



Appendix 8.1

Habitats & National Vegetation Classification Survey

Monan Repower

Monan Wind Farm
Ceann An Ora,
Ardhasaig,
Isle Of Harris,
HS3 3AJ

February 2024

IMTeco Ltd

Notes:

Site: Monan Repower, Monan Wind Farm, Ceann An Ora, Ardhasaig, Isle Of Harris, HS3 3AJ (NB 14155 04937)

Client: Constantine Wind Energy (UK) 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 Constantine Wind Energy (UK) Ltd, to map and detail individual plant species, undertake a National Vegetation Classification (NVC) and habitats survey at the Proposed Development for the repowering of the existing Monan Wind Farm. The Proposed Development is to comprise of three turbines (as per finalised layout, and as part of the evolution of the design) up to 86m to tip, at the existing Monan Wind Farm that presently comprises of three turbines 46m to tip. The proposed turbines would replace the existing turbines and their locations are proposed in close proximity to the current positions. The development is to include; a compound area, new and existing access tracks, turbines, hardstanding and fixed cabinets (Figure 1).

The Proposed Development site is located at Monan Wind Farm, Ceann An Ora, Ardhasaig, Isle Of Harris, HS3 3AJ, at the approximate central location of NB 14155 04937.

The Proposed Development is located in an area of prominent hills and rocky outcrops on the Isle of Harris, approximately 1km east of the village of Bun Abhainn Eadarra which lies approximately 4.6km north-west of Tarbert, Isle of Harris. The site is utilised mainly for rough grazing.

The development site is comprised mostly of peatland mire habitat and rocky outcrops with dry heath. The terrain within the landholding consists of raised ground, with elevation ranging from approximately 220 - 250 AOD. The land slopes down to the south via an access track, to the A859 road.

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 new 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

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>

components which include a habitat survey utilising the Phase 1 habitat classification system, NVC and Groundwater Dependent Terrestrial Ecosystems (GWDTE) classification.

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 situated in an area of open upland ground with peatland, blanket bog, bog pools, wet heath, lochans and rocky outcrops. The soil consists of peaty gleys with dystrophic semi-confined peat, comprising a mixture of Class 1 and 2 Peat. There are multiple drainage systems throughout and along track edges originating from the original wind farm development. The land is utilised for animal grazing.

The North Harris SSSI, SAC and North Harris Mountains SPA are situated 875m to the west of the Proposed Development site. The West Coast of the Outer Hebrides SPA is 1.2km south of the Proposed Development site. The site is within the Harris - Uig hills Wild Lands.

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.

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 Comhairle nan Eilean Siar 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/) |
| Outer Hebrides Local Development Plan (OHLDP) Outer Hebrides Local Development Plan (OHLDP) 2023 | Outer Hebrides Local Development Plan https://cne-siar.gov.uk/wp-content/uploads/2024/01/Outer-Hebrides-Local-Development-Plan-2018.pdf Development Plan Scheme 2023: Outer Hebrides Local Development Plan https://cne-siar.gov.uk/wp-content/uploads/2024/01/Development-Plan-Scheme-2023-.pdf |

| | |
|--|---|
| Outer Hebrides Local Development Plan: Supplementary Guidance for Wind Energy Development (2021) | https://cne-siar.gov.uk/wp-content/uploads/2024/01/SG-for-Wind-Energy-Development-2021.pdf |
| Outer Hebrides Biological Recording (OHBR) | https://www.ohbr.org.uk/ |

A search was made for information on statutory designated sites (Internationally and Nationally important sites for ecology) within 5 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 of the site boundary. 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 8⁴ 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 List⁵
- Nationally rare or nationally scarce species;
- Notable Species that have action plans under the Scottish Biodiversity List (SBL⁶) or are priority species under the Local Biodiversity Action Plan.

2.2 Phase 1 Habitat Survey

Habitat field surveys were undertaken in May to September 2023. 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.

⁴ Protected species list - WCA schedule 8: <https://www.nature.scot/doc/protected-species-list-wca-schedule-8>

⁵ IUCN Red List: <https://www.iucnredlist.org>

⁶ Scottish Biodiversity List: <https://www.nature.scot/doc/scottish-biodiversity-list>

- 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'.

