



Appendix 14.1

Habitats & National Vegetation Classification Survey

Greenside Extension Wind Farm

Greenwellheads,
St Fergus,
Peterhead
Scotland
AB42 3HJ

February 2024

IMTeco Ltd

Notes:

Site: Land located approximately 2-3km southeast of Crimond, Aberdeenshire, Scotland, AB43 8QH, (NK 06285 55226)

Client: GWEL Operating Company Ltd

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1 INTRODUCTION

1.1 Purpose of this Report

IMTeco Ltd was commissioned by Green Cat Renewables (GCR), on behalf of Greenside Wind Energy Ltd. (GWEL), to map and detail individual plant species, undertake a National Vegetation Classification (NVC) and habitats survey at the Proposed Development for a wind farm of three turbines (as part of the existing Greenside Wind Farm). The Proposed Development is to include the erection of three wind turbines up to 99.9m to tip and up to 2.35MW generating capacity. Associated and ancillary infrastructure includes hardstanding areas for each turbine location, on-site access tracks, an electrical substation and buried cables, borrow pit search area, temporary laydown areas and a temporary construction compound (Figure 1).

The Proposed Development site is located at Land located approximately 2-3km southeast of Crimond, Aberdeenshire, Scotland, AB43 8QH, at the approximate central location of NK 06285 55226, and c.3.9km from St Fergus, Aberdeenshire, Scotland.

An existing four turbine wind farm (Greenside Wind Farm) is located within the land holdings. The Proposed Development, known as Greenside Extension Wind Farm, is an extension to Greenside Wind Farm. Within 5km there is St Fergus wind farm (three turbines) which lies to the south within St Fergus Moss, and St Fergus Energy Park to the south-east, with two turbines.

The aim of the NVC survey is to identify and map the vegetation communities present within the site to identify those areas of greatest ecological interest. This would include Annex 1 Habitats¹, potential Ground Water Dependent Terrestrial Ecosystems (GWDTE)² and Scottish Biodiversity List (SBL)³ priority habitats.

The NVC 'study area' for the Proposed Development covers the extent of the Proposed Development with survey buffers as follows: at turbine locations out to 250m, and track locations with a 100m boundary, as per SEPA guidance (SEPA, 2017a, 2017b) for GWDTE.

This report details the findings of the NVC surveys and incorporates the assessment of the value of the habitats, likely impacts upon them and how these impacts might be mitigated.

The survey area (termed 'the site' throughout this report) includes all areas within the 250m ecological survey area boundary of the wind farm infrastructure, for all survey components which include a habitat survey utilising the Phase 1 habitat classification system, NVC and groundwater dependent terrestrial ecosystems (GWDTE) classification.

¹ As defined by the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora – the 'Habitats Directive'

² As defined within SEPA (2017, Ver 3). Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Available for download from <https://www.sepa.org.uk/media/144266/lups-qu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf>.

³ Scottish Biodiversity List <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list>

The surveys were undertaken in by Irene Tierney Principal Ecologist and full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

1.2 Ecological Context

The Site is located within arable land which is low-lying and a very gently undulating landform. There are conifer plantations locally and areas of historically modified (peat abstraction) peatland and wetlands, such as, St Fergus Moss, south of the Proposed Development. Small ponds are located within the farmland, as well as field ditches and watercourses, such as Black Water and unnamed watercourses.

The Landscape Character has been assessed as Coastal Agricultural Plain – Aberdeenshire⁴. The Site can be accessed via a farm track to Greenwellheads Farm which connects from the A90 road. The A90 road connects to the urban settlement of Crimond 2-3km to the north-west. The settlement of St Fergus lies 4.0km south-east of the Site.

The land is mainly utilised for cattle and sheep grazing. There are areas of marsh and swamp vegetation, numerous small ponds, and a small number of conifer plantations. Native woodland is sparse within this region with pockets and strips of ancient and native woodlands being present and identified on the Ancient Woodland Inventory (AWI) and the Native Woodland Survey Scotland (NWSS).

Rora Moss (SSSI) is situated 2.3km to the south of the development site and Loch of Strathbeg (SSSI, SPA, RAMSAR) is situated 3.0km to the north.

1.3 Policy & Legal Context

Guidance for assessing the potential impact of the Proposed Development on the ecological features of the development site will be based on the following statutory, general, and national guidance listed in Appendix A. Any appropriate local policy and guidance will also be considered.

⁴ Coastal Agricultural Plain – Aberdeenshire: <https://www.nature.scot/sites/default/files/LCA/LCT 017 - Coastal Agricultural Plain - Aberdeenshire - Final pdf.pdf>

2 METHODS

2.1 Background Data Search

A search was made for reference materials relating to the ecology of the site, and list of sources is given in Table 1. The site lies within Aberdeenshire Council.

Table 1: Data sources

Information Obtained	Available From
Designated site locations and citations/Protected areas	SiteLink Nature.scot (https://sitelink.nature.scot/map)
Designated site locations and citations	Nature.scot (https://www.nature.scot)
Designations and legal protection of noteworthy species	Joint Nature Conservation Committee (JNCC: https://jncc.gov.uk)
Geographic information about the natural environment	Magic Map DEFRA (https://magic.defra.gov.uk/home.htm)
Ancient Woodland Inventory, Commercial Plantation Plans, Native Woodland Survey Scotland	Scottish Forestry (https://forestry.gov.scot/ https://forestry.gov.scot/support-regulations/scottish-forestry-map-viewer) Scotland's Environment (https://www.environment.gov.scot) Magic Map (https://magic.defra.gov.uk/home.htm)
Scottish Wildlife Trust (for information on Local Nature Reserves)	https://scottishwildlifetrust.org.uk
River Quality & Catchments SEPA Water Classification Hub Scotland's Soil Map (Carbon and peatland 2016 map)	Scotland's Environment (https://www.environment.gov.scot) https://www.sepa.org.uk/data-visualisation/water-classification-hub/ Carbon and Peatland 2016 Map (https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/)
Aberdeenshire Council: Local Development Plan 2023	https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/
Aberdeenshire Council: Nature Conservation	https://www.aberdeenshire.gov.uk/environment/natural-heritage/biodiversity/
Aberdeenshire Council: Local Nature Conservation Sites	https://online.aberdeenshire.gov.uk/ldpmedia/LDP2021/Appendix12LocalNatureConservationSites.pdf
North East Scotland Biodiversity Partnership	https://www.nesbiodiversity.org.uk/

North East Scotland Biological Records Centre (NESBReC)	https://nesbrec.org.uk/
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A search was made for information on statutory designated sites (Internationally and Nationally important sites for ecology) within 10 km of the site boundary and non-statutory designated sites (important in a local context) within 2 km. A search was also made for records of noteworthy species within 5 km. Species included in the search parameters were:

- All wild plant and fungi species receive a level of protection under the Wildlife and Countryside Act 1981 (as amended). Some more rare or vulnerable species are given added protection under Schedule 8⁵ of the same Act.

Three Scottish plant species are European protected species:

- Killarney fern
- Slender naiad
- Yellow marsh saxifrage

These species receive protection under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

- Species listed as critically endangered, endangered or vulnerable on the IUCN Red List⁶
- Nationally rare or nationally scarce species;
- Notable Species that have action plans under the Scottish Biodiversity List (SBL⁷) or are priority species under the Local Biodiversity Action Plan.

Biological records were sought from North East Scotland Biological Records Centre (NESBReC).

2.2 Phase 1 Habitat Survey

Habitat field surveys were undertaken from May 2023 to January 2024. The habitat survey centred on the Phase 1 habitat survey approach (Joint Nature Conservation Committee 2010). This involves the following elements.

- Habitat mapping using a set of standard colour codes to indicate habitat types on a phase 1 habitat map.
- Description of features of possible ecological or nature conservation interest in notes relating to numbered locations on the phase 1 habitat map, called 'target notes'.

⁵ Protected species list - WCA schedule 8: <https://www.nature.scot/doc/protected-species-list-wca-schedule-8>

⁶ IUCN Red List: <https://www.iucnredlist.org>

⁷ Scottish Biodiversity List: <https://www.nature.scot/doc/scottish-biodiversity-list>

Phase 1 habitat survey methods are described in Joint Nature Conservation Committee (JNCC 2010) and target notes are included.

Plant nomenclature in this report follows Stace (2010) for native and naturalised species of vascular plant. Plant names in the text are given with the common name first, followed by the scientific name in brackets.

The Phase 1 characterisation has been utilised to allow a broader visual representation of the habitats within the study area. The NVC data should be referred to for further detail in any specific area.

2.3 National Vegetation Classification Survey

The NVC survey followed JNCC guidance (Rodwell, 2006), enabling the identification and recording of vegetation communities, using the descriptions and keys in the NVC handbooks (Rodwell, 1991 et seq). Individual plants and plant communities (or mosaics and transitions thereof) were recorded with the use of quadrats and whole community species lists compiled. The vegetation was classified to NVC sub-community level wherever possible, but only to NVC community level where sub-community determination was unclear. Most of the vegetation found in this survey was classified to NVC types where appropriate.

Complex mosaics of two or more habitats were mapped as mosaic polygons on high resolution 1:5000 aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species found. The presence and percentage cover for each NVC community was recorded within each polygon, so that the dominant community and character of the vegetation could be ascertained.

Vascular plants follow the nomenclature of The Botanical Society for the British Isles database (BSBI⁸) with all other flora and fauna following the UK Species Inventory (Natural History Museum⁹), New Flora of the British Isles, Third edition (Stace, 2010), Atherton et al (2010) for bryophytes and Purvis. W. (2000) for lichens.

2.4 Invasive Non-Native Plant Species

If invasive plant species were observed during the normal course of the survey e.g. Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*), Indian balsam (*Impatiens glandulifera*), they were noted within the report.

2.5 Survey Constraints

Habitat surveys and botanical surveys done in early spring, late autumn or winter are generally considered non-optimal. They can usually describe habitat types adequately, but many plant species (including invasive species) may be unidentifiable or altogether died-away.

⁸ <https://database.bsbi.org>

⁹ <https://www.nhm.ac.uk/our-science/data/uk-species/species/index.html>

While all significant plant species have probably been recorded, it is possible that some species, including invasive species, may have been missed or under-reported if surveys are undertaken out of season.

The NVC system does not cover all possible semi-natural vegetation or habitat types that may be found and since the NVC was adopted for use, further survey work has increased knowledge of vegetation communities that has led to additional communities being described. These new descriptions of communities do not fall within the present NVC system, and where these occur such communities are found and recorded and given a non-NVC community code with a description.

Botanical lists should not be considered fully comprehensive, as rarely occurring or early or late-flowering species may have been missed. However, this would not affect the broader assessment of the ecological value of the site and its habitats.

2.6 Data Collection & Assessment

Following NVC Data Collection, habitats were assessed for their potential to be on the Scottish Biodiversity List (SBL), Annex 1, or a UK Biodiversity Action Plan (UKBAP) priority habitat¹⁰. An assessment was undertaken using the NVC data to identify potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) within the survey area.

