha) – proposed for hedgerow and treeline enhancement and replanting
- Area 3 (0.85 ha) – proposed for establishment of pond and wetland meadow
- Area 4 (1.74 ha) – proposed for establishment of native broadleaved woodland
- Area 5 (3.08 ha) – proposed for establishment of native species-rich grassland habitat

These management areas aim to enhance the overall habitat quality and biodiversity within these areas.

Figure 99 outlines additional management areas including additional hedgerow replanting/enhancement within the Development site. See Appendix I for targeted figures for each area.

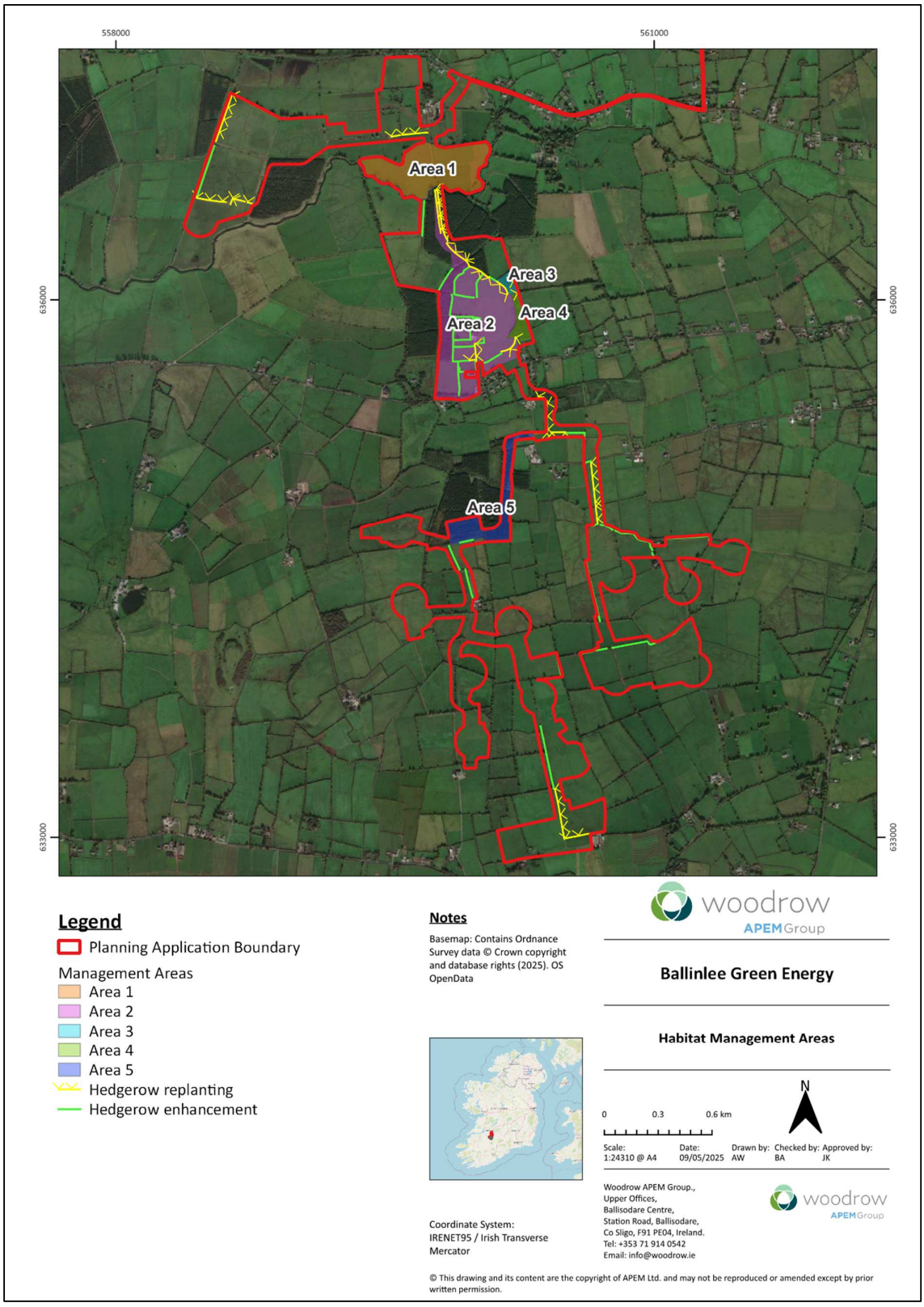

Figure 9: Proposed management and hedgerow replanting/enhancement areas within the Planning Application Boundary

4. MANAGEMENT AIMS AND OBJECTIVES

4.1. Management Rationale

This document outlines habitat enhancement measures within the Planning Application Boundary to offset impacts and improve conditions for ecologically important species and habitats, ensuring implementation of recommended mitigation (EIAR Chapter 6 Biodiversity) and pursuing enhancement opportunities where feasible.

The project design has been developed to avoid direct impacts to several key ecological habitats, as identified in Section 2.1. While some important linear features, such as hedgerows, will be unavoidably affected, the approach goes beyond simple like-for-like replacement or net gain measured solely by length.

Instead, the strategy is guided by a quality and function-based assessment, including HAS. This ensures that the ecological function, structure, and biodiversity value of both retained and newly established hedgerows are maintained or enhanced.

New and translocated hedgerow planting, totalling approximately 3,970 m, will be implemented with a focus on species composition, structural diversity, and connectivity, aiming to deliver measurable improvements in habitat quality and ecosystem services. The enhancement measures will be strategically located outside the designated bat buffer zone to maximise ecological value and minimise potential impacts on bat populations.

Monitoring and adaptive management will be employed to track the establishment and maturation of new hedgerows, ensuring that ecological function is achieved over time, rather than relying solely on quantitative measures of length.

4.2. Aims and Objectives

Taking account of the above, the objectives of the HSMP are as follows:

1. Habitat Reinstatement and Enhancement

To enhance and restore important biodiversity habitats within the Planning Application Boundary to compensate for adverse impacts due to the construction works.

2. Habitat Recovery/Restoration

To ensure the quick recovery of areas affected by the works through a combination of impact minimisation during works and targeted post-construction remedial action. Translocation of existing hedgerows, that are scheduled for removal, and provision of semi-mature species will reduce the establishment period.

3. Establishment of Species-rich Grassland

To enhance neglected habitats within the area to contribute to the compensation for losses elsewhere. Establishment of species-rich grassland mainly pertains to the area around the proposed Ballinlee substation.

4. Establishment of Native Broad-leaved Woodland

To enhance neglected habitats within the area to contribute to the compensation for losses elsewhere. Establishment of Native Broad-leaved Woodland mainly pertains to the area south of Turbine 5 within lands available for enhancement following the removal of conifer plantation during the construction phase.

5. Establishment of Pond and Wetland Meadow

To enhance neglected habitats within the area to contribute to the compensation for losses elsewhere. Establishment of pond(s) and wetland meadow mainly pertains to the area south of Turbine 5 within lands available for enhancement following the removal of conifer plantation during the construction phase (refer Area 3 in Appendix I).

6. Prevention of Invasive Plant Species Spread

To prevent the spread of giant rhubarb *Gunnera manicata* and Japanese knotweed *Reynoutria japonica*, both listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended), and of winter heliotrope, a low-risk invasive plant species.

7. Monitoring of Effectiveness and Remedial Action

To oversee and monitor the success of protection and enhancement measures and to take remedial action as required.

8. Maintenance of post-felling habitat conditions

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

The HSMP will be monitored and reported on during construction (hereafter referred to as Construction Year) and in Years 1, 2, 3, and 5 following the completion of construction or as required under any Planning Consent provided for the proposal. Table 6 (in Section 6 of this report) includes details of measurements of success for all actions outlined in this HSMP to best facilitate the aforementioned reporting.

4.3. Benefits to Biodiversity

Key habitat management actions that will maximise benefits to breeding birds and biodiversity (terrestrial mammals, bats, amphibians) include:

- Reinstating grassland habitat at the margins of arable and agricultural grassland fields within the footprint of the Planning Application Boundary;
- Leaving field margins or strips, measuring a minimum of 3 m in width, in order to provide nectar and pollen for pollinators in the early Autumn period, while flowering plants will retain their seed heads throughout the winter period, providing a valuable food resource for birds throughout the year;

- Translocation of hedgerows and planting of replacement semi-mature hedgerow within the Planning Application Boundary, and supplementary enhancement of hedgerows along failed hedgerow boundary features.