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 (BSBI⁷) with all other flora and fauna following the UK Species Inventory (Natural History Museum⁸), 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.

⁷ <https://database.bsbi.org>

⁸ <https://www.nhm.ac.uk/our-science/data/uk-species/species/index.html>

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.

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 habitat⁹. An assessment was undertaken using the NVC data to identify potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) within the ecological survey area (ESA).

2.7 Ecological Survey Area

The ecological survey area (ESA) included 250m buffer around the turbine bases and 100m along the new access tracks and included the existing track as it exits the A859.

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

3 RESULTS

3.1 Background Data Search

3.1.1 Biodiversity

The Comhairle nan Eilean Siar Council website was searched for all relevant and up to date information regarding biodiversity and this included the Outer Hebrides Biological Recording website¹⁰. Information was searched for on any Local Biodiversity Sites, the Scottish Wildlife Trust¹¹, and designated sites.

3.1.2 Designated Sites

Statutory Sites

There are four statutory designated sites (Figure 2) within 5 km of the site boundary, and they are listed in Table 2. One site, North Harris, is designated as a SSSI and an SAC.

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 & Special Areas of Conservation | | | |
| North Harris SSSI¹² | 875m | Bryophyte assemblage Subalpine wet heath | Favourable Maintained, 19 Aug 2009 Unfavourable Recovering, 14 Apr 2007 |
| North Harris SAC¹³ | 875m | Acid peat-stained lakes and ponds Alpine and subalpine heaths Acidic scree Blanket bog Depressions on peat substrates Atlantic salmon (<i>Salmo salar</i>) Clear-water lakes or lochs with aquatic vegetation and | Various Assessments from 2007 to 2016 2007 for each qualifying feature as Unfavourable No change to Favourable Recovered |

¹⁰ <https://www.ohbr.org.uk/>

¹¹ <https://scottishwildlifetrust.org.uk/>

¹² <https://sitelink.nature.scot/site/1236>

¹³ <https://sitelink.nature.scot/site/8339>

| Site of Interest | Distance from site (approx.) | Description/Qualifying Features of Interest only | Condition (at last assessed date) |
|--|------------------------------|---|---|
| | | <p>poor to moderate nutrient levels</p> <p>Dry heaths</p> <p>Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)</p> <p>Otter (<i>Lutra lutra</i>)</p> <p>Montane acid grasslands</p> <p>Plants in crevices on acid rocks</p> <p>Wet heathland with cross-leaved heath</p> | |
| Special Protected Area (SPA) | | | |
| North Harris Mountains SPA¹⁴ | 875m | Golden eagle (<i>Aquila chrysaetos</i>), breeding | Favourable Maintained, 31 Jul 2015 |
| West Coast of the Outer Hebrides SPA¹⁵ | 1.2km | <p>Black-throated diver (<i>Gavia arctica</i>), non-breeding</p> <p>Great northern diver (<i>Gavia immer</i>), non-breeding</p> <p>Eider (<i>Somateria mollissima</i>), non-breeding</p> <p>Long-tailed duck (<i>Clangula hyemalis</i>), non-breeding</p> <p>Red-breasted merganser (<i>Mergus serrator</i>), non-breeding</p> <p>Slavonian grebe (<i>Podiceps auritus</i>), non-breeding</p> <p>Red-throated diver (<i>Gavia stellata</i>), breeding</p> | Various Assessments made in 2007 for each qualifying feature as Favourable Maintained |

Non-statutory Sites

There are no woodlands designated in the Ancient Woodland Inventory (AWI) and the Native Woodland Survey of Scotland (NWSS) within 2 km of the site boundary. There are no conifer plantations listed within the National Forestry Inventory within the 2km buffer of the site boundary. There are no local biodiversity sites within the 2km buffer of the site boundary.

¹⁴ <https://sitelink.nature.scot/site/8556>

¹⁵ <https://sitelink.nature.scot/site/10484>

Other Notable Sites

Other notable sites just outwith the 5 km buffer of the site includes the Loch Seaforth Marine Consultation Area (MCA) at 5.1km and Langavat SAC¹⁶ at 5.3km qualified for Atlantic salmon (*Salmo salar*).