2.7 Ecological Survey Area

The ecological survey area (ESA) included 250m buffer around the turbine bases and 100m along the access tracks.

¹⁰ <https://hub.incc.gov.uk/assets/2728792c-c8c6-4b8c-9ccd-a908cb0f1432>

3 RESULTS

3.1 Background Data Search

3.1.1 Biodiversity

The Aberdeenshire Council website was searched for all relevant and up-to-date information regarding biodiversity, which included the Aberdeenshire Local Development Plan 2023¹¹, Aberdeenshire Council: Nature Conservation, and Local Nature Conservation Sites, North East Scotland Biodiversity Partnership and the North East Scotland Biological Records Centre (NESBReC). Detailed additional biodiversity guidance, priority strategic habitats and habitat action plans were assessed.

Information was searched for on the Local Biodiversity Sites and The Scottish Wildlife Trust¹².

3.1.2 Designated Sites

Statutory Sites

There are three statutory designated sites (Figure 2) within 5 km of the site boundary, and they are listed in Table 2. The Kirkhill SSSI is for a geological feature. Loch of Strathbeg has been designated as a SSSI, SPA and a RAMSAR site and is therefore designated for a variety of features, many of which include bird assemblages, and the main habitat features have been listed in Table 2.

Table 2: Statutory designated sites within 5 km of the site.

Site of Interest	Distance from site (approx.)	Description/Qualifying Features of Interest only	Condition (at last assessed date)
Sites of Special Scientific Interest			
Rora Moss SSSI¹³	2.3km	Wetlands: Raised bog	Unfavourable No change 21 Jun 2012
Loch of Strathbeg SSSI¹⁴	3km	<i>Multiple features: Relevant biological features listed only.</i>	
		Eutrophic loch	Unfavourable No change 20 Aug 2009
		Fen meadow	Favourable Recovered 19 Sept 2013
		Open water transition fen	Unfavourable No change 19 Sept 2013
		Saltmarsh	Favourable Maintained

¹¹ <https://storymaps.arcgis.com/stories/27f01f5e60544ece88580ca32dc4beb5>

¹² <https://scottishwildlifetrust.org.uk/>

¹³ <https://sitelink.nature.scot/site/1371>

¹⁴ <https://sitelink.nature.scot/site/1040>

Site of Interest	Distance from site (approx.)	Description/Qualifying Features of Interest only	Condition (at last assessed date)
		Sand dunes	13 Jun 2011 Favourable Maintained 31 Jul 2013
Kirkhill SSSI ¹⁵	5km	Geological: Quaternary of Scotland	Favourable Maintained 7 Jul 2010
Special Areas of Conservation			
Loch of Strathbeg SPA ¹⁶	3km	Bird assemblage: breeding & non-breeding	Various condition and dates from 2009-2014
RAMSAR			
Loch of Strathbeg RAMSAR ¹⁷	3km	Eutrophic loch	Unfavourable No change 20 Aug 2009

Non-statutory Sites

There are no Local Biodiversity Sites (LBS) within the 2km buffer of the red line boundary, however, there are multiple LBS sites between 2-5km and are detailed in Table 3 (Figure 3) as notable sites of interest.

There are woodlands designated in the Ancient Woodland Inventory (AWI) and the Native Woodland Survey of Scotland (NWSS) within 2 km of the site boundary (summarised in Table 4 & Figure 4). There are conifer plantations listed within the National Forestry Inventory within the 2km buffer that borders the red line boundary of the site to the west and east.

Table 3: Local non-statutory designated sites of notable interest up to 5 km of the site.

Site of Interest	Distance from site (approx.)	Description/Qualifying Features of Interest only
Local Biodiversity Sites LBS (Aberdeenshire Local Nature Conservation Sites¹⁸)		
Rora Moss LBS	2.0km	Lowland raised bog with acid grassland, ponds and rush pasture. Good variety of peatland species. The southern part of the site is commercial forestry with bog habitat in the unplanted areas.
Strathbeg to Rattray LBS	2.3km	Loch of Strathbeg is one of the largest coastal freshwater lochs in the UK. Swamp, reedbed, fen, marsh and wet woodland surrounds with coastal sand dune on

¹⁵ <https://sitelink.nature.scot/site/872>

¹⁶ <https://sitelink.nature.scot/site/8537>

¹⁷ <https://sitelink.nature.scot/site/8443>

¹⁸ <https://online.aberdeenshire.gov.uk/ldpmedia/LDP2021/Appendix12LocalNatureConservationSites.pdf>

Site of Interest	Distance from site (approx.)	Description/Qualifying Features of Interest only
		seaward side. Fields important for resident and migrant birds.
Ratray Head to Peterhead LBS	3.2km	Variety of coastal habitats including sand dunes. Good diversity of plant species including several species that are rare in NE Scotland. Adjacent fields important for roosting and feeding geese, waders and wildfowl.

Table 4: Listed woodland sites within 2 km of the site.

Site of Interest	Distance from site (approx.)	Description/Qualifying Features of Interest only
Native Woodland Survey Scotland (main ones listed only)		
Native woodland	1.0km	Young pole immature
	1.3km, 1.7km & 2.0km	Established regenerating Established regenerating
Nearly-native woodland	1.8km	Lowland mixed deciduous woodland, shrub
Ancient Woodland Inventory		
Crimond	645m	2b: Long-Established (of plantation origin)
Crimond Belts	1.0km	2b: Long-Established (of plantation origin)
Greenmyre Wood	1.6km	2b: Long-Established (of plantation origin)
Crimond / St. Fergus	1.8km	2b: Long-Established (of plantation origin)

3.2 Carbon & Soil Profile

3.2.1 Overview

Scotland's soils are an important natural resource providing a range of benefits for the environment with a wide range of essential functions, such as controlling the quality and quantity of water flow, supporting valuable habitats and species, and storing carbon. They are included within the NPF4 under Policy 5: Soils. Understanding the geology and the soil enables better understanding of the habitats that the soil supports and the water flow through the soil. This information can assist in determining the protection of sensitive habitats, enabling biodiversity net gain and mitigation strategies.

3.2.2 Geology

The British Geological Society's¹⁹ (BGS) map data was consulted to inform the bedrock and sediment properties, such as the possible location of peat and carbon concentration within the survey area. The underlying bedrock groups in the study area are mapped as sedimentary rock of the Crinan Subgroup and Tayvallich Subgroup – Semipelite, pelite and psammite. This is a metamorphic bedrock comprised of pelite, psammite, quartzite and semipelite with subsidiary basalt, calcsilicate-rock and limestone. The superficial deposits in this area consist of sedimentary superficial deposits primarily comprised of Hatton Till Formation – Diamicton, clay, sand and gravel. It is described as diamicton, clayey, pebbly, calcareous, red and crudely stratified. Additionally, alongside the local rock types it is noted to contain red sandstone, Mesozoic/Tertiary mudstone and limestone, shell fragments. Superficial deposits of Peat formed during the Quaternary period are within the wider area.

3.2.3 Soil Profile

The Scotland Soil Maps²⁰, UK Soil Observatory Map viewer²¹ and the National Soil Map Scotland²² were consulted to determine the type of soil present and their level of Carbon and water holding capacity. Carbon and Peatland map²³ illustrates the distribution of carbon and peatland classes within Scotland and the map was consulted to determine likely peatland classes present within the site. The map provides a consolidated spatial dataset which combines historical soil information with land cover data. The map also illustrates where there are areas of peat, if any, and identifies areas as mostly mineral soils with pockets of carbon-rich soil, peat and peatland habitat. The data on peat locations mainly correlates with that from the British Geological Society map data and the combined data indicates that the site is a combination of noncalcareous gleys; some peaty gleys and brown forest soils with gleying. There is an area of dystrophic basin peat within the conifer plantation to the west in the location where a turbine is proposed.

The Carbon and Peatland soil map has classed the soils as the following types; Class 0 soils (mineral soil with no peatland vegetation) and Class 5 (peat soil with no peatland vegetation) Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat. Class 1 soil is situated outwith the study area and at St Fergus Moss a peatland area that has had peat extracted. The Proposed Development has been overlaid onto the Carbon and Soil Map (2016) (Figure 5).

- Class 0: This soil type is mainly mineral soil. Two turbines, associated access tracks are proposed in this section. The vegetation classifications are wet modified grassland and patches of marsh and swamp grassland. All are impacted by grazing and drainage.

¹⁹ British Geological Society (BGS); <https://www.bgs.ac.uk/>

²⁰ Scotland's Environment, Scotland's Soil; <https://www.environment.gov.scot/>

²¹ <https://mapapps2.bgs.ac.uk/ukso/home.html>

²² Scotland's Environment, National Soil Map of Scotland and NSIS <https://map.environment.gov.scot/sewebmap/>

²³ Scotland's Environment, Scotland's Soil; https://map.environment.gov.scot/Soil_maps/?layer=10

- Class 5: Consists of peat soil with no peatland vegetation. The soil information takes precedence over vegetation data and no peatland habitat is recorded. The habitat in this section consists mainly of conifer plantation.

The available water capacity of the soil is listed as 147.78mm to 480.26mm. This is in the low to high-value range, with low values indicative of a water deficiency, and high values indicating a potential water excess. The topsoil organic carbon concentration ranges from 4.92% to 24.795%.

3.2.4 Hydrogeology

According to the BGS and the Hydrogeological and Groundwater Vulnerability Maps of Scotland²⁴, there is one productivity aquifer associated with the underlying bedrock, as follows;

- Argyll Group: This is recognised as a low productivity aquifer (Class 2C) where the flow is virtually all through fractures and other discontinuities and where there are small amounts of groundwater in near surface weathered zone and fractures.
- Low productivity aquifers do not widely contain groundwater in exploitable quantities; however, some bedrock formations can locally yield water supplies in sufficient quantities for private/domestic use.

The area contains a number of drains and ditches, small un-named watercourses and the Black Water river within the study area. The Black Water watercourse has been classified by SEPA²⁵ as of Moderate ecological condition overall in 2022 and since 2019, where previously it was of Bad ecological condition. The Black Water (u/s St Fergus is a river ID: 23064), in the Buchan Coastal catchment of the Scotland river basin district. The main stem is approximately 6.0 kilometres in length. The water body has been designated as a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact on the drainage of agricultural land.

3.3 Description of Habitat Types, NVC Communities and Evaluation

3.3.1 Phase 1 Habitat Overview

A total of seventeen Phase One habitats were recorded within the survey area. Table 5 lists the broader habitat types of the Phase One habitat found in this survey. A Phase 1 habitat map is provided in Figure 6. The habitats found within the ecological survey area of the proposed development site were mainly dominated by modified grassland fields utilised for grazing, marsh and swamp vegetation, conifer and broadleaved plantations, ponds, running water and ditch systems. Habitats of interest are Target Noted and illustrated in Figure 7.