5. MANAGEMENT PROPOSAL

5.1. Objective 1 – Habitat Reinstatement and Enhancement

To enhance and restore habitats important for biodiversity within the Planning Application Boundary to compensate habitat loss under the footprint of the Development.

5.1.1. Rationale for Objective and Associated Issues

Habitat enhancement measures are increasingly acknowledged as an important aspect of windfarm Development and are often used to compensate for loss of habitat to the windfarm footprint or construction operations. Opportunities for habitat enhancement are best aimed at habitat types that have the potential to contribute meaningfully to wildlife conservation in the area.

Enhancement and restoration of habitats such as hedgerow and woodland will benefit a wide range of terrestrial species including those outlined in Section 2.2. These measures and management will provide foraging and breeding habitat and shelter for these species. Refer to Section 2.1 showing habitat present within the Planning Application Boundary and what will be lost as part of the Development.

5.1.2. Hedgerows and Treelines

5.1.2.1. Replanting

The majority of hedgerow and treeline habitat loss is associated with habitat buffering measures required to avoid negative effects on bats as per NatureScot (2021) recommendations. Under the footprint of the Development there will be a loss of *c.* 1.9 km of hedgerow and *c.* 922.8 m of treelines will be removed. The aim is to enhance retained hedgerows and compensate for the loss of hedgerows by planting a similar, or greater length, of hedgerow within the Planning Application Boundary to maintain ecological corridors throughout the area. Through management measures hedgerows will be reinstated to the same or better Hedgerow Assessment System (HAS) classification as identified during surveys and set out in Section 2.2 of this report.

As such, measures include:

- Where possible, hedgerows (including those with trees), scattered trees and scrub, removed to facilitate the Development will be replaced using appropriate semi-mature native and locally sourced species and ensuring connectivity for ecological features. Hedgerows will be replanted in a greater amount and composition (based on HAS) than that being removed to reduce the effects of habitat fragmentation from the Development and provide greater habitat connectivity for bat species and other species reliant on hedgerows as ecological corridors. A total of *c.* 3970.1 m of hedgerow is proposed to be replanted within the Planning

Application Boundary, resulting in a net gain in length of 2390.6 m. Hedgerow planting will be accordance with the latest guidance (in this instance NBDC, 2018) and include the following native species: alder *Alnus glutinosa*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, , hazel *Corylus avellana*, dog-rose *Rosa canina*, guelder rose *Viburnum opulus*, spindle *Euonymus europaeus* and hawthorn *Crataegus monogyna*.

- Double hedgerows will be created along access tracks within wooded areas. Hedgerow planting will include the following native species: alder *Alnus glutinosa*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, hazel *Corylus avellana*, dog-rose *Rosa canina*, guelder rose *Viburnum opulus*, spindle *Euonymus europaeus* and hawthorn *Crataegus monogyna*.
- Bat vegetation buffers must be managed in a way so as to keep the buffer zones clear from vegetation for the lifetime of the Development to ensure that these areas remain unattractive to foraging bats (NatureScot, 2021). No hedgerow replanting will take place in these areas and scrub vegetation will not be allowed to regenerate naturally.
- Hedgerows outside the bat buffers will be developed into wildlife corridors, aligning with the Limerick Development Plan 2022-2028 and Limerick Local Biodiversity Action Plan (LBAP) 2025–2030. A minimum of a 3 m unmown set-aside will be maintained on either side of the hedgerow and would include seeding for semi-natural grassland, a pollinator flower seed mix or strips of arable crops that would not be harvested and remain a food resource and refuge for wintering and breeding birds, passerine birds like and meadow pipit and other fauna.

5.1.2.2. Translocation

Translocation of removed mature hedgerow plants is a successful option for reinstatement of hedgerows scheduled for removal and will reduce the establishment period of such replanted features.

Translocation will be undertaken in line with the guidance document on hedgerow translocation from Hedgerows Ireland.[9]

5.1.2.3. Enhancement

Where existing hedgerows require enhancement, supplementary semi-mature hedgerow planting to create double hedgerows will be planted. Hedgerow planting will include the following native species: alder *Alnus glutinosa*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, hazel *Corylus avellana*, dog-rose *Rosa canina*, guelder rose *Viburnum opulus*, spindle *Euonymus europaeus* and hawthorn *Crataegus monogyna*. A total length of 6133.1 m of hedgerow habitat is proposed for enhancement measures.

5.1.2.4. Methods and Action

Actions for 'Objective 1: Habitat Replanting and Enhancement' are prefixed with 'A' for cross-referencing with Table 6.

9 Guidance Note: Hedgerow Translocation Hedgerows Ireland

[Available at https://hedgerows.ie/translocation/]

A1 A total length of 3,970.1 m of hedgerow will be planted, and the following steps will be adopted during planting:

- Planting will be undertaken in the appropriate season (October to March) using bare root stock (i.e. whips (apart from translocation)) avoiding periods following heavy rain or periods of frost;
- Areas for hedgerow laying will be marked out using wire or twine (area of c. 1.2 m in width);
- The ground between twines will first be prepared by scraping away vegetation with a mini-digger or small excavator;
- Plants will be protected from drying out by keeping plants in a bag until needed;
- Planting will be performed in double staggered rows, with *c*. 33 cm between the rows and the same between each plant. All eight species as listed in Section 5.1.2.2 will be incorporated in 30 m sections (*Note: for biodiversity it is important that no one species makes up more than 70% of the total number of plants*);
- Species like hawthorn *Crataegus monogyna* will be planted as trees every 10-15 m in order to enhance hedgerow structure (*Note: these may need to be protected as trees using tree guards*);
- Planting will be performed to the same depth, with stems exposed and roots buried;
- Organic mulching (e.g. wood chip, straw) will be used around plants in order to control the growth of competing vegetation;
- Where hedgerows are to be planted in areas with livestock, a fence will be placed along the length of the newly laid hedgerow;
- Management of new hedgerows will allow for establishment of an occasional tree or sapling at irregular intervals, to represent the existing baseline;
- Hedgerows will be watered during the first year to assist with establishment (Note: watering to be adapted based on weather conditions);
- Light pruning will be adopted during the establishment phase (Years 1-5) in order to shape the hedge and encourage denser growth at the base;
- Herbicide application will not be used, but if absolutely necessary, a non-drip weed wipe will be used to control invasive species;
- Failed or dead plants (identified during monitoring) will be replaced the following planting season;
- Through management measures hedgerows will be reinstated to the same or better Hedgerow Assessment System (HAS) classification as identified during surveys.

5.2. Objective 2 – Habitat Recovery/Restoration

To ensure the quick recovery of areas affected by the works through a combination of impact minimisation during works and targeted post-construction remedial action.

5.2.1. Rationale for Objective and Associated Issues

The Development will inevitably result in localised impacts as a result of the footprint of the permanent and temporary infrastructure, see Chapter 6 Biodiversity. Construction will result in the creation of bare areas of soil that can contribute sediment in water run-off.

5.2.2. Methods and Action

The implementation of the measures detailed below will result in both the reduction of areas of bare soil and the time for which they remain un-vegetated. They also prioritise areas for active re-vegetation.

Actions for 'Objective 2: Habitat Recovery/Restoration' are prefixed with 'B' for cross-referencing with Table 6.

B1 No vegetation stripping or placement of spoil will be undertaken on important habitats outside the construction footprint.

B2 Areas requiring active re-seeding will be identified as works progress and seeding will be undertaken in the first spring after the main groundwork operations (e.g. after cabling and access track construction) have been completed, as set out below.

B3 Where possible, hedgerows (including those with trees), scattered trees and scrub, removed to facilitate the new infrastructure will be replaced in a like-for-like manner (in terms of length/area) using appropriate native species as listed in Section 5.1.2.1 and ensuring connectivity for ecological features.

B4 The success of re-vegetation measures will be monitored and remedial action will be taken as required.

5.2.3. Seeding

Reseeding of grassland habitats will be implemented using hay transfer. This is an effective near-natural solution for grassland restoration (Orsolya, 2022) which avoids importing a seed mix and instead utilises the existing seed bank and seed resource. Adjacent, or nearby, grassland similar to the grassland that is being removed will be cut when grasses and flowering plants are in seed. These cuttings will be laid over the reinstated bare ground for natural colonisation. Donor sites will be assessed on:

1. **Vegetation Match**:
   - Donor site must match the target vegetation type and soil conditions of the receptor site.
2. **Species Richness**:
   - High diversity of native wildflowers and grasses.
   - Avoid sites dominated by agricultural cultivars.

3. **Local Provenance**:
    - Seed must originate from the same biogeographic zone or natural area.
4. **Ecological Compatibility**:
    - Similar soil pH, drainage, and climatic conditions.
    - Avoid donor sites with invasive species or recent fertiliser use.