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 enhancement and mitigation strategies.

3.2.2 Geology

The British Geological Society's¹⁷ (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 group in the study area is mapped as Lewisian Complex – Gneiss: Metamorphic bedrock. The superficial deposits in this area consist of sedimentary superficial deposits of peat, with peaty podzols and peaty gleys.

3.2.3 Soil Profile

The Scotland Soil Maps¹⁸, UK Soil Observatory Map viewer¹⁹ and the National Soil Map Scotland²⁰ were consulted to determine the type of soil present and their level of Carbon and water holding capacity. Carbon and Peatland map²¹ 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 correlates with that from the British Geological Society map data and the combined data indicates that the site is a combination peaty gleys and peaty podzols.

The Carbon and Peatland soil map has classed the soils as the following types;

Class 1 and Class 2 soils (Figure 3).

- Class 1: This soil type is a nationally important carbon-rich soil of deep peat and priority peatland habitat and has high conservation value. Part of the Proposed

¹⁶ <https://sitelink.nature.scot/site/8269>

¹⁷ British Geological Society (BGS); <https://www.bgs.ac.uk/>

¹⁸ Scotland's Environment, Scotland's Soil; <https://www.environment.gov.scot/>

¹⁹ UKSO <https://mapapps2.bgs.ac.uk/ukso/home.html>

²⁰ Scotland's Environment, National Soil Map of Scotland and NSIS <https://map.environment.gov.scot/sewebmap/>

²¹ Scotland's Environment, Scotland's Soil; https://map.environment.gov.scot/Soil_maps/?layer=10

Development and previous development footprint of Monan Wind Farm is designed within this area.

- Class 2: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential. Part of the Proposed Development is within Class 2 soil, with some of the previous development footprint of Monan Wind Farm within Class 2 soil.

The available water capacity of the soil is listed as 379.93mm. This is in the high-value range, with high values indicating a potential water excess. The topsoil organic carbon concentration ranges from 38.9%.

3.2.4 Hydrogeology

According to the BGS and the Hydrogeological and Groundwater Vulnerability Maps of Scotland²², there is one productivity aquifer associated with the underlying bedrock, as follows;

- Lewisian Complex: This is recognised as a low productivity aquifer (2C) where the flow is virtually all through fractures and other discontinuities. These are characterised as having groundwater limited to near surface weathered zones and secondary 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, ditches and small un-named watercourses within the study area. The un-named watercourses and ditches flow south and connect to the Abhainn Ceann an Ora and into Loch na Sgeireagan Mor with connectivity to Loch na Sgeireagan Beag and Loch a'Mhorghain. The Abhainn Ceann an Ora flows south-west into the sea Loch Bun Abhainn Eadarra.

The Abhainn Glaic a' Choin duinn watercourse has not been classified by SEPA, and is part of the Lewis and Harris Coastal catchment. This watercourse flows south-west into the sea Loch Bun Abhainn Eadarra.

3.3 Description of Habitat Types, NVC Communities and Evaluation

3.3.1 Phase 1 Habitat Overview

A total of ten Phase One habitats were recorded within the survey area. Table 3 lists the broader habitat types of the Phase One habitat found in this survey. A Phase 1 habitat map is provided in Figure 4. The habitats found within the ecological survey area of the proposed development site were mainly dominated by blanket bog, wet and dry heath, and acid grassland, with mosaics of grassland and wet/dry heath. The site also consisted of a loch, bog pools, running water, ditch systems and existing wind farm infrastructure.

²² British Geological Survey 1:50,000 Digital Map. Available online: <https://www.bgs.ac.uk/data/mapViewers/home.html>

Table 3: Phase One habitat types recorded at the Proposed Development survey area

| Phase 1 Code | Description |
|--------------|-----------------------------------|
| B1.1 | Acid grassland - unimproved |
| B1.2 | Acid grassland – semi improved |
| B2.2 | Neutral grassland – semi improved |
| D1.1 | Dry dwarf shrub heath - acid |
| D2 | Wet dwarf shrub heath |
| D5 | Dry heath/acid grassland |
| D6 | Wet heath/acid grassland |
| E1.6.1 | Blanket sphagnum bog |
| G1 | Standing water |
| G2 | Running water & ditch systems |
| | Wind Farm Infrastructure |

The area and percentage of habitats, within the ecological survey area, were calculated and are provided in Table 4. 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 4 are approximations. Habitat area calculations are based on the total area of land within the Ecological Survey Area as 53.12ha.