²⁴ British Geological Survey 1:50,000 Digital Map. Available online: <https://www.bgs.ac.uk/data/mapViewers/home.html>

²⁵ <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>

Table 5: Phase One habitat types recorded at the Proposed Development survey area.

Phase 1 Code	Description
A1.1.2	Broadleaved woodland - plantation
A1.2.2	Coniferous woodland - plantation
A1.3.2	Mixed woodland - plantation
A2.2	Scrub -scattered
A3.1	Broadleaved scattered trees
B2.2	Neutral grassland - semi-improved
B4	Improved grassland
B5	Marsh/marshy grassland
F1	Swamp
G1	Standing water
G2	Running water & ditch systems
I2.4	Refuse tip and stone pile
J1.1	Cultivated land - arable
J2.1.2	Intact hedge – species poor
J2.2.2	Defunct hedge – species poor
J2.3.2	Hedge with trees – species poor
J3.6	Buildings

The area and percentage of habitats, within the ecological survey area, was calculated and are provided in Table 6. The habitat area calculations are rounded up (to the second decimal point), and with overlapping of habitats, mosaics and the three-dimensional nature of habitats, the areas given in Table 6 are approximations. Habitat area calculations are based on the total area of land within the Habitat Survey Area as 89.16ha of the Ecological Survey Area only.

Table 6 - Summary of Phase 1 Habitats area within the main survey area.

Phase 1 Habitat	Area (ha)	% of Habitat in main Study Area
Broadleaved woodland - semi-natural	0.93	1.05
Coniferous woodland - plantation	10.08	11.30
Mixed woodland - plantation	0.80	0.90
Scrub -scattered	0.05	0.05
Broadleaved scattered trees	0.69	0.77
Neutral grassland - semi-improved	2.05	2.30
Improved grassland	63.79	71.54
Marsh/marshy grassland	1.25	1.40
Swamp	0.94	1.05

Standing water	0.81	0.90
Refuse tip and stone pile	0.07	0.08
Cultivated land - arable	7.29	8.18
Intact hedge – species poor	0.06	0.07
Hedge with trees – species poor	0.02	0.02
Buildings	0.34	0.38
Total	89.16	100

3.3.2 NVC Classification Overview

A total of four main NVC vegetation types, with three non-NVC types (Figure 8), were found in this survey. These National Vegetation Communities are listed in Table 7 and described in the following pages.

Table 7 - National Vegetation Classification types recorded within the ESA.

NVC type	Description
MG6	<i>Lolium perenne-Cynosurus cristatus</i> grassland
MG10a	<i>Holcus lanatus-Juncus effusus</i> rush-pasture, typical sub-community
M27	<i>Filipendula ulmaria-Angelica sylvestris</i> mire
S28	<i>Phalaris arundinacea</i> tall-herb fen
BP	Non NVC type - Broadleaved Plantation
CP	Non NVC type - Coniferous Plantation
Other	Non-NVC type (watercourses, ditches, ponds, refuse & stone piles, buildings)

3.3.3 MG6 *Lolium perenne-Cynosurus cristatus* grasslands

This vegetation is dominated by *Lolium perenne* grass with *Cynosurus cristatus* in lesser amounts. Among these grasses are also *Festuca rubra* and *Agrostis capillaris*. It occurs in free-draining circum-neutral soils. The main habitat (71.54% of the total area) within the ESA is improved grassland fields, utilised for cattle and sheep grazing (Figure 10). Within the fields there are areas of waterlogged or impeded soil and some ponds were evident. In some fields there were rush grasses of *Juncus effusus* growing which forms the vegetation communities of MG10a (*Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community).

3.3.4 MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community

This vegetation is dominated by a dense growth of the tall tussocks of *Juncus effusus* accompanied by a species-poor flora including *Holcus lanatus*, *Deschampsia cespitosa*, *Ranunculus repens* and *Rumex acetosa*.

It is a form of rush-pasture characteristic of areas with strongly impeded drainage over a wide range of usually acid to neutral mineral soils on level to gently sloping ground

(Rodwell et al., 1992). This community requires consistently high soil moisture (Rodwell et al., 1992). It occurs across most of the British lowlands.

Although found on various soil types including brown earth and calcareous earth throughout its range, this habitat can also have close associations with various types of mire vegetation and can form significant parts of rush-dominated mire mosaics in areas of suitably moist soils. Growing through the tussocks there is usually and typically variable amounts of *Holcus lanatus*, *Agrostis spp.*, *Ranunculus repens*, *Rumex acetosa* and *Trifolium repens*. More occasional and only in some stands there were additional floristics of *Senecio jacobaea*, *Cirsium arvense*, *Cirsium palustre*, *Rumex obtusifolius*, *Equisetum arvense*, *Cynosurus cristatus*, *Prunella vulgaris* and *Taraxacum officinale* agg.

The MG10a community was in the improved grassland grazing field and along the edges of the ditch system within the study area (Figure 11).

3.3.5 **M27 *Filipendula ulmaria*-*Angelica sylvestris* mire**

This vegetation community is a tall, lush, herb-rich mire mainly dominated by *Filipendula ulmaria*. In summer the dark-green sward is scattered with dense creamy patches of sweet-scented flowers – a colourful sight against the sombre greens and browns of other upland grasslands, heaths and mires.

The M27 on site resembles that of the sub-communities M27b and M27c and appears to be a transition community between coarse grassland and swamp vegetation.

The vegetation community includes *Urtica dioica*, *Galium aparine* and *Cirsium arvense*. It could be regarded as transitional between tall-herb fen and coarse grassland, Phalaris fen and certain weedy vegetation types. There is also present *Juncus effusus*, *Holcus lanatus*, *Mentha aquatica* and *Lotus uliginosus*.

This is a mire of damp mesotrophic soils at low to moderate altitudes. It generally occurs in mosaics with other tall-herb mires and swamps, in glens and wet hollows, alongside slow-moving streams, at the edges of lochs, and on flushed slopes close to sea-level. These are all places where the water-table fluctuates widely over the year.

This habitat is located around the pond at Target Note 2 and at wetter habitats (see Figure 7; TN2, TN4, TN11).

3.3.6 **S28 *Phalaris arundinacea* tall-herb fen**

This community comprises a species-poor vegetation in which *Phalaris arundinacea* is dominant, forming a dense canopy, about 1-1.5 m tall (Figure 12). *Phalaris arundinacea* is a dominant plant species in areas noted at TN5, TN9, TN10 (Figure 7), and it is also located in small dense patches with the M27 community and along some of the ditches.

Swamp and tall herb fen habitats are characterised by the fact that the water table is at or above the soil surface for most of the year. They tend to be botanically species-poor (e.g. reedbeds) relative to other wetland habitats. Reed canary-grass is intolerant of permanent flooding and prefers areas where the water-table tends to lie below the surface for most of the year.

A new access track is proposed through one of the *Phalaris arundinacea* communities (TN5).

3.3.7 **BP Broadleaved Plantation – Non NVC type**

There are immature broadleaved trees planted along the edges of the conifer plantation within the survey area (Figure 13).

3.3.8 **CP Coniferous Plantation – Non NVC type**

There is a commercial conifer plantation (Figure 14) within the survey area extent to the west, and one of the turbines are proposed within the plantation. During the survey it was noted that there were areas within the plantation that were waterlogged and soil moisture is within the high range (see Section 3.2.3).

3.3.9 **Other Non-NVC type**

The watercourses, ditches (Figure 15), fences, ponds and tracks are classed as Non-NVC types. There were also scattered trees and scrub that did not fit with an NVC category. There was a line and double line of small trees/scrub that were planted along a ditch and track edge (Figure 16) which were not aligned to an NVC category. There were multiple ponds on site of various sizes within modified grassland fields (Figure 17), and with more biodiverse habitats such as M27 (Figure 18).

3.4 **Invasive Species**

There are no invasive plant species noted on site, however, there are a variety of invasive non-native species (INNS) within 2 km of the ecological survey area (NESBREc data), such as *Fallopia japonica*.

3.5 **Notable Species**

No notable or rare plant species were incidentally recorded during the habitat surveys; however, this does not preclude their presence from the study area.

4 EVALUATION OF BOTANICAL INTEREST

4.1 Evaluation Criteria

NVC communities can be compared with a number of additional habitat classifications in order to assist in the assessment of the sensitivity and conservation interest of certain areas. The NVC communities identified can be compared against the following three classifications:

- SEPA guidance on Groundwater Dependent Terrestrial Ecosystems (GWDTEs) (SEPA 2017a; 2017b);
- Habitats Directive (92/43/EEC)²⁶ Annex I habitats;
- Scottish Biodiversity List (SBL)²⁷ priority habitats.

4.2 Habitats classed by SEPA as Groundwater Dependent Terrestrial Ecosystems

SEPA has classified several NVC communities as potentially dependent on groundwater (SEPA, 2017a & 2017b). Wetlands or habitats containing these NVC communities are to be considered GWDTE unless further information can be provided to demonstrate this is not the case.

Many of the NVC communities on the list are very common habitat types across Scotland. Furthermore, some of the NVC communities may be considered GWDTE only in certain hydrogeological settings. Designation as a potential GWDTE does not therefore infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine a habitats respective conservation importance. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment.

This report details the results of the NVC vegetation communities to determine the potential level of groundwater dependency. The hydrological data details the location of low productivity aquifers only.

Determining groundwater dependency is complex as most water-dependent terrestrial ecosystems rely on a combination of groundwater, surface water and rainwater, and many vegetation communities will use the available source of water. In some topographical and hydrogeological conditions, a particular ecosystem can be groundwater-dependent whereas in others the same ecosystem is surface water dependent.

To add to this complexity the seasonal patterns of water availability impact water use, where groundwater reliance can be greater in the summer when rainfall and surface water are less available.

It is noted that on the periphery of the ESA there are Class 5 peat soils and consist of organic soils of undifferentiated basin peats. The nearest being located within the plantation and connects with the drains as well as the ponds and mire M27 and swamp

²⁶ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. <https://www.legislation.gov.uk/eudr/1992/43/annex/1>

²⁷ <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list>

community S28. The conifer plantation soil was noted as being waterlogged in some areas.

Among the habitats found in this survey, the following are classed by the Scottish Environmental Protection Agency (SEPA, 2017a; 2017b) as Groundwater Dependent Terrestrial Ecosystems (GWDTE) (Table 8).

Table 8 - NVC communities and their GWDTE score (1= Strong dependency upon groundwater, 2= likely to be some dependency, 3= slight or no dependency)

NVC Community	GWDTE score (1, 2, or 3)
MG10a	2
M27	2
S28	3
MG6	No classification
<p>* GWDTE Score Scotland or may vary for different hydroecological settings [∞] Country Occurrence: Scotland only – Not in England & Wales <i>Explanation of GWDTE scores:</i> 1 – Strong dependency upon groundwater discharge. 2 – Likely to be some dependency on groundwater discharge. 3 – Groundwater discharge usually irrelevant: site fed by other water sources.</p>	

It is important to note that the GWDTE classification system above uses the data for the Scotland (GW) Dependency Score (UKTAG Guidance 5ab Annex 1)²⁸, or where it may vary for different hydroecological conditions as noted by * in brackets, and by [∞] as per country occurrence for GWDTE classification.