Hay transfer is considered to be a nature-based solution developed for grassland restoration and reinstatement that is achieved by the transfer of recently mown green or dry grassland cuttings originating from donor sites, in this case nearby similar grassland, with a desired species composition, to areas that are being reinstated (i.e. receptor sites). In addition to introducing propagules of grassland specialist species, the transfer of plant material can also help supress the growth of weeds. Additionally, it has the added advantage of potentially transferring invertebrates and non-vascular plants from donor sites, which allows for a more complete restoration of a natural grassland ecosystem (Valkó et al., 2022). The method by which hay transfer will be carried out is set out below along with measures to assess its success through monitoring.

5.3. Objective 3 – Establishment of Species-rich Native Grassland

To enhance neglected habitats within the Development site to contribute to the compensation for losses elsewhere (refer to Table 2).

Conifer plantation will be removed during the construction phase of the Development to accommodate the proposed Ballinlee substation, including an area of 0.93 ha surrounding the substation. This area will become available for habitat enhancement measures which will take the form of a proposed species-rich grassland using locally sourced seed stock. See Figure A.4 for the location of this management area.

Prior to any seeding, soil chemistry will be tested and depending on the outcome will be appropriately managed for seeding of grassland habitats as set out below.

5.3.1. Seeding

This will be carried out as outlined above in Section 5.2.3.

5.3.2. Methods and Actions

Actions for 'Objective 3: Establishment of Species-rich Grassland' are prefixed with 'C' for cross-referencing with Table 6.

The following steps have been derived from Valkó *et al*. (2022) and Wagner *et al*. (2021), as well as the Great Irish Grasslands – Grassland Management Website for green hay transfer.

C1 Donor sites of high quality in terms of semi-natural grassland species richness, in this case the grassland being removed or adjacent similar grassland, will be identified and selected as close to the receptor sites as possible;

- Donor sites, i.e. area of grassland removal or adjacent similar grassland, will be checked for grass and wildflower seed production from July onwards, in order to avoid cutting hay too late in the season. (*Note: cutting should ideally take place outside the bird breeding season, which is 01 March to 31 August, inclusive*);
- Vegetation at the donor sites will be cut in early-September when flowering plants are in seed (*Note: conditioner mowers or silage harvesters should be avoided as this may result in seed loss);*
- Cut vegetation, or green hay, will be transferred to the receptor sites which will represent bare soil following soil reinstatement post-construction;
- Once at the receptor sites, hay will be spread at a thickness of approximately 10cm over the bare soil covering all areas to be reinstated;
- The spread hay will be rolled using a ring roller (e.g. lawn roller) in order to ensure good contact between the seeds in the hay and the soil. If this is not possible, the hay will be raked manually;
- The spread hay will be left in-situ and only removed if necessary (following a period of one week).

5.4. Objective 4 – Establishment of Native Broadleaved Woodland

The following sets out measures to plant, establish and maintain a woodland species mix within the Planning Application Boundary. Similar to hedgerows, plants will be of native origin or Irish provenance, preferably grown from locally sourced seeds. Planting native broadleaved species will enhance the site's biodiversity and be connected to the wider environment via the hedgerow system.. Given the current widespread ash dieback in Ireland, it is advisable to avoid planting ash.

Based on the latest guidance from the Department of Agriculture, Food and the Marine (DAFM 2024), NPWS, and Woodlands of Ireland, the semi-mature tree planting species will include

Overstorey / Major Tree Species

- Pedunculate oak (*Quercus robur*)
- Sessile oak (*Quercus petraea*)
- Ash (*Fraxinus excelsior*)
- Alder (*Alnus glutinosa*)
- Silver birch (*Betula pendula*)
- Downy birch (*Betula pubescens*)
- Wild cherry (*Prunus avium*)
- Aspen (*Populus tremula*)
- Grey willow (*Salix cinerea*)

Understorey / Minor Tree and Shrub Species

- Hazel (*Corylus avellana*)
- Hawthorn (*Crataegus monogyna*)
- Spindle (*Euonymus europaeus*)
- Holly (*Ilex aquifolium*)
- Crab apple (*Malus sylvestris*)
- Blackthorn (*Prunus spinosa*)
- Goat willow (*Salix caprea*)
- Eared willow (*Salix aurita*)
- Rusty willow (*Salix cinerea subsp. oleifolia*)
- Elder (*Sambucus nigra*)
- Rowan (*Sorbus aucuparia*)
- Yew (*Taxus baccata*)
- Guelder rose (*Viburnum opulus*)

All imports will be screened for invasive species along with suppliers providing a plant passport (traceability document - certifies the origin and species of the planting stock).

5.4.1. Method and Actions

Actions for 'Objective 4: Establishment of Native Broadleaved Woodland are prefixed with 'D' for cross-referencing with Table 6.

It is proposed to plant approximately 1.74 ha of native woodland in an area south of Turbine 5 (see Figure A.3) which will increase the amount of woodland habitat within the site. Creation of this habitat would constitute a high local biodiversity value.

The following species and composition will be planted.

- Pure groups (30-40 trees) of alder (50%), grey willow or hazel (10%) & downy birch (10%). With group spacing of 2.5–3 m apart.
- Groups interspersed alternately (to improve stability & robustness, & to prevent the development of an alder monoculture).
- Pedunculate oak (10%) on drier areas.
- Hawthorn (5%) scattered throughout.
- Minor species (15%) to comprise at least two of the following, positioned between the above pure groups: holly, hazel, guelder rose.

The recommended density and spacing for native broadleaved tree planting in Ireland (according to DAFM Native Woodland Scheme and NPWS) will be employed, 3 m x 3 m (approx. 1,100 trees per hectare) for native woodland establishment.

While this habitat will develop into a habitat of minimum Local Importance (Higher Value) it has the potential to form a habitat of greater significance. Monitoring of the planted area will allow for the assessment of this habitats value to be made. The planting of 1.74 ha of woodland habitat will also provide potential foraging, commuting and resting habitat for a range of faunal species such as badger, pine marten, nesting birds and pollinators.

Some key considerations prior to planting include the planting mixture used, design and planting patterns as well as tree spacing requirements. According to the Woodlands of Ireland (2024), a robust and varied pattern tends to work best, with a combination of planted clumps and open areas being recommended. There are six main variables used to develop planting patterns that include:

- Species composition of clumps;
- Clump size and location;
- Spacing of overstory, understorey and minor species in adjacent clumps;
- Spacing of overstorey, understory and minor species with clumps;
- Size of gaps between clumps;
- Size and location of larger open areas.

D1 In broad terms, planting will encompass the following steps:

- Planting will be undertaken between October and March when trees are dormant and less likely to get damaged. Planting will be avoided following periods of heavy rain or periods of frost;
- Ground preparation will be limited to inverted mounding, shallow ripping, pit planting or auger planting in areas not previously used for conifer plantation;
- Trees will be left to mature without cutting and protected with a tree guard;
- The control of competing vegetation such as grasses and bramble will be controlled through organic mulching (e.g. wood chip, straw) or trampling where practical;
- Any invasive plant species growing on site will be controlled as per the methods outlined in Section 6.1;
- Leaf litter and dead wood arising naturally or from management of the woodland will be left in-situ in order to create habitat for invertebrates.
- Ground preparation will include stump removal, deep ripping to alleviate compaction, and vegetation control to manage brash and regenerating conifers; insecticide treatment may be required to mitigate pine weevil risk.
- Protection against browsing by livestock and wildlife (including deer) in the new woodland habitat will be achieved through the installation of new stockproof and deer-proof fencing, maintaining a minimum distance of 5 meters where required. Fencing used will not impact or cause fragmentation for other terrestrial species.

5.5. Objective 5 – Establishment of Pond and Wetland Meadow

Ponds and wetland meadow habitat will be created for the purposes of providing breeding habitat for amphibians, including common frog and smooth newt. Multiple smaller ponds are generally preferable to a single large one, as they offer more variety and reduce the risk of fish introduction. However, very small ponds may need more maintenance over time (English Nature, 2001). The area around the mitigation ponds will be considered as potential newt habitat and should reflect this with the provision of refuges/hibernacula, in the form of log piles from felling operations and mounds produced from excavated material for the pond The location of this management area is provided in Figure A.3.

5.5.1. Methods and Actions

Actions for 'Objective 5: Establishment of Pond and Wetland Meadow' are prefixed with 'E' for cross-referencing with Table 6.