Table 4 - Summary of Phase 1 Habitat area within the main survey area.

| Phase 1 Habitat | Area (ha) | % of Habitat in main Study Area |
|-----------------------------------|--------------|---------------------------------|
| Acid grassland - unimproved | 0.49 | 0.90 |
| Acid grassland – semi improved | 0.18 | 0.35 |
| Neutral grassland – semi improved | 0.71 | 1.34 |
| Dry dwarf shrub heath - acid | 10.07 | 18.96 |
| Wet dwarf shrub heath | 8.28 | 15.60 |
| Dry heath/acid grassland | 0.61 | 1.14 |
| Wet heath/acid grassland | 1.11 | 2.08 |
| Blanket sphagnum bog | 30.19 | 56.83 |
| Standing water | 0.59 | 1.12 |
| Wind Farm Infrastructure | 0.89 | 1.68 |
| Total | 53.12 | 100 |

3.3.2 Habitat Loss

Part of the existing infrastructure layout is to be utilised for the proposed repowering design at Monan Wind Farm, which will utilise the existing track and the hardstandings. Each new turbine, hardstanding etc is re-positioned differently from the original design, although overlapping (apart from the new layout for Turbine 1) and therefore the footprint for each turbine is taken into consideration for habitat loss. A new access track to Turbine

1, with hardstanding, turbine foundation, and fixed cabinets will result in the loss of habitats. Table 5 (Figure 5) lists the type and area of habitat lost for the new sections of the proposal. The total habitat lost to the proposed repowering infrastructure is 0.52Ha.

Table 5 - Habitat loss for the Proposed Repowering Design at Monan Wind Farm.

| Habitat at Repowering Infrastructure | Area (ha) | % of Habitat in Repowering Infrastructure Area |
|--------------------------------------|-------------|--|
| Acid grassland – semi improved | 0.03 | 5 |
| Dry dwarf shrub heath - acid | 0.15 | 29 |
| Wet dwarf shrub heath | 0.17 | 33 |
| Dry heath/acid grassland | 0.05 | 9 |
| Blanket sphagnum bog | 0.12 | 24 |
| Total | 0.52 | 100 |

3.3.3 NVC Classification Overview

A total of six main NVC vegetation types (Figure 6), were found in this survey. These National Vegetation Communities are listed in Table 6 and described in the following pages.

Table 6- National Vegetation Classification types recorded within the ESA.

| NVC type | Description |
|----------|---|
| U5e | <i>Nardus stricta-Galium saxatile</i> grassland |
| MG10a | <i>Holcus lanatus-Juncus effusus</i> rush-pasture, typical sub-community |
| H10b | <i>Calluna vulgaris-Erica cinerea</i> heath, <i>Racomitrium lanuginosum</i> sub-community |
| M15a | <i>Scirpus cespitosus-Erica tetralix</i> wet heath, <i>Carex panicea</i> sub-community |
| M15c | <i>Scirpus cespitosus-Erica tetralix</i> wet heath, <i>Cladonia</i> spp. sub-community |
| M17b | <i>Scirpus cespitosus-Eriophorum vaginatum</i> blanket mire, <i>Cladonia</i> spp. sub-community |
| Other | Non-NVC type (loch, watercourses, ditches, fences & tracks) |

3.3.4 U5e *Nardus stricta-Galium saxatile* grassland

There is an area of acid grassland on an upland slope which forms mosaics with the bog habitats and wet heath. This acid grassland is a pale sward of sparse wiry clumps of *Nardus stricta*. Other grasses grow with the *Nardus*, the most common of which are *Agrostis capillaris* and *Festuca ovina*. The short turf contains *Potentilla erecta* and *Galium saxatile*.