Using SEPA’s guidance the habitats are colour-coded according to their dependency to groundwater, as illustrated in Figure 9 & Table 8. The NVC communities recorded that are likely to be considered as having a moderate dependency (Class 2) on GWDTE in certain hydrogeological settings are highlighted in yellow. Habitats that are considered as having a groundwater discharge that is irrelevant or fed by other sources (Class 3) are highlighted in white. Those with no dependency on groundwater are clear of shading. There are no Class 1 (highly dependent on groundwater) habitats within the ESA.

The list of NVC communities provided in the UKTAG Guidance 5ab Annex 1 indicates that MG10a and M27 have a moderate groundwater dependency, with the remaining either having low or no groundwater dependency in Scottish situations.

4.2.1 Annex 1 Habitats

The Joint Nature Conservation Committee (JNCC) Annex I Habitat listings and descriptions²⁹, have been used to compare with the survey results and field observations. A number of UKHab and NVC communities can correlate to the various Annex I habitat

²⁸ UKTAG Guidance 5ab Annex 1, <http://www.wfd.uk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/UKTAG%20guidance%205%20ab%20ANNEX%201%20updated%205%20October%202009.pdf>

²⁹ Habitats List <https://sac.jncc.gov.uk/habitat/>

types. However, the fact that an NVC community can be attributed to an Annex I type does not necessarily mean all instances of that NVC communities constitutes an Annex I Habitat. Its Annex I status can depend on various factors such as quality, extent, species assemblages, geographical setting, substrates and so on.

There are no NVC communities within the study area which constitute an Annex I Habitat.

4.2.2 Scottish Biodiversity List Priority Habitats

The Scottish Biodiversity List (SBL) is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was published in 2005 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004³⁰. The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland: these are termed 'priority habitats'. Some of these priority habitats are quite broad and can correlate to a large number of NVC types.

There are no SBL priority habitat types (full descriptions of SBL habitats can be found on the NatureScot website³¹), recorded within the ESA (Table 9). All SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats³².

4.2.3 Summary of Habitat Sensitivities

The NVC and habitat types, their associated habitat sensitivities as described above. There are no corresponding categories for the Annex 1 habitats and the Scottish Biodiversity List (Table 9).

Table 9 - NVC types recorded at the Proposed site, with corresponding GWDTE designation, Scottish Biodiversity List and/or Annex 1 designations, if any.

NVC type	GWDTE Code (LUPS -GU31, SEPA 2017) Colour Code:High = red Moderate=Yellow Low or none=White/clear	Scottish Biodiversity List (SBL) (/ - no correspondence)	Annex 1 Code (/ - no correspondence)
MG10a	Moderate	/	/
M27	Moderate	/	/
S28		/	/
MG6		/	/

4.2.4 Habitat Loss

The main habitat on site is modified grassland utilised for sheep and cattle grazing. The main habitat lost to track and turbine infrastructure will be modified grassland and a section of conifer plantation for access track and turbine location.

³⁰ <https://www.legislation.gov.uk/asp/2004/6/contents>

³¹ <https://www.nature.scot/landscapes-and-habitats/habitat-types/habitat-definitions>

³² <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/>

4.3 Evaluation & Discussion

4.3.1 NVC Evaluations

NVC and habitat surveys within the study area were undertaken to identify those areas of vegetation communities with the greatest ecological or conservation interest. The study area surveys covered the Proposed Development Site for the Greenside Extension Wind Farm, to a buffer zone of 250m for the turbine survey area and 100m at track locations, as outlined in Figure 8.

In total, four NVC communities were recorded within the respective study area. Non-NVC habitat types present included conifer and broadleaved plantation, watercourses, ditch systems, ponds, scattered trees and scrub. The most common vegetation types (Phase 1 and NVC) within the study area (Tables 6 & 7) included modified grassland (71.54%) for grazing followed by conifer plantation (11.30%).

There are no plant species from the habitats recorded on site that are critically endangered, endangered or vulnerable on the IUCN Red list.

4.3.2 GWDTE Evaluations

The survey results have been compared to several sensitivity classifications, and Tables 8 & 9 summarises the presence or absence of Annex I, SBL and potential GWDTE habitats.

There are two communities categorised³³ as Class 2 GWDTE (MG10a, M27). The MG10a community is in multiple locations and mainly within modified grassland fields where drainage is impacted, and along the length of drainage ditches. S28 is categorised as Class 3 with little or no dependency on groundwater.

Where there are moderate GWDTE located on non-peat soil classification there appears to be ponding in shallows and dips where water accumulates, leading to surface waterlogging. This can occur where the surface topography is typically almost flat with minor surface irregularities, which would tend to encourage ponding in the natural hollows. There are multiple ponds on site and the soil was highly waterlogged during some survey dates, where the drainage ditches were overflowing and the existing farm track at Greenwellheads was flooded.

4.4 Impact to Sensitive Habitats & Mitigation Considerations

4.4.1 Groundwater Dependent Terrestrial Ecosystems

Some of the moderate GWDTE habitats are in the form of mosaics with other habitats, and their groundwater dependency classification aligns with that of the dominant habitats.

It is concluded that the main habitats within the site which are described as moderately groundwater-dependent (MG10a and M27) may be due to water seepage and potential water flow through fractures and other discontinuities in the surrounding rock. However, there is likely no reliably available source of groundwater on which they can depend.

³³ UKTAG Guidance 5ab Annex 1, <http://www.wfd.uk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/UKTAG%20guidance%205%20ab%20ANNEX%20%20updated%205%20October%202009.pdf>

Therefore, are likely to rely on a combination of rainfall and surface runoff, with some direct surface water in areas adjacent to watercourses and waterbodies.

Nevertheless, all these habitats are considered to be sensitive and important for biodiversity, and a level of protection is required to minimise and, if necessary, mitigate any impacts that may occur.

A habitat management plan is advised to ensure that all sensitive habitats are protected, and any loss of habitats are compensated for and there is a biodiversity enhancement plan put in place. The site was noted for its numerous ponds and flooding during heavy rain. There may be the potential to enhance for biodiversity and flood control, and manage the ditch systems and include riparian vegetation as part of a potential biodiversity enhancement plan.

4.4.2 **Water Flow**

Any development should always take into consideration any effect on the water movement on site, especially as there is lateral flow of water through the mineral soils into ditches and watercourses. An un-named watercourse flows through the site and eventually connects with the Black Water off-site. Part of the Black Water traverses through the site where there is an existing access track which will be utilised by the Proposed Development. The Black Water has been classified by SEPA as of Moderate ecological condition overall in 2022. Mitigation and pollution prevention plans are required (as part of the CEMP) to avoid pollution of all watercourses.

Wetland habitats are known to be sensitive to changes in their water supply, whether this is from groundwater, surface water or rainwater (see Section 4.4.1). All wetland features should be protected, especially during the construction phase as this is when sensitive habitats are at most risk from site traffic, soil/water runoff and potential pollutants. It is essential that sensitive ecological receptors are not impacted by the development. Therefore, the application of the mitigation hierarchy and construction good practice will be required.

Micro-siting may be required in a localised context, and for other non-habitat issues as yet unidentified.

It is possible to identify potential areas of concern and put measures in place to manage and control potential problems (such as in times of heavy rain) during the construction phase. The following are general control measures that can be used:

- Drainage ditches should be constructed on both the upslope and downslope if necessary, to control the routing of water and prevent it from getting onto the construction area;
- Drains or ditches carrying natural clean water must be prevented from being contaminated by dirty runoff from open construction surfaces;
- Clean water should not be diverted into the same areas as dirty runoff from construction surfaces. This will fill up silt settlement traps and fences too quickly, making them vulnerable to failure during heavy storm events; and
- Measures such as the use of silt fencing, silt traps and other suitable filtration methods can be employed. These mechanisms are intended to reduce the speed

of flow, filter runoff and allow suspended silts and particulates to settle out naturally.

Areas of vulnerability will be identified prior to commencement, such as, steep gradients and wetland areas. Suitable site-specific drainage measures will be identified to suit these areas and will be shown clearly on the construction maps within the Construction and Environment Management Plan (CEMP), which will be provided prior to any constructional work commences.

5 BIODIVERSITY ENHANCEMENT AND HABITAT MANAGEMENT PLAN

The Applicant has committed to the provision of a Habitat Management and Monitoring Plan (HMMP) to reduce adverse environmental effects and to provide significant enhancements for important ecological features and biodiversity enhancement at the Proposed Development, and as a requirement in line with Policy 3 of National Planning Framework 4. Biodiversity Net Gain is an evolving discipline within Scotland.

Biodiversity enhancements must be identified in proportion to the opportunities on site, scale of the development and informed by the ecological baseline survey. Biodiversity enhancements will be delivered within the Land Ownership Boundary and the ESA.

The assessment of the biodiversity baseline investigates distinctive habitat types such as terrestrial habitats, linear features (hedgerows), and watercourses. The proposal for enhancement has therefore included defined objectives according to two of the habitat types located within the Proposed Development ESA and include Terrestrial Habitats and Watercourse Habitats.

5.1 Enhancement of Watercourse Habitats

Objective 1: Management of Bank Side Vegetation, via riparian planting in appropriate areas within the Site to deliver benefits to species and macro-invertebrates, including the casting of shade, maintenance of cool water temperatures, provision of cover and sources of food from infalling litter and insects, and to deliver opportunities for other wildlife, including foraging and commuting bats, terrestrial mammals (including otter), birds and reptiles. This objective can be met in sections along the Un-named watercourse, or the small section of the Black Water.

Objective 2: Riparian Planting, to include both continuous and discontinuous shrub and tree-dominated planting of broad-leaved species of local provenance, to provide cover for commuting or mobile species, and potentially rest site opportunities in denser areas of planting. Benefits for other biodiversity including birds, amphibians will benefit bats by potentially increasing food resources.

5.2 Enhancement of Terrestrial Habitats

Objective 1: Hedge and tree planting, to include both species-rich hedges and trees (broad-leaved species) planting along the field margins of species of local provenance, in an area noted for biodiversity enhancement in the survey extent. This will provide commuting corridors for badgers and other species, such as birds and bats, and increase insects and nesting potential for birds. It will also provide shelter for other species such as brown hare.

Objective 2: Planting of wildflower edges/corridors along the agricultural field in the east. This will provide bees and other pollinating insects with food, shelter and places to breed. An increase in pollinating insects within a farmland environment assists in the pollination of arable crops.