This section provides details on the methods used to create these habitats, based on those outlined in The Irish Pond Manual (O'Rourke & Loughran, 2024). Refer to the manual should more detail be required. See Appendix I for location of the proposed pond and wetland meadow.

E1 Pond Creation

- As discussed already, multiple smaller ponds are preferable to one large amphibian pond. A range of pond depths should be created as this provides greater diversity in terms of aquatic species and presence of underwater refuges.Determine if pond will be fed by groundwater or surface water.
- If surface water, them determine if a lining (e.g., geomembrane) will be required. If there is a possibility that the pond is lined, make sure the hole is positioned so that it will not matter if any lining is breached.
- Pond edges that gently slope (gradient of 1 in 10 or if possible 1 in 20) create a wide drawdown zone which encourages a diversity of plants and invertebrates. Figure 10 provides a good example of variable sloping edges for large and small amphibian ponds.
- Shallow water areas should be maintained around the edges of the ponds (<10 cm for at least 1 m (50 slope)) which will allow a diverse community of edge plant species to grow which in turn provides greater foraging and shelter opportunities for juvenile newts. Shallow water also warms up quickly which will stimulate the growth of larval newts in the summer.
- In general, water depth should not exceed 1.2 m for amphibian ponds (Baker *et al*., 2011).
- It is usually not necessary to deliberately plant new ponds, instead allowing the pond to colonise naturally. However, if the distance between the new mitigation pond and the closest similar habitat is too great then it may be necessary to plant up a new pond. In these instances, aquatic plants will be sourced from the nearest similar habitat within the same local region, identified as ideally within 10 km of the proposed pond location (O'Rourke & Loughran, 2024).

- Species include curled pondweed (*Potamogeton crispus*), frogbit (*Hydrocharis morsus-ranae*), water crowfoot (*Ranunculus aquatilis*), common water starwort (*Callitriche stagnalis*), common hornwort (*Ceratophyllum demersum*) and white waterlily (*Nymphaea alba*). Tall emergent vegetation should not dominate the pond to the point where it shades out other less dominant plants, as this will reduce diversity of the pond.
- Whilst the surrounding habitat will be planted with a combination of species rich grassland mix and native woodland, the area immediately surrounding the pond habitat (within the field boundary) will be allowed to be naturally colonised by typical pond and wetland meadow species including soft rush (*Juncus effusus*), meadowsweet (*Filipendula ulmaria*) yellow flag iris (*Iris pseudacorus*), cuckoo flower (*Cardamine pratensis*), water mint (*Mentha aquatica*), ragged robin (*Lychnis flos-cuculi*), marsh cinquefoil (*Potentilla palustris*) and water forget-me-not (*Myosotis scorpioides*). Should this not occur in year 1, additional seeding of wetland species as prescribed in Section 5.2.3 will be used.
- Smooth newts spend much of their life cycle in terrestrial environments outside of ponds. They require cover that provides damp areas for resting, particularly important in winter when newts go into hibernation. Damp refuges also support invertebrate prey species for newt to feed on (Freshwaterhabitats.org.uk, 2024). Typically, suitable refuges for resting/over-wintering can be found in terrestrial habitats of high quality and specially provided structures are not often needed. However, provision of artificial hibernacula can be beneficial on newly restored sites.
- Logs from trees and hedgerows that are felled during the construction phase will be recycled to provide terrestrial refugia for amphibians within the vicinity of the pond(s).
- Additionally, spoil from digging new ponds can be retained on-site and shaped into at least two to three uncompacted mounds per pond, ideally located on south-facing slopes or marginal zones near scrub or tussocky grassland. These mounds should be approximately 1–1.5 m wide and 0.5–1 m high, and constructed using a loose mix of soil, clean rubble, logs, and tree roots to create internal cracks, voids, and fissures suitable for amphibian hibernation and small mammal burrows. (English Nature, 2001 and O'Rourke & Loughran, 2024).
- Amphibian refuges that are situated close to ponds and blend into the local environment are considered optimal.
- Pond(s) will be excavated in late autumn and left to fill in with rainwater over the winter period. The pond(s) will be situated so that no runoff water from elsewhere on the site can enter it, and there will be no surface drains in proximity to the pond(s).
- New ponds will be created in locations where they are primarily filled by rain and ground water (refer above) rather than access track run-off or water drained from the local environment that may be subject to agri-chemical application e.g. fertiliser runoff.
- Pond(s) will be located in a low intensity catchment where possible to ensure they are fed from a clean water source
- Overflow channels or swales will be included to manage excess water during heavy rainfall, preventing erosion and maintaining water quality.
- Introducing fish into amphibian-focused wetlands will be avoided, as they predate on eggs and larvae and reduce invertebrate diversity.

- For areas previously used as part of conifer plantation
    - Soil Condition and Hydrology:
        - Soils are often acidic, compacted, and nutrient-poor due to conifer needle litter and machinery use.
        - Drainage systems (e.g. furrows, ditches) may still be present and need to be blocked or reprofiled to restore natural hydrology.
        - Water retention may be poor initially, requiring bunding or clay lining in some areas.
    - Ground Preparation:
        - Deep ripping or subsoiling may be needed to break up compacted layers and improve infiltration.
        - Stump and brash removal is often necessary to allow for vegetation establishment and reduce pine weevil risk.
    - Vegetation Establishment:
        - Natural colonisation may be slower due to low seed bank diversity and acidic conditions.

    May require active planting of wetland species and soil amendments (e.g. lime or organic matter) to support growth.

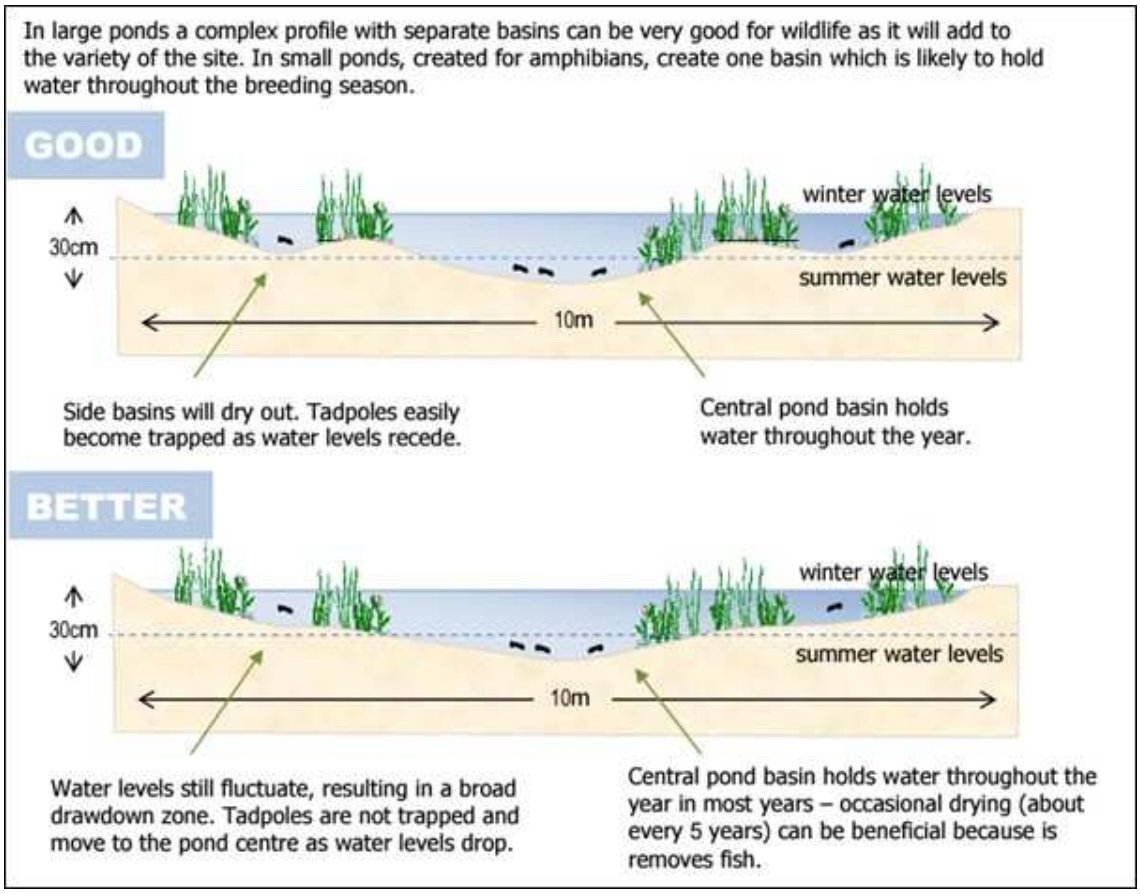

Figure 10: Amphibian Pond designs

5.6. Objective 6 – Prevention of Invasive Plant Species Spread

5.6.1. Rationale for Objective and Associated Issues

Terrestrial non-native invasive species, which are listed on the 3rd schedule of the Habitats Regulations S.I. 477 of 2011, were recorded within the Development site. These include the high impact species Japanese knotweed (*Reynoutria japonica*) and medium impact species giant rhubarb (*Gunnera manicata*).