The *Racomitrium lanuginosum* subcommunity U5e has an extensive silvery carpet of *Racomitrium lanuginosum*; the sward of *Nardus* can be sparse, and is interspersed with *Trichophorum cespitosum*, *Calluna vulgaris* and some montane species such as *Vaccinium vitis-idaea*. Acid grassland is noted in the southern section of the site and as mosaics with wet heath and MG10a.

3.3.5 **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).

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 located in the southern section of the ESA, as a mosaic with acid grassland and bog habitat, close to the main road, in a water-logged area that had been previously disturbed (Figure 8).

3.3.6 **H10b *Calluna vulgaris*-*Erica cinerea* heath, *Racomitrium lanuginosum* sub-community**

This is a dry heath with a low, dark-coloured canopy of *Calluna vulgaris* and *Erica cinerea* (Figure 9) which occurs widely throughout the more oceanic sections of Scotland. It is a community characteristic of acid to circumneutral and generally free-draining soils mineral. It is common on steep, stony slopes (Rodwell et al., 1991; Elkington et al., 2001).

The *Racomitrium lanuginosum* sub-community H10b occurs at higher elevations and has a shorter, sparser and more open canopy with mats of *Racomitrium lanuginosum* covering the ground beneath the dwarf shrubs. There are some lichens including *Cladonia portentosa* and *C. uncialis* ssp. *biuncialis*, with occasional *Trichophorum cespitosum*.

3.3.7 **M15a *Scirpus cespitosus*-*Erica tetralix* wet heath, *Carex panicea* sub-community**

M15 consists of a mixture of *Calluna vulgaris*, *Erica tetralix*, *Molinia caerulea* and *Trichophorum germanicum*, dotted with *Potentilla erecta* and *Narthecium ossifragum* (Figure 10).

The *Carex panicea* sub-community M15a is more of a soligenous mire than a wet heath, with a thin canopy of the characteristic species *Carex panicea* and other vascular plants such as *C. echinata*, *Juncus squarrosus* and *Drosera rotundifolia*.

There is a patchy carpet of mosses over the wet peaty ground in which the most common species are usually *Sphagnum denticulatum* and *Campylopus atrovirens*. Other bryophytes include *S. capillifolium*, *S. papillosum* and *Racomitrium lanuginosum*.

Schoenus nigricans is also present in patches with sparse sward of *Narthecium*, *Trichophorum*, *Carex panicea* and *Nardus stricta*. They are more common at higher altitudes and occur in depressions in grasslands as well as in wet heaths and bogs.

3.3.8 **M15c *Scirpus cespitosus*-*Erica tetralix* wet heath, *Cladonia* spp. sub-community**

The *Cladonia* species sub-community M15c has a shorter and more open sward. *Myrica gale* is rare here, and *Erica cinerea* is as common as *E. tetralix*. The moss *Racomitrium lanuginosum* is common and grows in a thin, silvery green weft beneath the vascular plants. *Cladonia* lichens are found in this community.

3.3.9 **M17b *Scirpus cespitosus*-*Eriophorum vaginatum* blanket mire, *Cladonia* spp. sub-community**

This mire dominates the landscape and is composed of *Eriophorum vaginatum*, *E. angustifolium*, *Trichophorum cespitosum* and *Molinia caerulea*, dotted with *Calluna vulgaris* and *Erica tetralix*. There are mats of *Sphagnum papillosum* and *S. capillifolium*. Small vascular plants are present such as *Narthecium ossifragum*, *Drosera* species and *Potentilla erecta* (Figure 11). This mire surface contains a system of small bog pools and hummocks, each with characteristic assemblages of *Sphagna* and other plants. There are larger pools and lochans which are not described in the NVC.

The *Cladonia* species sub-community M17b occurs on slightly drier peats. The moss *Racomitrium lanuginosum*, defines this sub-community and it grows in silvery-green patches and low hummocks.

3.3.10 **Other Non-NVC type**

The watercourses, loch (Figure 12), ditches, fences and tracks are classed as Non-NVC types. Some ditches have exposed peat soil at the sides, where the edges have no vegetation, likely due to the slope being too steep (Figure 13).

3.4 **Invasive Species**

There are no invasive plant species noted on site.

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)²³ Annex I habitats;
- Scottish Biodiversity List (SBL)²⁴ 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.

²³ 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>

²⁴ <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list>

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 7).