The appropriateness of any specific measures proposed to achieve the aims and objectives, methods to be used and suitable locations within the Site for implementation, will be determined in consultation with the landowners, NatureScot, Aberdeenshire Council and the Applicant, post-consent. Prescriptive measures will be included in the HMMP to be agreed with NatureScot, Aberdeenshire Council, and additional relevant stakeholders, and to be secured by appropriate planning condition. The success of management prescriptions and habitat creation in achieving the aims and objectives of the HMMP will be monitored, with the results reported to an advisory group, in accordance with timings and protocols to be agreed with NatureScot and Aberdeenshire Council. The HMMP, once finalised, will be a live document, with the habitat management measures implemented being adaptive throughout the lifetime of the Proposed Development in response to the findings of ongoing monitoring.

6 Additional Biodiversity Measures

A selection of additional biodiversity measures are considered to ensure the opportunities for enhancement can achieve the greatest benefit for nature. These additional biodiversity measures are of an ecological and practical nature and include the most suitable and locally appropriate biodiversity measures specific for the location, site and proposed development.

The aim of these selected measures is to provide homes for nature, and enhance the nature found on the site and in its surroundings. Thus, to further improve the site the following species-specific habitat provisions are recommended;

- Bat and bird roosting boxes to be installed with the retained trees along the plantation edges;
- Refugia/hibernacula in the form of external and buried log piles within areas of open space to provide suitable shelter for amphibians and reptiles and to further enhance biodiversity;

Further details are listed in Appendix B and the advice follows the guidance within the Developing with Nature guidance³⁴ (Guidance on securing positive effects for biodiversity from local development to support NPF4 policy 3c).

³⁴ Developing with Nature guidance. <https://www.nature.scot/doc/developing-nature-guidance>

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8 FIGURES

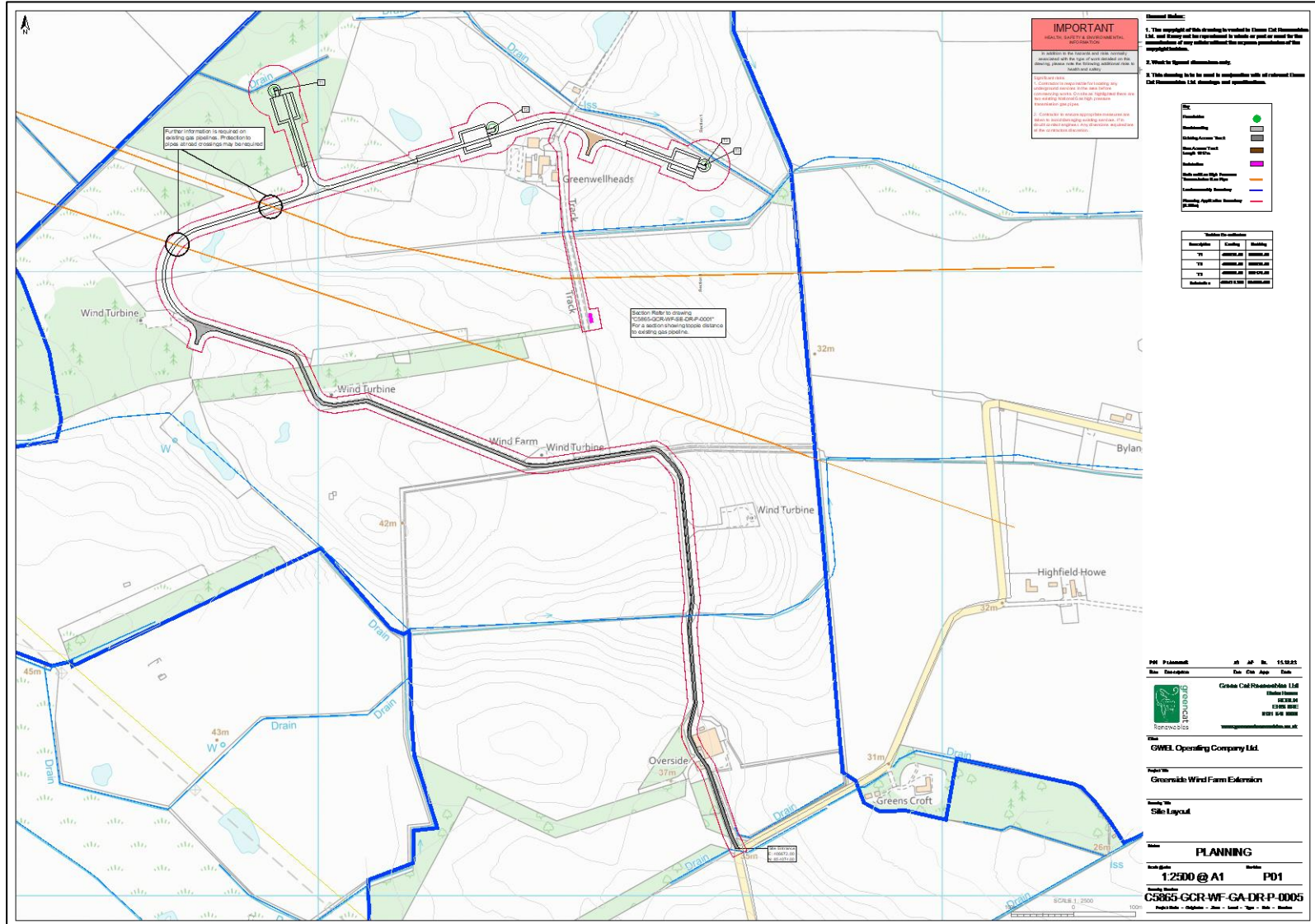
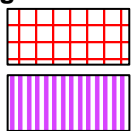


Figure 1: Site Layout Plan



Figure 2. Statutory Designated Sites within 5km buffer of the Proposed Development.



Sites of Special Scientific Interest (SSSI)

Special Protection Area (SPA)

5km buffer



RAMSAR



Figure 3: Multiple Local Biodiversity Sites up to 5km, as notable sites of interest.

 Local Biodiversity Site

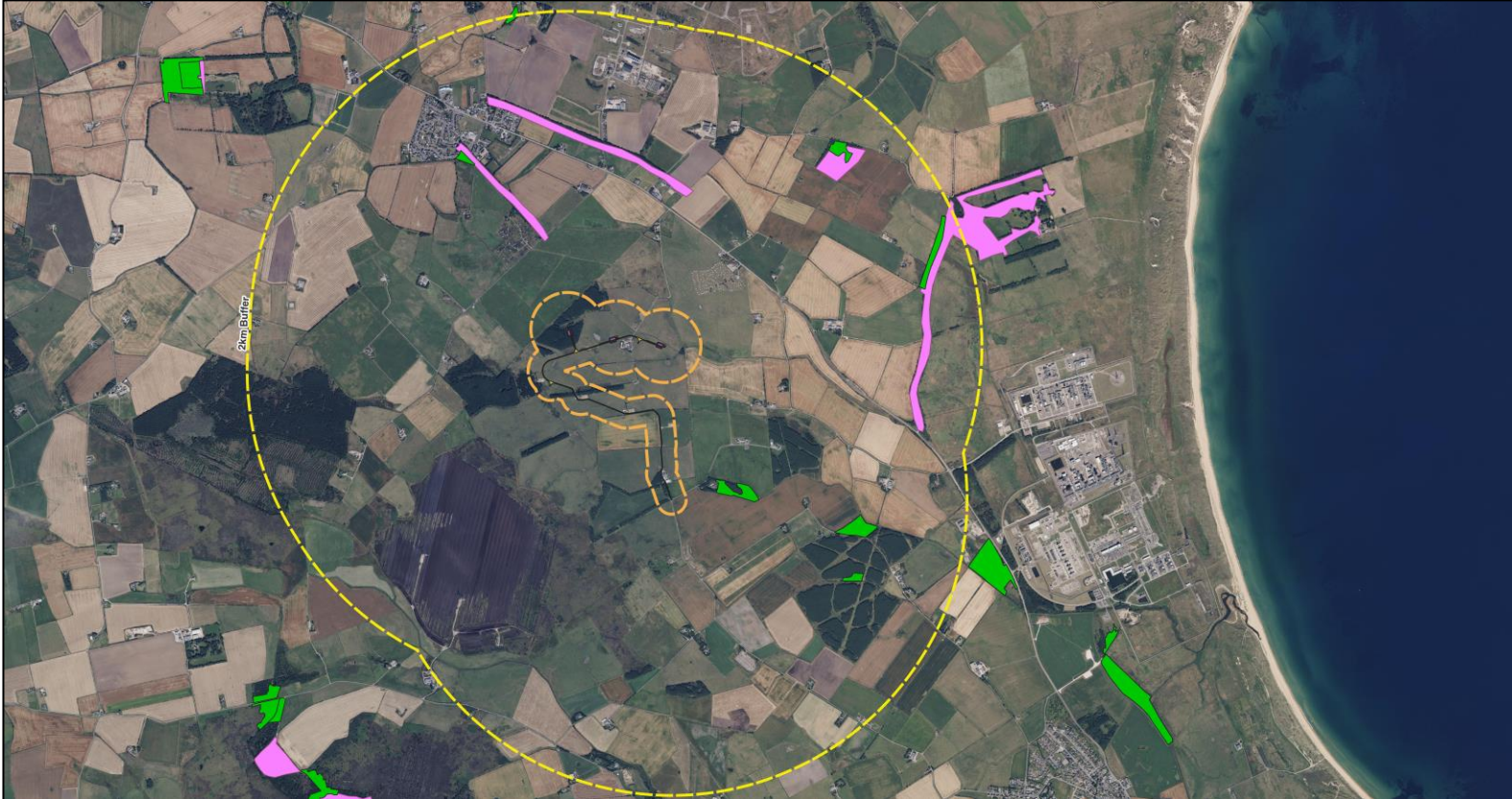


Figure 4: The Native Woodland Survey of Scotland and Ancient Woodland Inventory, within 2km of the site boundary.