Invasive species commonly have the ability to reproduce quickly, grow rapidly, disperse easily, tolerate a wide range of environmental conditions and have an association with humans. They also tend to be very difficult to remove. Invasive species out-compete native species for resources such as food, light and space. They often alter the environment by excreting chemical compounds which can make them unpalatable to grazing animals or suppress nearby plants.

Giant rhubarb was observed during field surveys however all locations of this species were outside of the Planning Application Boundary and will not be affected by proposed works.

Although winter heliotrope (*Petasites fragrans*) was observed in several locations along the GCR (as provided in

Table 4), it is not anticipated that any activities will require its removal in these areas. Nevertheless, if works necessitate their removal, appropriate treatment and control measures will be implemented for this species and have been included in this plan as a precautionary measure.

Table 4: Locations of invasive plant species

Common name	Scientific name	Status	Location (lat, long)
Japanese knotweed	Reynoutria japonica	High impact invasive species Third Schedule listed species[10]	52.461869, -8.574126
			52.502840, - 8.574894
Giant rhubarb	Gunnera manicata	Medium impact invasive species Third Schedule listed species[10]	52.475476, -8.610188
			52.482384, -8.586413
			52.477534, -8.605623
			52.479538, -8.595351
Winter heliotrope	Petasites fragrans	Low impact invasive species	52.565736, - 8.539628
			52.582093, - 8.545685
			52.563159, - 8.540248
			52.547470, - 8.546584
			52.503220, - 8.565315
			52.492463, -8.568330

[10] *listed on the 3rd Schedule of the Habitats Regulations S.I. 477 of 2011*

5.6.2. Methods and Actions

The below sub-sections outline measures that will be implemented for the safe removal and disposal of non-scheduled species, as well as measures to treat and control Japanese knotweed in the event that works necessitate their removal.

Actions for 'Objective 6: Prevention of Non-Native Invasive Species Spread' are prefixed with 'F' for cross-referencing with Table 6.

5.6.2.1. Japanese knotweed

Japanese knotweed, a native to Japan and parts of East Asia, is a 3rd schedule species, and subject to restrictions under the Habitats Regulations S.I. 477 of 2011. Where works necessitate their removal, or any newly established stands are identified, the following pre-treatment measures will be implemented.

- Japanese knotweed will be fenced off with a perimeter of no less than 10 m or at the point where they adjoin roads or built infrastructure, whichever is nearest;
- Signage will be placed on these areas to clearly state no entry of any kind is permitted during and after treatment;
- All footwear and equipment will be cleaned prior to arrival to and upon departure from areas infested with Japanese knotweed.
- For works to remove any new stands in proximity to waterbodies, a geotextile membrane or heavy-duty tarpaulin will be laid to catch any plant fragments or contaminated soil in order to prevent plant fragments floating downstream.

Avoid mechanical cutting as in many cases this can increase the spread of the plant and does not kill it. If soil is removed from an area contaminated with Japanese knotweed the soil must be disposed of correctly through a licensed waste disposal site. The soil or plant is classified as 'special waste' and would need to be disposed of in a landfill licensed to accept special waste. In addition, it would have to be consigned and managed in accordance with the Special Waste Regulations 1996 (as amended).

F1 Chemical treatment should be implemented by either a contracted invasive species control specialist or the relevant competent authority.

Currently, the preferred types of herbicides to be used in the treatment of Japanese knotweed are Glyphosate and 2,4-D Amine, although, 2,4-D Amine is not recommended for use near water (Kelly et al., 2008). Generally, if either is applied as the treatment option, it will need to be reapplied for several years after the first application and consistently monitored to ensure the plant control measures have been effective (Bibby, 2018).

The following guidelines for chemical treatment will be followed:

- Any worker that must enter an infested area will only be allowed to leave the site through a decontamination area, comprising of a brush down area. This area will have only one entry and exit point so complete control of the movement of workers is possible;
- Herbicide should ideally be applied during active growth in April to May and repeated annually and monitored for at least 5 years where no regrowth has taken place;

- Where there is sensitive adjacent vegetation, a weed-wipe may be used for a more precise spray;
- Repeated treatment (chemical or physical) will be required for a period of at least 5 years;
- Monitoring will be required during mid-spring and mid-summer to assess sapling regrowth.

5.6.2.2. Winter heliotrope

According to NRA (2010) Guidelines, the physical treatment of low impact species like winter heliotrope is often challenging due to the risk of reinfestation and further spread, and only practical where infestations are limited in extent. Where this is the case, entire stands of winter heliotrope will be excavated and buried (to a depth of 2 m), incinerated or disposed of at an appropriately licensed waste facility. This may require follow up treatments by herbicide. Due to the risk of reinfestation a number of follow up visits will be required over a two-year period to identify any regrowth. Where larger stands occur an application of glyphosate-based herbicide will be applied using a weed wipe applicator or spot treatment (*Note: In accordance with the Plant Protection Product Regulations, only those Plant Protection Products authorised for professional use in Ireland will be employed*).

5.7. Objective 7 – Monitoring of Effectiveness and Remedial Action

To oversee and monitor the success of protection and enhancement measures and to take remedial action as required.

5.7.1. Rationale for Objective and Associated Issues

Monitoring and reporting on the achievement of the actions of the HSMP and taking remedial action as necessary is fundamental to avoiding long-term impact on habitats and watercourses and maximising its potential for success.

5.7.2. Methods and Actions

The measures detailed below provide a framework for the monitoring of works, as well as the success of restoration and habitat enhancement measures, and the rapid undertaking of remedial actions if measures are found not to be fully successful during any monitoring exercises.

Actions for 'Objective 7: Monitoring of Effectiveness and Remedial Action' are prefixed with 'G' for cross-referencing with Table 6.

G1 All construction works will be monitored by an ECoW with visits being at minimum intervals of once per week during the construction works. The role of the ECoW, will include the following:

- Agree method statements for critical work periods, including approaches to drainage works in the vicinity of watercourses and important habitats;
- Monitor spoil placement areas and advise on approaches within the working corridor;
- Identify areas requiring re-seeding or other positive vegetation measures during works;
- Overseeing re-seeding or positive re-vegetation works;
- Identifying locations for monitoring of re-vegetation within the footprint of the works;
- Undertaking the necessary protection measures and providing advice to ensure legal compliance with respect to nesting birds;
- Ensuring that appropriate exclusion zones are applied around the important/priority habitats and nests of sensitive bird species, and adhered to by all contractors working on the site;
- Undertaking the necessary pre-construction protected species surveys (e.g., badger, otter and nesting birds, where appropriate), obtaining any licences and supervising the implementation of any mitigation measures required;
- Liaison with contractors and construction staff working on Site;
- Providing regular reports and maintaining regular contact with nature conservation organisations and any other relevant stakeholders;
- Providing regular on-site advice with respect to any ecological issues that arise.

5.7.2.1. Hedgerows and Treelines

G2 Periodic inspections will be undertaken within the first-year post-planting, in order to assess growth and identify failed plants or invasive species. Annual monitoring will continue for the following two years, during which time, hedgerows will be subject to a condition assessment following the Heritage Council's Hedgerow Appraisal System. This will assist in identifying management issues pertaining to weed control, gaps that need to be filled, as well as any fencing damage (where required). A final assessment will be conducted during Year 5, at which time hedgerows should meet the criteria for 'Adequate' to 'Favourable' condition. Any necessary remedial actions will be identified and addressed within one year of each monitoring visit.

5.7.2.2. Species-rich Native Grassland

G3 Monitoring of the success of reseeded areas will be undertaken and reported annually. This will involve periodic inspections over the first year followed by annual monitoring for the next two years. Additional monitoring will occur in Year 5. Success will be measured by achieving a grass to broad leaf herb ratio of at least 50:50 post-seeding.

Evaluation of vegetation structure and species composition will be conducted using 2m x 2m quadrats in July of each monitoring year in Year 1, 2, 3 and 5 post re-seeding, coinciding with the peak flowering period for most plants. Any necessary remedial actions, such as reseeding or stabilizing the ground, will be identified, and addressed within one year of each monitoring visit.