Table 7 - 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) |
|---|-----------------------------|
| M15a <i>Scirpus cespitosus</i> - <i>Erica tetralix</i> wet heath, <i>Carex panicea</i> <u>sub-community</u> | 2 |
| M15c <i>Scirpus cespitosus</i> - <i>Erica tetralix</i> wet heath, <i>Cladonia</i> spp. sub-community | 2 |
| MG10a <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture, typical sub-community | 2* |
| U5e <i>Nardus stricta</i> - <i>Galium saxatile</i> grassland | 3 |
| H10b <i>Calluna vulgaris</i> - <i>Erica cinerea</i> heath, <i>Racomitrium lanuginosum</i> sub-community | 3 |
| M17b <i>Scirpus cespitosus</i> - <i>Eriophorum vaginatum</i> blanket mire, <i>Cladonia</i> spp. sub-community | 3 |
| <p>* GWDTE Score Scotland or may vary for different hydroecological settings ∞ Country Occurrence: Scotland only – Not in England & Wales Explanation of GWDTE scores: 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)²⁵, 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 7 & Table 8. There were no NVC communities recorded that are considered as having a strong or high dependency (Class 1) on GWDTE. Many of the habitats that are considered as having a moderate GWDTE (Class 2) are highlighted in yellow and some form mosaics with other habitats that had a lower dependency score and were classed according to the dominant habitat, and as a striped mosaic of yellow/clear. Those with slight or non-dependency are clear of shading (Class 3).

The list of NVC communities provided in the UKTAG Guidance 5ab Annex 1 indicates that MG10a and M15a/c have moderate groundwater dependency, with the remaining either having low or no groundwater dependency in Scottish situations.

²⁵ 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>

4.2.1 Annex 1 Habitats

The Joint Nature Conservation Committee (JNCC) Annex I Habitat listings and descriptions²⁶, 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 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 community 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.

The following NVC communities within the study area which constitutes Annex I Habitats are listed in Table 8. The NVC communities/sub-communities that correlate with Annex I type H7130, H4010 and H4030 are discussed below.

4.2.1.1 7130 Blanket Bog

The blanketing of the ground with a variable depth of peat gives this habitat type its name and results in the various morphological types according to their topographical position. Blanket bogs show a complex pattern of variation related to climatic factors. This is illustrated by the variety of patterning of the bog surface in different parts of the UK, in particular the Outer Hebrides. Such climatic factors also influence the floristic composition of bog vegetation.

Active bogs are defined as supporting a significant area of vegetation that is normally peat-forming. Typical species include the important peat-forming species, such as *Sphagnum* spp. and *Eriophorum* spp., or *Molinia caerulea* in certain circumstances, together with *Calluna vulgaris* and other ericaceous species. The most abundant NVC blanket bog types are M17, M18, M19, M20 and M25 where these form part of a larger blanket mire.

The Annex I type 7130²⁷ Blanket bog correlates with the NVC community within the study area, such as being dominated by M17. The bog habitat within the study area is combined with that of wet heath and varies in its floristics depending on how deep the peat is and the rocky slopes in which it forms blankets of peatland vegetation around its base.

The M17 is a community which is in good overall condition over the site, with exceptions of drainage impact in some areas, grazing and where historical track and hardstanding have had an edge effect. There is evidence of some historical drainage in the centre of the site, as well as drains associated with the existing track. The Annex I type 7130 Blanket Bog does partially correlate with the NVC community within the study area.

4.2.1.2 4010 Northern Atlantic wet heaths with *Erica tetralix*

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures *Erica tetralix*, *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses.

²⁶ <https://sac.jncc.gov.uk/habitat/>

²⁷ <https://sac.jncc.gov.uk/habitat/H7130/>

The M15 community identified on site includes distinctive variants such as bog-myrtle *Myrica gale*, or black bog-rush *Schoenus nigricans*, with some cover of *Cladonia* lichens. There is also present the characteristic woolly fringe-moss *Racomitrium lanuginosum*. Drainage and grazing impacts are evident in some sections of the habitat. The wet heath plant community does correlate with the 4010²⁸ Northern Atlantic wet heaths category.