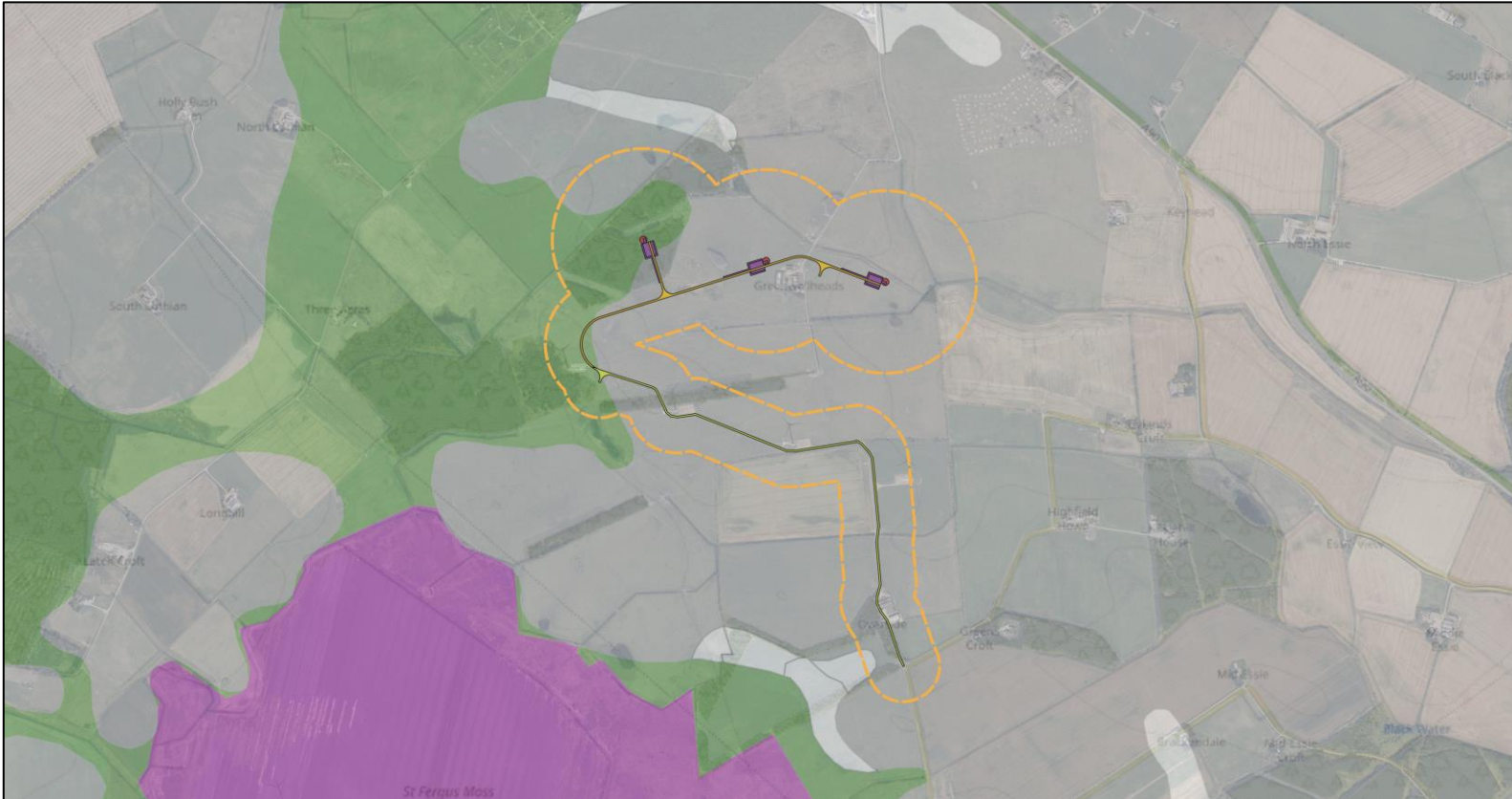










Figure 5: The Proposed Development overlaid onto the Carbon and Soil Map (2016).

Map Legend Table (accessed Scotland's Soils Website³⁵) for the carbon and peatland class, shown in the following categories.

Colour Code	Class description	Indicative soil	Indicative vegetation
	Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value	Peat soil	Peatland
	Class 2 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential	Peat soil with occasional peaty soil	Peatland or areas with high potential to be restored to peatland
	Class 3 - Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat	Predominantly peaty soil with some peat soil	Peatland with some heath
	Class 4 - Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils	Predominantly mineral soil with some peat soil	Heath with some peatland
	Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.	Peat soil	No peatland vegetation
	Mineral soil - Peatland habitats are not typically found on such soils (Class 0)	Mineral soils	No peatland vegetation
	Unknown soil type – information to be updated when new data are released (Class -1)	Not classified (unknown soil type)	Not applicable
	Non-soil (e.g. loch, built up area, rock and scree) (Class -2)	No soil	Not applicable

³⁵ <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

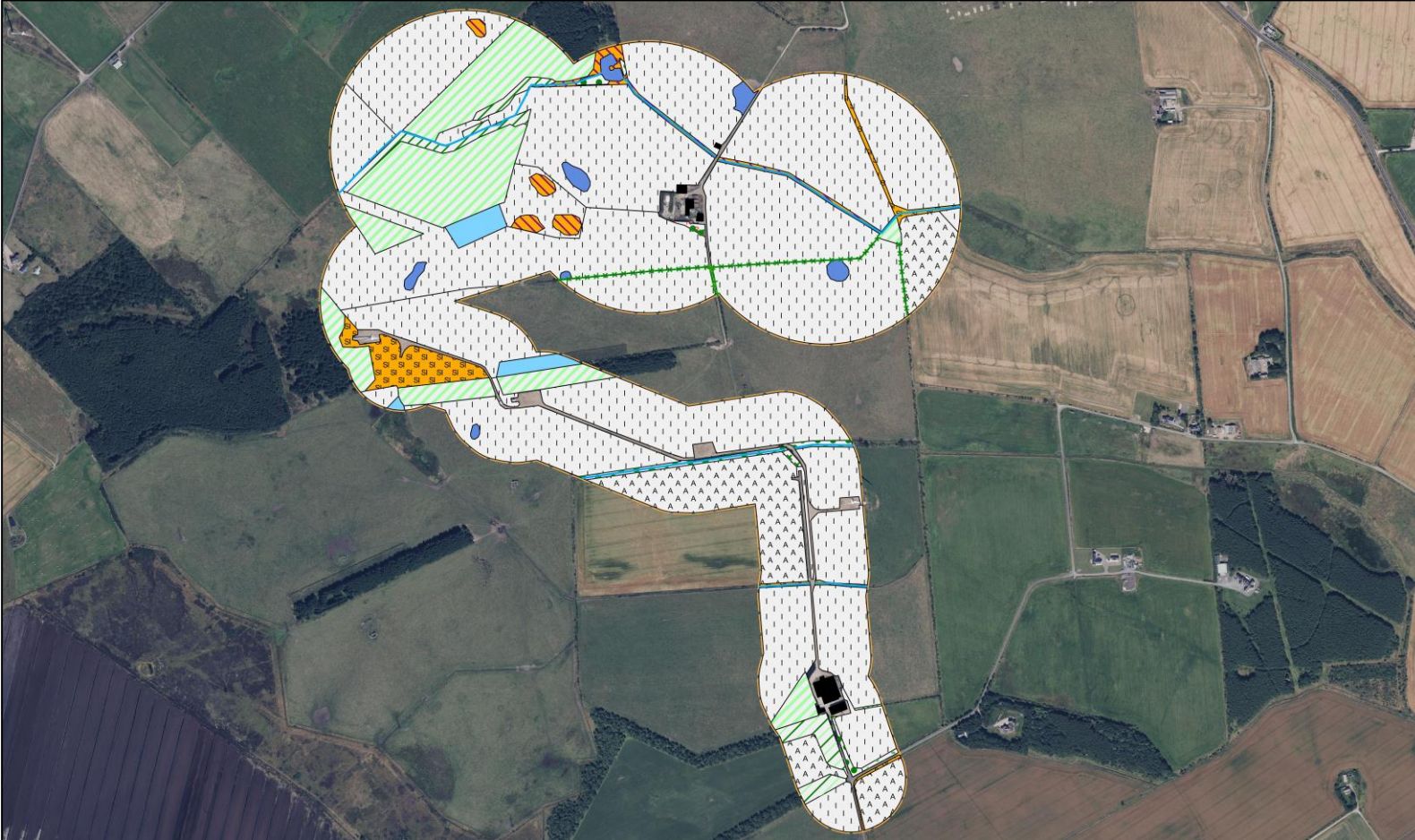

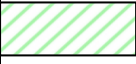




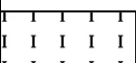




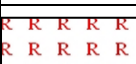
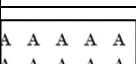







Figure 6: The Phase 1 habitat map within the Ecological Survey Area for the Proposed Development.

Legend for Phase One habitat survey at the Proposed Development.

Code	Phase 1 Habitat Description
	A1.1.2 Broadleaved woodland – plantation
	A1.2.2 Coniferous woodland – plantation
	A1.3.2 Mixed woodland – plantation
	A2.2 Scrub -scattered
	A3.1 Broadleaved Parkland/scattered trees
	B2.2 Neutral grassland - semi-improved
	B4 Improved grassland
	B5 Marsh/marshy grassland
	F1 Swamp
	G1 standing Water
	G2 Running water & Ditch systems
	I2.4 Refuse tip and stone pile
	J1.1 Cultivated/disturbed land - arable
	J2.1.2 Intact hedge – species poor
	J2.2.2 Defunct hedge – species poor
	J2.3.2 Hedge with trees – species poor
	J3.6 Buildings
	Ecological Survey Area boundary