5.7.2.3. Native Woodland

G4 As per the monitoring of hedgerows, periodic inspections of newly planted woodland will be undertaken within the first year. The primary aim of these inspections will be to assess growth, identify failed plants or invasive species, and determine whether competing vegetation will need to be controlled. Annual monitoring will continue for the following two years, with a final assessment conducted during Year 5. Any necessary remedial actions will be identified and addressed within one year of each monitoring visit.

Maintenance of the proposed woodland planting will be followed as per the Native Woodland Establishment GPC9 & GPC10 Silvicultural Standards (Department of Agriculture, Food and the Marine, 2015).

5.7.2.4. Pond and Wetland Meadow

G5 According to guidelines for Great crested newt (English Nature, 2001), which are equally applicable to smooth newt, typical habitat maintenance schemes require at least 4 years of post-development management, and ideally longer if resources are available. In the case of high-impact developments, perpetual management may be necessary. However, as unlike Great crested newt which requires very specific habitat conditions, smooth newt possess greater adaptability and make use of a range of waterbodies of varying conditions. Therefore, 1 year of post-development monitoring is acceptable for this species.

Table 55 lists the main issues that need to be addressed for a long-term maintenance plan. Appropriate mitigation is also proposed.

Table 5: Potential impacts on amphibian pond habitat with proposed mitigation

Impact	Mitigation
Overshading by tall emergent pond plant species or trees/scrub around pond margins – particularly on southern facing side of pond(s)	Mechanically cutting back vegetation in winter to avoid injuring frogs and newts.
Pond-leakage caused by puncturing	Repair and refilling works to be carried out during winter
Introduction of fish - more likely in larger ponds	Removal through draining, electro-fishing or netting
Eutrophication resulting from nitrates in fertilisers	Avoid the use of fertilisers in the vicinity of newt terrestrial and pond habitat Maintain agri-buffer zone around newt habitat

G6 Re-vegetation of areas within the working corridor will be monitored where they fall within a 50 m buffer zone to watercourses within the construction year and in years 1, 2 and 3.

- Monitoring will be in the form of general assessment of area cover of vegetation, undertaken quarterly during the construction year and annually in years 1, 2 and 3, with an aim of maximising cover to reduce likelihood of water quality impacts on the watercourse. Fixed point photography will be used to document change and success. Remedial action in the form of re-seeding will be taken if required.

5.8. Objective 8 – Maintenance of post-felling habitat conditions

5.8.1. Rationale for Objective and Associated Issues

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.

5.8.2. Methods and Actions

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.

Actions for 'Objective 8: Maintenance of post-felling habitat conditions' are prefixed with 'H' for cross referencing with Table 6.

H1 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.

H2 Felled timber and branches must be removed, with stumps brashed to ground level.

H3 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.

H4 To prevent the area scrubbing up, the areas will be restored to grassland and a mowing or grazing regime will be implemented and monitored as detailed as outlined in Chapter 6. .

6. IMPLEMENTATION

6.1. Responsibilities

All management tasks outlined in this HSMP will be undertaken by the developer subject to agreement, or by a suitably qualified contractor acting on their behalf. Ecological monitoring and reporting of management tasks will be undertaken by a suitably qualified and experienced ecologist. Monitoring results will be reported on during the year of monitoring surveys, and any remedial actions will be identified within these reports.

Treatment of non-native invasive plant species will be undertaken by a horticulturist with experience in the identification of, and licenced for the removal of, invasive species. The treatment of invasive species with herbicide will be undertaken by personnel who have demonstrated compliance with the Plant Protection Product Regulations.

6.2. Management and Monitoring Schedule

Table 6 includes the Actions for which specific effort is required. Actions are provided unique reference codes so that they can be cross-referenced to the specific Actions listed in full within the above HSMP reporting, under Objectives 1 to 8.

The timings of the required Actions are provided on the following understandings:

- ‘Construction year’ applies to the entire period from commencement of site investigation works to energy commissioning and completion of works.
- ‘Post-construction year 1’ applies to the first full year following commissioning and completion of works. Years 2, 3, etc. relate to subsequent years thereafter.

Table 6: Programme of actions, timing, reporting and monitoring requirements

Action	Timing	Monitoring and Reporting	Measurement of Success / Remedial Action	Responsibilities
Objective 1 – Habitat Reinstatement and Enhancement				
A1 A total length of 3970.1 m of hedgerow will be planted.	During construction and Post-construction	Construction year and post-construction year 1, 3, and 5	Habitats replaced and success monitored. Remedial action to include further planting work if required.	Contractor / ECoW
Objective 2 – Habitat Recovery/Restoration				
B1 No vegetation stripping or placement of spoil will be undertaken on important habitats outside the construction footprint.	During construction	Within Construction year	Areas identified and Method Statements agreed prior to construction commencing.	Contractor / ECoW
B2 Areas requiring active re-seeding will be identified as works progress and seeding will be undertaken in the first spring after the main groundwork operations (e.g. after cabling) have been completed.	During construction/ post-construction	Construction year, and post-construction year 1	Works undertaken as described and overseen by ECoW. Reported on in Construction year, Year 1 and Year 3 reports.	Contractor / ECoW
B3 Where possible, hedgerows (including those with trees), scattered trees and scrub, removed to facilitate the new infrastructure will be replaced in a like-	During construction/	Construction year, and post-	Works undertaken as described and overseen by ECoW.	

Action	Timing	Monitoring and Reporting	Measurement of Success / Remedial Action	Responsibilities
for-like manner (in terms of length/area) using appropriate native species and ensuring connectivity for ecological features.	post construction	construction year 1 and 3	Reported on in Year 1 report.	
B4 The success of re-vegetation measures will be monitored and remedial action taken as required.	Post construction	Construction year, and post-construction year 1 and 3	Works undertaken as described and overseen by ECoW. Reported on in Year 1 report.	ECoW / Contract Ecologist
Objective 3 – Establishments of Species-rich Grassland				
C1 Donor sites of high quality in terms of semi-natural grassland species richness, in this case the grassland being removed or adjacent similar grassland, will be identified and selected as close to the receptor sites as possible.	Post construction	Construction year, and post-construction year 1 and 3	Works undertaken as described and overseen by ECoW. Reported on in Year 1 report.	ECoW / Contract Ecologist
Objective 4 – Establishments of Native Broadleaved Woodland				
D1 Planting 1.74 ha of a native woodland mix	Between October and March in the first-year post-construction	Construction year and post-construction year 1, 3, and 5	Habitats replaced and success monitored.	ECoW / Contract Ecologist
Objective 5 – Creation of Pond and Wetland Meadow				
E1 Creation of a wildlife friendly pond and wetland meadow, specifically for the benefit of amphibian species.	Between September and January in the first-year post-construction	Construction year, and post-construction year 1	Habitat created and success monitored.	ECoW / Contract Ecologist

Action	Timing	Monitoring and Reporting	Measurement of Success / Remedial Action	Responsibilities
Objective 6 – Prevention of Non-Native Species Spread				
F1 Chemical treatment of Japanese knotweed	Prior to construction where species cannot be avoided, and throughout lifespan of project as required.	-	-	ECoW / Contract Ecologist
Objective 7 – Monitoring of Effectiveness and Remedial Action				
G1 All construction work to be monitored by ECoW.	During Construction	Within Construction year	Successful completion of works while maintaining strict adherence to guidelines.	ECoW
G2 Success of hedgerow and treeline replanting will be monitored by means of habitat condition assessment following the Heritage Council's Hedgerow Appraisal System.	During and Post-construction	Construction year and year 1,2,3 ,4 and 5	Monitoring undertaken. Remedial action if required.	ECoW / Contract Ecologist
G3 Species-rich grassland will be monitored by means of vegetation quadrats.	During and Post-construction	Construction year and year 1,2,3 ,4 and 5	Monitoring undertaken. Remedial action to include further seeding if required.	ECoW / Contract Ecologist