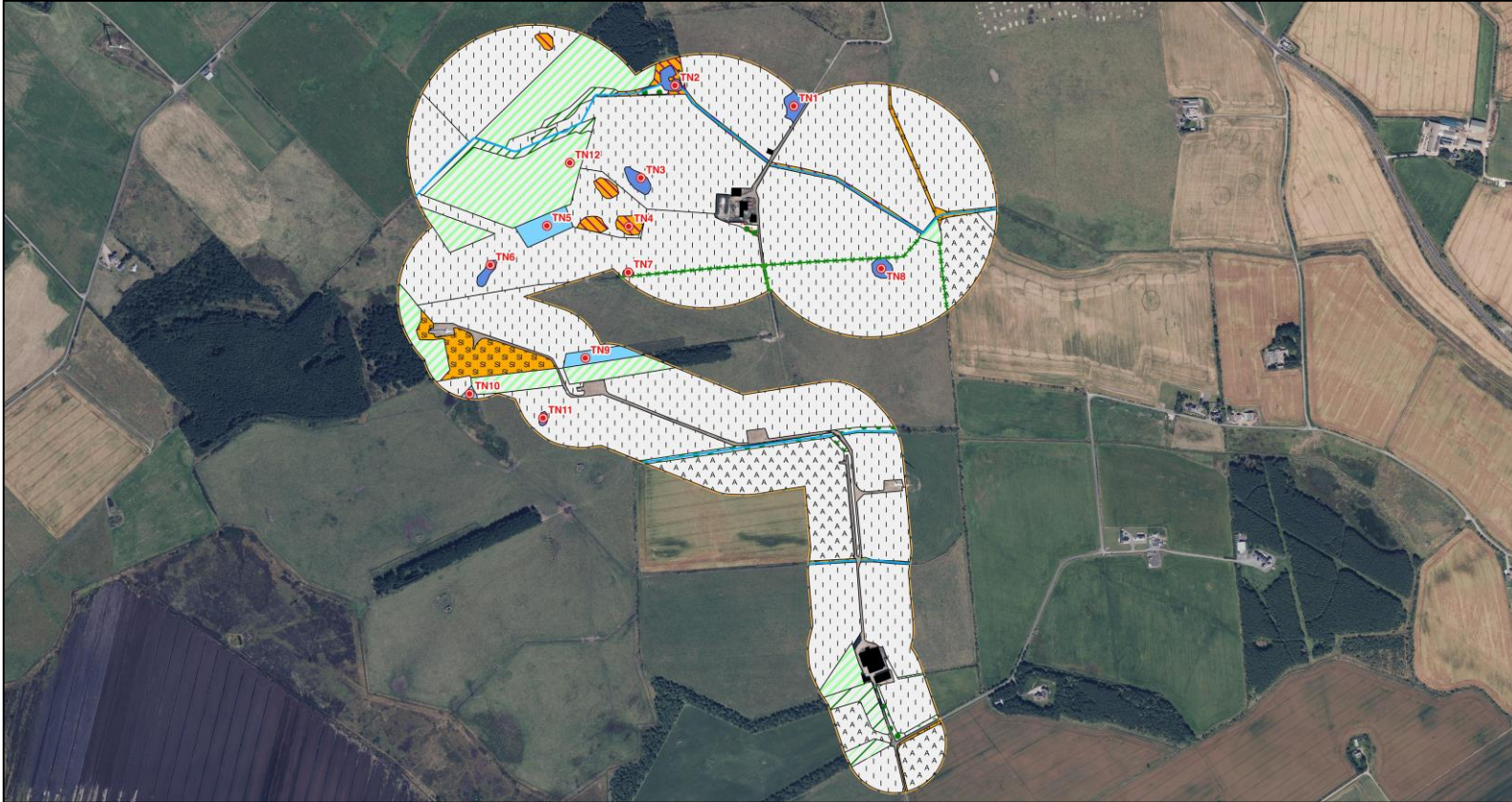


Figure 7: Location of Target Notes for areas of interest within the Ecological Survey Area for the Proposed Development.

 Target Note

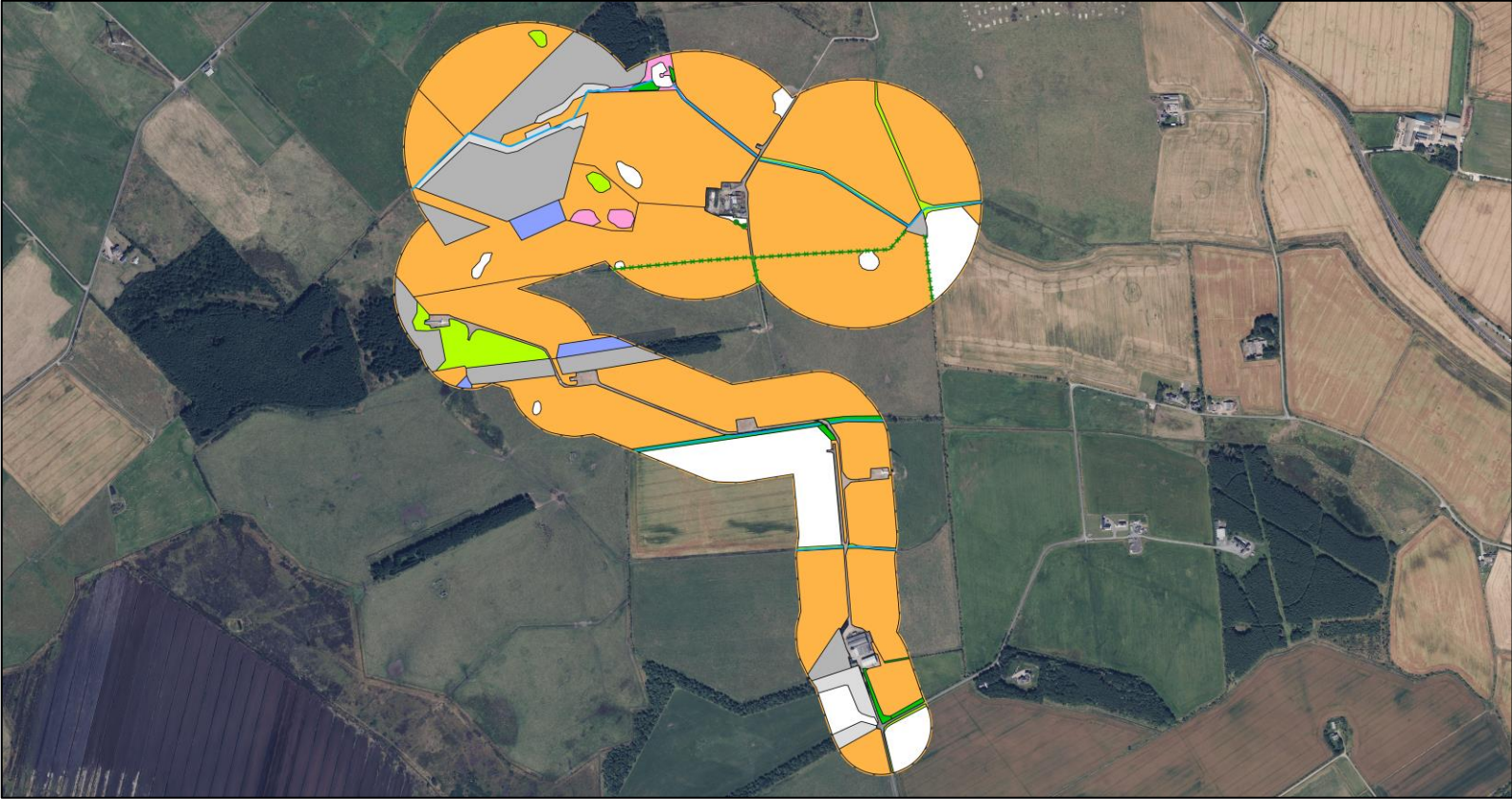










Figure 8: NVC survey map within the Ecological Survey Area for the Proposed Development.

Proposed Development NVC Legend

Follows the suggested colour code system for NVC mapping by Ben Averis (2014)³⁶.

Mosaics of two or more groupings are illustrated by hatchings, and the dominant community is given preference when over a 60% threshold to ensure a broader view of the main habitats within the Study Area.

NVC type	NVC Colour Code
Improved grasslands (MG6a)	
Semi - improved neutral grasslands (MG10a)	
Other mires (M27)	
Swamps and fens (S28)	
Scattered, immature broadleaved woodland & scrub (Non-NVC type)	
Non NVC type: Coniferous plantation	
Non NVC type: Broadleaved & mixed plantation	
Non NVC type: Anything else (arable field, hardstanding, bare ground etc)	

³⁶ https://studylib.net/viewer_next/web/study?file=%2F%2Fs3p.study...ata%2F007412064_1-3e2fa623f71659e5efada57360d18d70.png&ads=true



Figure 9: GWDTE survey map within the Ecological Survey Area for the Proposed Development.

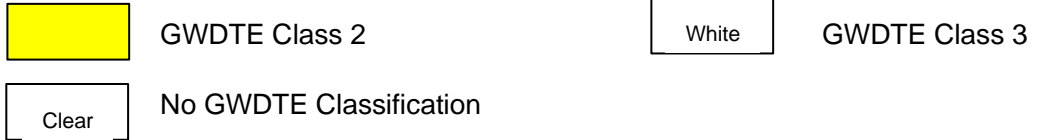




Figure 10. The modified grassland fields of MG6 utilised for grazing, with areas of MG10a.



Figure 11. The MG10a community was in improved grassland grazing fields and along the edges of the ditch systems.



Figure 12. *Phalaris arundinacea* is a dominant plant species in the S28 community.



Figure 13. Immature broadleaved trees are planted long the conifer plantation edge. Ditch present.



Figure 14. Conifer plantation on site.



Figure 15. Ditch between two modified grassland fields.



Figure 16. Existing track with a ditch at the edge with double row of scrub and immature trees.



Figure 17. Large pond within a modified grassland field.



Figure 18. Pond near the conifer plantation surrounded with M27 habitat.

APPENDIX A – POLICY AND LEGISLATION

	Legislation or Guidance Document
Legislation	<p>Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011³⁷, which transpose the EIA Directive into the Scottish planning system;</p> <p>Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (The Habitats Directive)³⁸;</p> <p>Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive)³⁹;</p> <p>The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law⁴⁰;</p> <p>Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive)⁴¹;</p> <p>The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017⁴²;</p> <p>The Water Environment and Water Services (Scotland) Act 2003 (WEWS)⁴³;</p> <p>The Water Environment (Controlled Activities) (Scotland) Regulations 2011⁴⁴, Amendment Regulations 2021⁴⁶;</p> <p>The Wildlife and Countryside Act 1981 (as amended)⁴⁷;</p> <p>Nature Conservation (Scotland) Act 2004 (as amended)⁴⁸;</p> <p>The Wildlife and Natural Environment (Scotland) Act 2011⁴⁹</p> <p>The Protection of Badgers Act 1992⁵⁰</p>
Policy	<p>Aberdeenshire Local Development Plan 2023⁵¹;</p> <p>Fourth National Planning Framework Draft (NPF4)⁵²;</p>

³⁷ Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011: <https://www.gov.scot/publications/planning-circular-3-2011-town-country-planning-environmental-impact-assessment/>

³⁸ European Commission (1992) Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (The Habitats Directive) <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN>

³⁹ Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive); https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF

⁴⁰ The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law: <https://www.legislation.gov.uk/ukksi/1994/2716/contents/made>

⁴¹ Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive: <https://ec.europa.eu/environment/eia/eia-legalcontext.htm>

⁴² The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; <https://www.legislation.gov.uk/ssi/2017/101/contents/made>

⁴³ The Water Environment and Water Services (Scotland) Act 2003 (WEWS); <https://www.legislation.gov.uk/asp/2003/3/contents>

⁴⁴ The Water Environment (Controlled Activities) (Scotland) Regulations 2011; <https://www.legislation.gov.uk/ssi/2011/209/contents/made>

⁴⁵ The Water Environment (Controlled Activities) (Scotland) Regulations 2011; A practical guide, Version 8.3 February 2019 https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf

⁴⁶ The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021 <https://www.legislation.gov.uk/ssi/2021/412/contents/made>

⁴⁷ The Wildlife and Countryside Act 1981 (as amended); UK Government (1981) Wildlife and Countryside Act 1981, Chapter 69. Part 1: <http://www.legislation.gov.uk/ukpga/1981/69/section/1>

⁴⁸ Nature Conservation (Scotland) Act 2004 (as amended); <https://www.legislation.gov.uk/asp/2004/6/contents>

⁴⁹ The Wildlife and Natural Environment (Scotland) Act 2011; <https://www.legislation.gov.uk/asp/2011/6/contents>

⁵⁰ The Protection of Badgers Act 1992; <https://www.legislation.gov.uk/ukpga/1992/51/contents>

⁵¹ <https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/>

⁵² <https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/>

	Legislation or Guidance Document
	<p>UK Post-2010 Biodiversity Framework (2012)⁵³;</p> <p>Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity (2013)⁵⁴;</p> <p>Scottish Government (2017). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0⁵⁵;</p> <p>PAN 51: Planning, Environmental Protection and Regulation (revised 2006)⁵⁶;</p> <p>PAN 60: Planning for Natural Heritage (Scottish Government, 2000)⁵⁷; and</p> <p>Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000)⁵⁸</p>
Guidance	<p>Averis et al., (2014). An Illustrated Guide to British Upland Vegetation. Joint Nature Conservation Committee. Peterborough;</p> <p>Bang and Dahlstrøm. (2001). Animal Tracks and Signs. Oxford University Press, Oxford;</p> <p>Chanin (2003a) Monitoring the Otter (<i>Lutra lutra</i>). Conserving Natura 2000 Rivers: Monitoring Series No. 10. English Nature, Peterborough;</p> <p>Chanin (2003b). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough;</p> <p>CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.⁵⁹;</p> <p>Collins, J.(ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)⁶⁰;</p> <p>Cresswell et al., (2012). UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. Published by The Mammal Society;</p> <p>Croose, E., Birks, J.D.S., Schofield, H.W. & O'Reilly, C. (2014). Distribution of the pine marten (<i>Martes martes</i>) in southern Scotland in 2013. Scottish Natural Heritage Commissioned Report No. 740.</p> <p>Dean et al., (2016). The Water Vole Mitigation Handbook. (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London;</p> <p>DEFRA (2016). Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management. University of Exeter;</p>

⁵³ UK Post-2010 Biodiversity Framework (2012); <https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/>

⁵⁴ Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity (2013); <https://www.gov.scot/policies/biodiversity/scottish-biodiversity-strategy/>

⁵⁵ Scottish Government (2017). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0; <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/>

⁵⁶ PAN 51: Planning, Environmental Protection and Regulation (revised 2006); <https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/>

⁵⁷ PAN 60: Planning for Natural Heritage (Scottish Government, 2000); <https://www.gov.scot/publications/pan-60-natural-heritage/>

⁵⁸ Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000); <https://www.gov.scot/binaries/content/documents/govscot/publications/foi-eir-release/2020/01/foi-201900008726/documents/foi-201900008726-information-released-a/foi-201900008726-information-released-a/govscot%3Adocument/FOI%2B-%2B201900008726%2B-%2BInformation%2BReleased%2B-%2BCircular%2B6-1995%2BNature%2BConservation%2B-%2B%2527The%2BHabitats%2Band%2BBirds%2BDirectives%2527%2B%2528Updated%2BJune%2B2000%2529..PDF>

⁵⁹ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 3rd edition. Chartered Institute of Ecology and Environmental Management, Winchester: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf>

⁶⁰ Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good practice Guidelines (3rd edition). The Bat Conservation Trust, London: <https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition>

	Legislation or Guidance Document
	<p>European Commission (2011). Wind energy developments and Natura 2000⁶¹;</p> <p>European Commission (2011). EU Biodiversity Strategy⁶²;</p> <p>Gurnell et al., (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Scotland, Edinburgh;</p> <p>Harris S., Cresswell P and Jefferies D., (1989). Surveying Badgers. The Mammal Society, London;</p> <p>Harris and Yalden. (2008). Mammals of the British Isles: Handbook. , 4th Edition. The Mammal Society, Southampton;</p> <p>Hundt (2012). Bat Surveys: Good Practice Guidelines (2nd Edition), BCT, London;</p> <p>Joint Nature Conservation Committee (2013). Guidelines for selection of biological Sites of Special Scientific Interest (SSSI);</p> <p>Joint Nature Conservation Committee (2004) Common Standards Monitoring Guidance for Reptiles and Amphibians, Version February 2004. JNCC, Peterborough;</p> <p>Rodwell (2006). National Vegetation Classification: Users' handbook;</p> <p>Scottish Government (2013). Scottish Biodiversity List⁶³;</p> <p>Scottish Executive (2001) (updated 2006). European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements;</p> <p>Scottish Executive Rural Affairs Department (SERAD) (2000). Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("The Habitats and Birds Directives"). Revised Guidance Updating Scottish Office Circular No 6/1995;</p> <p>Scottish Environment Protection Agency (SEPA) (2017) Guidance Note 4 - Planning guidance on on-shore windfarm developments (Issue 9)⁶⁴;</p> <p>Scottish Environment Protection Agency (SEPA) (2017). Guidance Note 31 - Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (Version 3)⁶⁵;</p> <p>Scottish Natural Heritage (Version 2, 2016). Planning for Development: What to consider and include in Habitat Management Plans⁶⁶;</p> <p>Scottish Natural Heritage (2003). Best Practice Guidance - Badger Surveys. Inverness Badger Survey 2003. Commissioned Report No. 096;</p>

⁶¹ European Commission (2011). Wind energy developments and Natura 2000:

<https://ec.europa.eu/environment/nature/info/pubs/docs/leaflets/windfarm/en.pdf>

⁶² European Commission. (2011). EU Biodiversity Strategy. http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

⁶³ Scottish Government. (2013). Scottish Biodiversity List. <https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL>

⁶⁴ Scottish Environment Protection Agency (SEPA) (2017) Guidance Note 4 - Planning guidance on on-shore windfarm developments (Issue 9); <https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf>

⁶⁵ Scottish Environment Protection Agency (SEPA) (2017) Guidance Note 31 - Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (Version 3); <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf>

⁶⁶ Scottish Natural Heritage (Version 2, 2016). Planning for Development: What to consider and include in Habitat Management Plans; <https://www.nature.scot/sites/default/files/2019-01/Guidance%20-%20Planning%20for%20development%20-%20-%20What%20to%20consider%20and%20include%20in%20Habitat%20Management%20Plans.pdf>

	Legislation or Guidance Document
	<p>Scottish Natural Heritage (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland⁶⁷;</p> <p>Strachan et al., (2011). The Water Vole Conservation Handbook;</p> <p>The Herpetological Conservation Trust (2007). National Amphibian and Reptile Recording Scheme, Habitat Recording Guide;</p> <p>BS 42020:2013 Biodiversity: Code of Practice for Planning and Development: BSI Standards Publication.</p> <p>Scottish Natural Heritage (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments⁶⁸;</p> <p>Scottish Natural Heritage (2015). Scotland’s National Peatland Plan;</p> <p>Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019). Bats and Onshore Wind Turbines: survey, assessment and mitigation;</p> <p>UKhab Ltd: UK Habitat Classification System⁶⁹</p> <p>Scottish Natural Heritage (2016). General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms⁷⁰;</p> <p>Scottish Natural Heritage (2016) Decommissioning and Restoration Plans for Wind Farms;</p> <p>Scottish Renewables, SNH, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science, AECoW (4th edition, 2019). Good Practice During Windfarm Construction</p> <p>The Scottish Government (2019): Scotland’s Forestry Strategy⁷¹</p>

⁶⁷ Scottish Natural Heritage, (2018). Environmental Impact Assessment Handbook. Guidance for competent authorities, consultation bodies and others in involved in the Environmental Impact Assessment process in Scotland. Natural Heritage Management. Version 5. <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf>

⁶⁸ Scottish Natural Heritage (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments; <https://www.nature.scot/sites/default/files/2019-11/Guidance%20-%20Assessing%20the%20cumulative%20impact%20of%20onshore%20wind%20energy%20developments.pdf>

⁶⁹ UKhab Ltd: UK Habitat Classification System <https://ukhab.org>

⁷⁰ Scottish Natural Heritage (2016). General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms: NatureScot. (2020). General pre-application/ scoping advice to developers of onshore wind farms: <https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms>

⁷¹ The Scottish Government (2019): Scotland’s Forestry Strategy: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/>

APPENDIX B: ADDITIONAL BIODIVERSITY MEASURES

A. Refugia/Hibernacula: Log and Leaf Piles (Developing with Nature guidance⁷²: Measure 8: Log and Leaf Piles)

This is a loosely organised pile of logs and leaves that creates a habitat of slowly decaying wood. The log material should be sourced on site (or from as close as possible), for example using cut material from tree felling, thinning or pruning.

Method

A shallow scrape is dug in the ground which is lined with leaf litter or wood chips. Logs of varying sizes are arranged irregularly on top of this to create a wide range of different-sized voids and entrances. Smaller logs and twigs can be placed in gaps, and leaf litter or bark chips added over the top. This will require 1 to 2m² several log piles can be placed across the park area where there is minimal disturbance and at least partial shading to reduce drying out and restricting the invertebrates. Siting in different habitats with different levels of shade will support more biodiversity.

The log and leaf piles can be created on top of buried hibernacula features and will provide year-round shelter for amphibians and other invertebrate species.

Management

Low-level management of log and leaf piles is required. The log and leaf piles will require new wood or leaf material to be added as the original material decays, preferably using material collected on-site (do not use grass clippings). Leaf piles may require additional leaf litter added more regularly or built up in the autumn due to faster decay. The method needs to be done carefully so as not to disrupt the present habitat and should avoid hedgehog breeding (mid-April to September) and hibernation periods (November to end of February). The log and leaf piles should be monitored twice per year (March and October).

⁷² Developing with Nature guidance. <https://www.nature.scot/doc/developing-nature-guidance>

B. Underground Hibernacula and Rock Piles (Developing with Nature guidance: Measure 9: Hibernacula)

Hibernacula's are important as they provide habitat and shelter for a wide range of invertebrates, small mammals, amphibians and reptiles, and can be particularly important for the latter two when placed near ponds and water courses. They provide over-wintering hibernation sites for pollinator and predatory species.

Method

A hole is dug in the ground and a layer of stones is placed on the floor, followed by logs and twigs (and possibly more rocks), to create a chamber within the hole. This can be built up to ground level or higher to form a mound (which could provide a bee bank) and covered with soil but leaving access to the covered chamber (access can be achieved by including short sections of pipe). An alternative is a rock pile, with a range of rocks and stones filling the hole to provide different-sized voids, and left uncovered. The hibernacula is best situated on south-facing slopes away from tree roots and the potential of disturbing reptiles. The hibernacula should be situated in an area with some shade and ground cover is best suited to avoid drying out. For rock piles particularly some direct sunlight can help it act as a basking area for insects. Siting in different habitats with different amounts of shade will support more biodiversity.

The area required will be approximately 1m², with multiple hibernacula's placed across the park area in an undisturbed location so as not be driven over by machinery for access, and avoid areas at risk of flooding, as hibernating animals could potentially drown. Areas to be located included the SuDs ponds, incorporated around their edges, and where they will not be impacted by flood/high water levels. These can act as year-round shelter for amphibians, reptiles and invertebrate species. Rock piles can be incorporated in open areas, as these can be used as basking areas and for shelter. These can be incorporated particularly into wildflower meadows to allow basking.

Ensure that they are kept free of both vehicle and foot traffic, as their weight could collapse the hibernacula beneath.

Management

Low-level management of the entrances into the hibernacula is required. These should be kept clear of blockages to allow access. Rock piles need to be kept free of encroaching vegetation to leave the area clear and allow sunlight to penetrate. The hibernacula's should be monitored twice per year.