Action	Timing	Monitoring and Reporting	Measurement of Success / Remedial Action	Responsibilities
G4 Newly planted native woodland will be monitored to assess growth, identify failed plants or invasive species, and determine whether competing vegetation will need to be controlled	During and Post-construction	Construction year and year 1,2,3 ,4 and 5	Monitoring undertaken. Remedial action if required.	ECoW / Contract Ecologist
G5 The wildlife friendly pond and associated wetland meadow habitat will be monitored to ensure the success of the newly created habitat.	During and Post-construction	Within Construction year	Tall emergent pond plants will be cut back in winter to avoid overshading of the pond.	ECoW / Contract Ecologist
G6 Re-vegetation of areas within the working corridor will be monitored where they fall within a 50 m buffer zone to watercourses.	During and Post-construction	Construction year (quarterly) and post-construction year 1, 2 and 3 (annually)	Areas requiring re-vegetation identified. Re-vegetation undertaken and reported on in reports.	Contractor/ ECoW
Objective 8 – Maintenance of post-felling habitat conditions				
H1 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.	During and Post-construction	Construction year and year 1, 2 and 3 post-construction.	Monitoring undertaken. Remedial action if required.	ECoW / Contract Ecologist
H2 Felled timber and branches must be removed, with stumps brashed to ground level	During Construction	Within Construction year	Successful completion of works while maintaining strict adherence to guidelines.	ECoW / Contractor

Action	Timing	Monitoring and Reporting	Measurement of Success / Remedial Action	Responsibilities
H3 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	During Construction	Within Construction year	Successful completion of works while maintaining strict adherence to guidelines.	ECoW / Contractor
H4 To prevent the area scrubbing up, the areas will be restored to grassland and a mowing or grazing regime will be implemented and monitored as detailed as outlined in Chapter 6. .	During and Post-construction	Construction year and year 1, 2 and 3 post-construction.	Monitoring undertaken. Remedial action if required.	ECoW / Contract Ecologist

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APPENDIX I – HABITAT MANAGEMENT AREAS

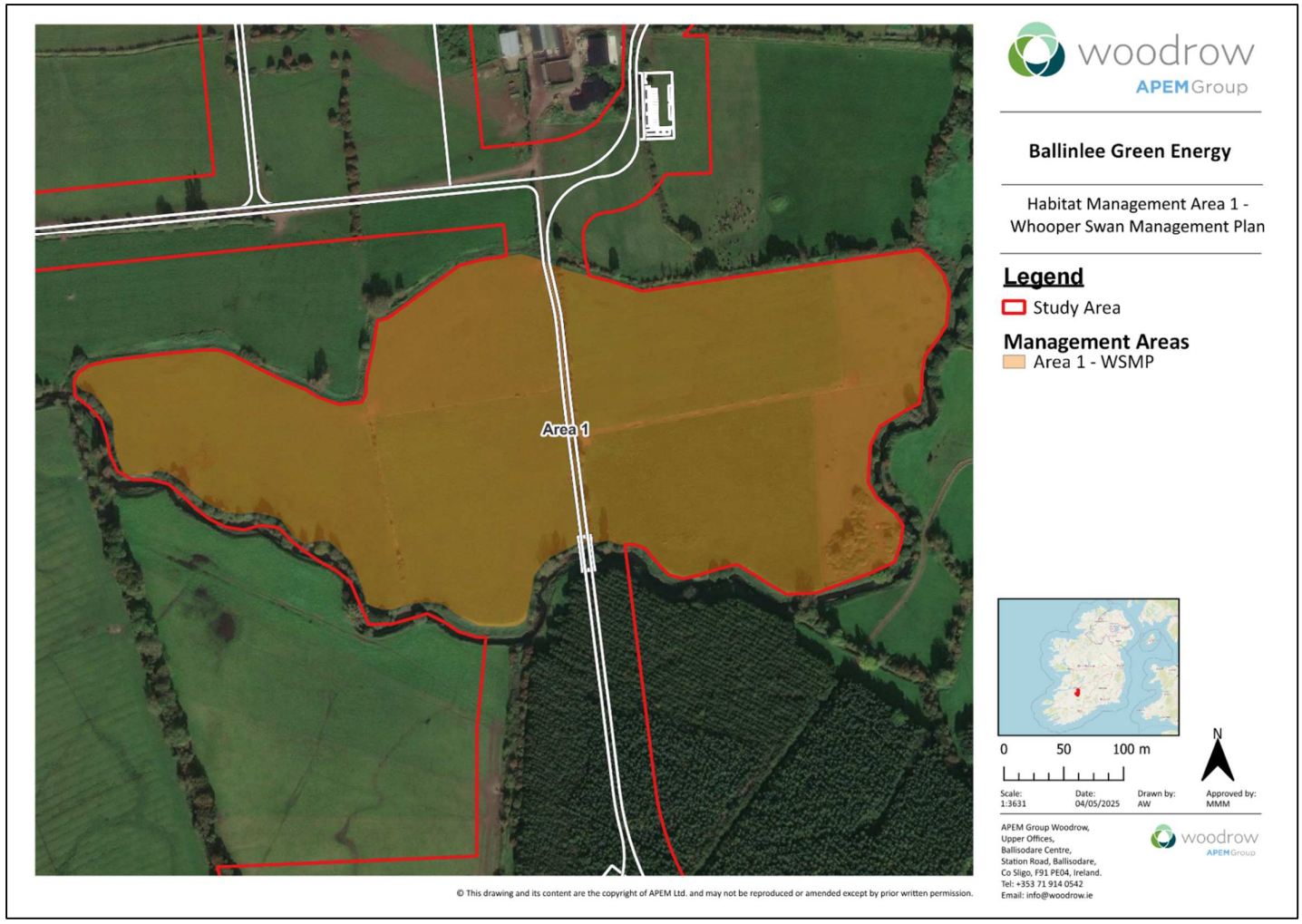

Figure A.1: Habitat Management Area 1 – See Whooper Swan Management Plan (APEM Group Woodrow, 2025)

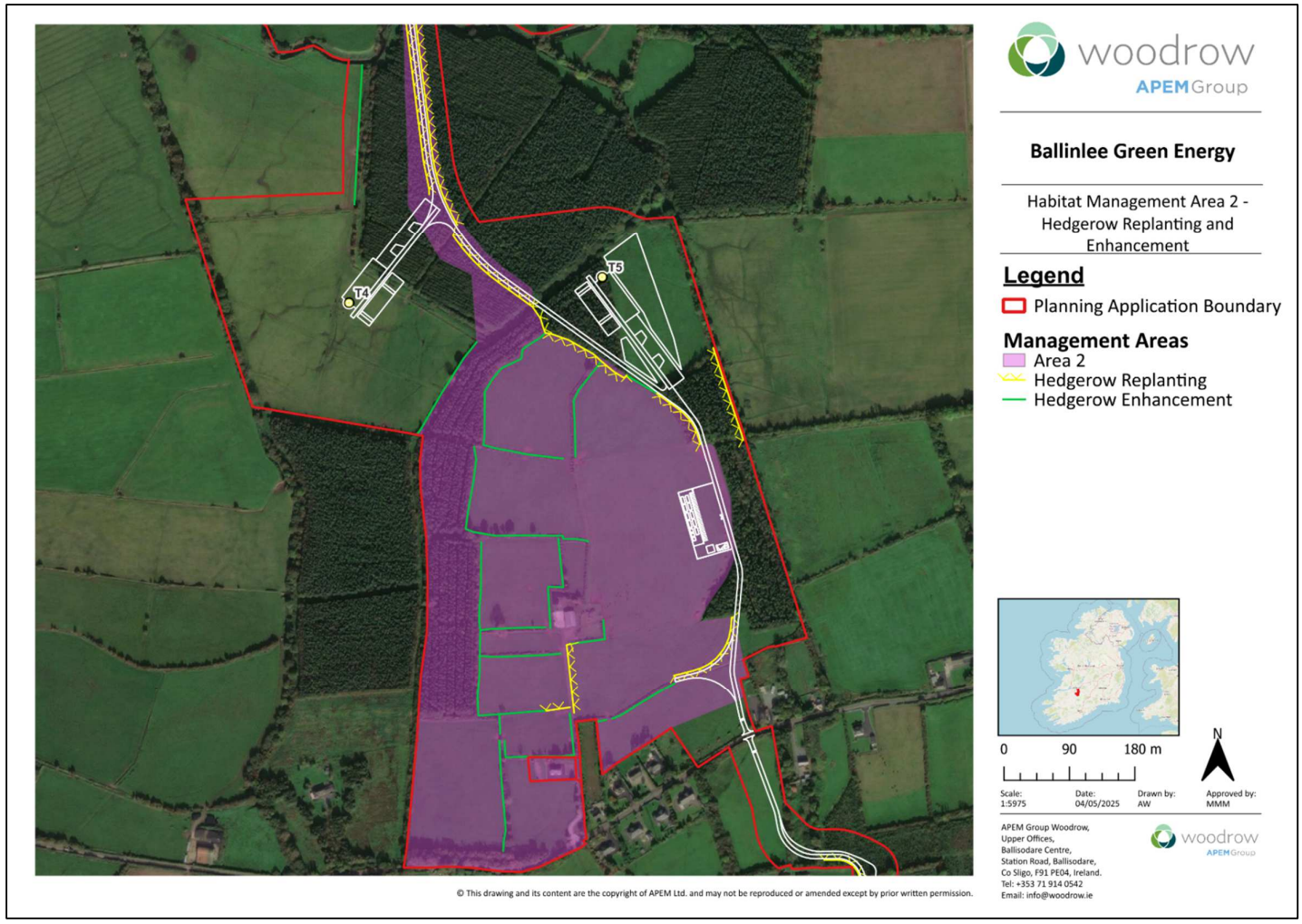

Figure A.2: Habitat Management Area 2

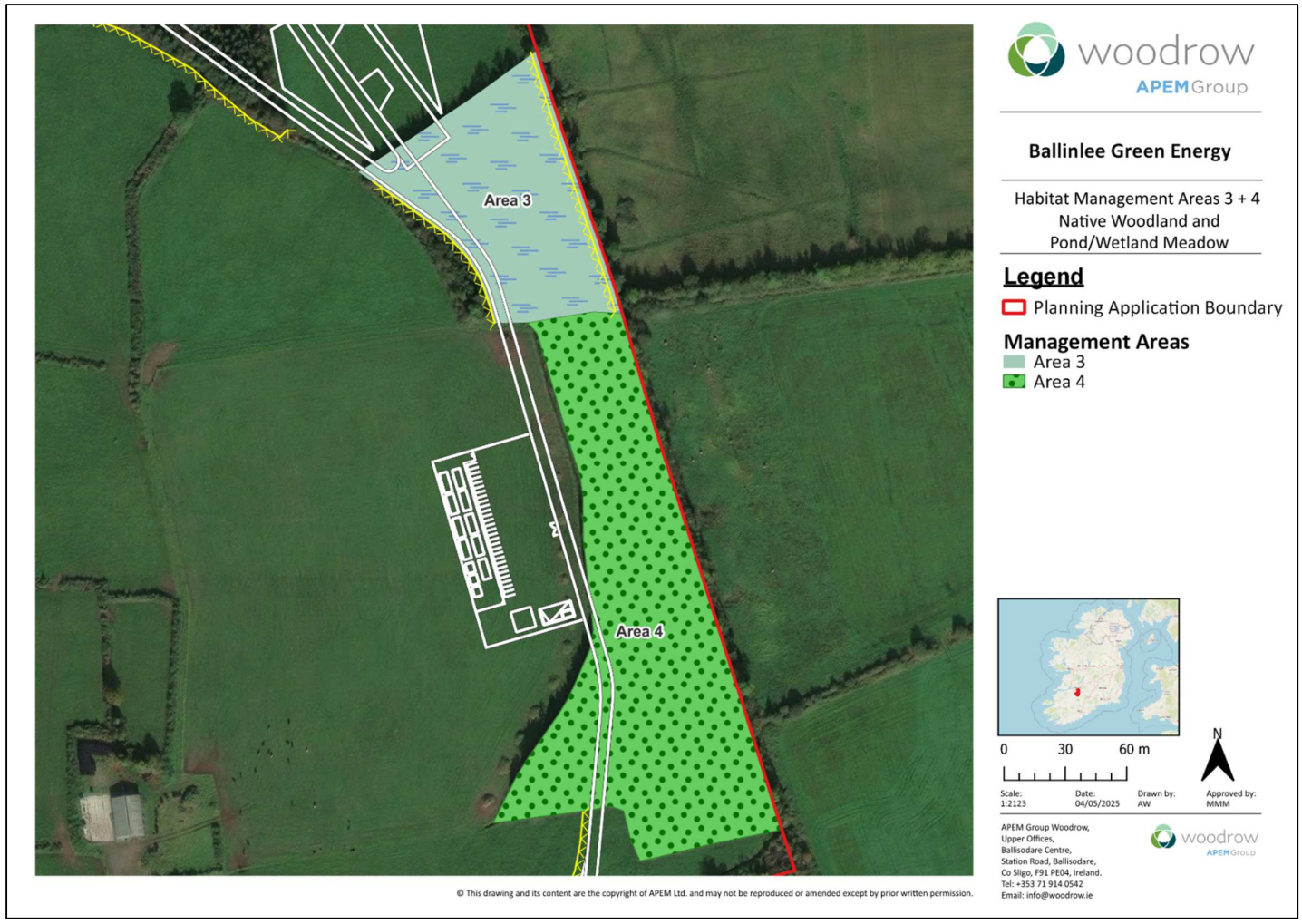

Figure A.3: Habitat Management Area 3 (pond & wetland meadow) + 4 (native broadleaved woodland)

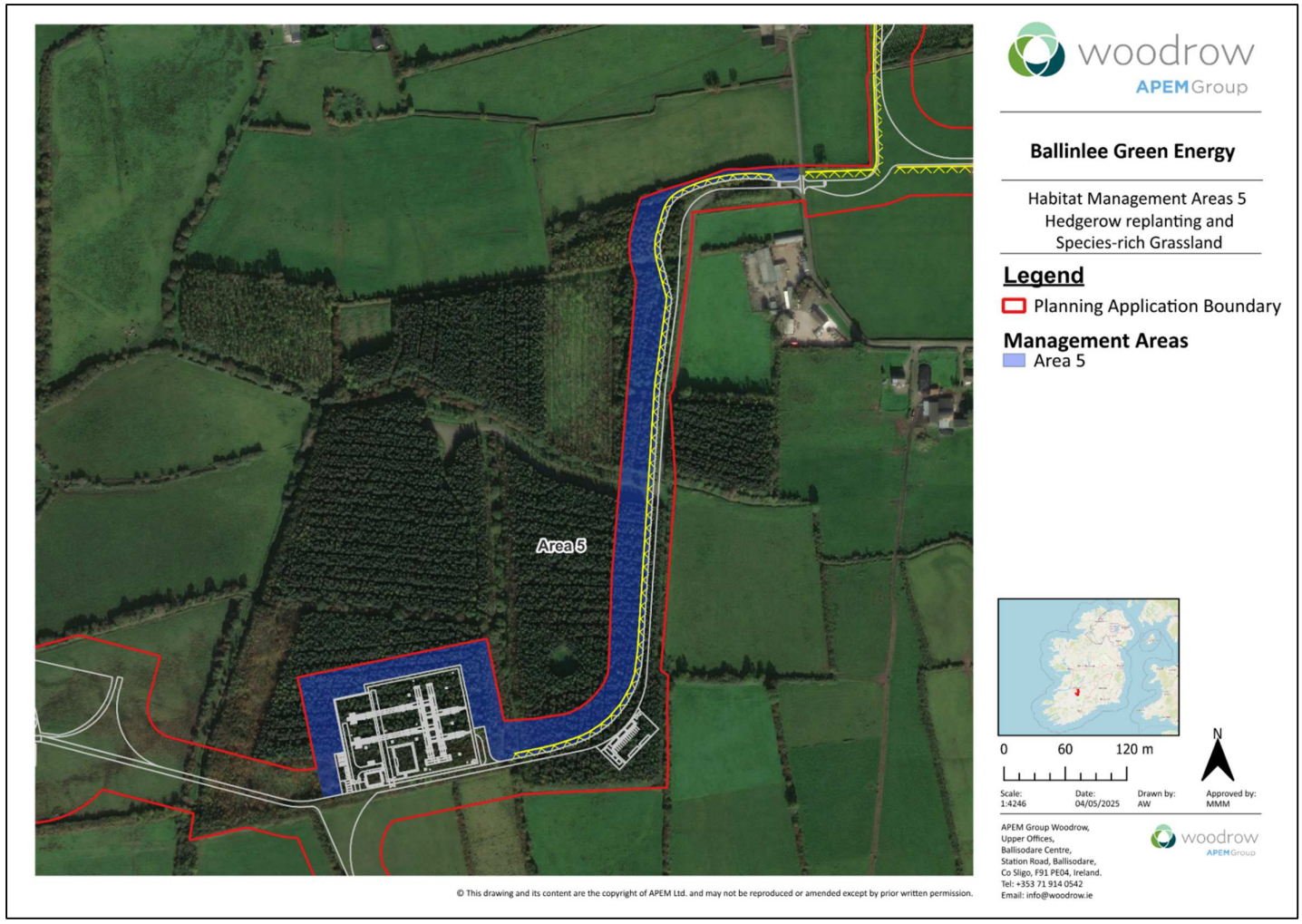

Figure A.4: Habitat Management Area 5 (native species rich grassland habitat)