4.2.1.3 4030 European dry heaths

European dry heaths typically occur on freely draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather *Calluna vulgaris*, which occurs in in this community in combination with bilberry *Vaccinium* spp. and bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most dry heaths are managed as extensive grazing for livestock or, in upland areas, as grouse moors. Twelve NVC types in Britain meet the definition of the 4030 European dry heaths²⁹ habitat type, of which H10 is one of them.

The H10 community is located on site in areas of shallow, drier peat and more rocky outcrops. It is associated with wet heath and blanket bog on site which forms mosaics due to the geology and topography. H10 is closely associated with the drier regions located near drainage channels along the track and infrastructure edges, where the soil has been disturbed and is drier. H10 forms mosaics with acid grasslands in these areas.

Where the H10 is natural and not impacted by historical modification then it does correlate with that of the H4030 community.

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.

The relevant SBL priority habitat types (full descriptions of which can be found on the NatureScot website³¹), are recorded within the study area (Table 8). These 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 and their corresponding categories for the Scottish Biodiversity List are summarised in Table

²⁸ <https://sac.jncc.gov.uk/habitat/H4010/>

²⁹ <https://sac.jncc.gov.uk/habitat/H4030/>

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/>

8. There was one Annex 1 located, and the NVC floristics indicated partial correlation, mainly due to modification via drainage and grazing.

Table 8 - NVC types recorded at the Proposed site, with corresponding GWDTE designation, Scottish Biodiversity List and/or Annex 1 designations.

| NVC type | GWDTE Code (LUPS - GU31, SEPA 2017) Colour Code High = red Moderate=Yellow | Scottish Biodiversity List (SBL) | Annex 1 Code | Annex 1 Title |
|----------|---|----------------------------------|--------------|---|
| M15a/c | Moderate | Upland heathland | 4010 | Northern Atlantic wet heaths with <i>Erica tetralix</i> |
| MG10a | Moderate | / | / | / |
| H10b | / | Upland heathland | 4030 | European dry heaths |
| M17 | / | Blanket bog | 7130 | Blanket bog |
| U5e | / | / | / | / |

4.2.4 Habitat Loss

The main habitat on site is blanket bog followed by upland dry and wet heath communities. The main habitat lost to the proposed repowering infrastructure is wet heath, with a loss of 0.17Ha (see Table 5 and Figure 5), and closely followed by dry heath with a loss of 0.15Ha, and blanket bog at 0.12ha.

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 Monan Repower Wind Farm, to a buffer zone of 250m for the turbine survey area and 100m at track locations, as outlined in Figure 6.

In total, six NVC communities were recorded within the respective study area. Non-NVC habitat types present included watercourses, ditch systems and tracks. The most common vegetation types (Phase 1 and NVC) within the study area (Tables 4 & 6) included blanket bog and upland dry and wet heath.

There has been some impact on the vegetation communities on site by upland farm practices which include drainage and grazing. However, many of the NVC communities are regarded as healthy forms. There are mosaics of NVC communities which form transitional zones with other plant communities.

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 7 & 8 summarises the presence or absence of Annex I, SBL and potential GWDTE habitats.

There are three communities categorised as Class 2 GWDTE (MG10a, M15a, M15c). The MG10a community is mainly located in the southern section of the ESA close to the track and main road (A 859) within a modified acid grassland area and heath vegetation, where part of the soil is waterlogged and there are drainage channels. The MG10a shares the same hydrological situation as the acid grassland and heath community in this area, and may not indicate a true moderate GWDTE.

The M15a and M15c communities are scattered throughout the ESA and form mosaics with M17b and a drier form of the upland heath H10b, both Class 3 with little or no dependency. The geology and depth of the peaty soil over the site varies and the NVC communities tend to correlate with the hollows, dips and rocky outcrops within this upland area. It is possible that there are some of these rocky sections which may form fissures and impact NVC communities.

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.

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 groundwater-dependent (MG10a) may be due to disruption of the soil and drainage impacts from the previous works undertaken for the wind farm.

The M15a and M15c sub-communities may be due to bog habitat seepage and potential water flow through fractures and other discontinuities in the surrounding rock. The hydrogeology indicates that this is a low productivity aquifer (Class 2C) which does not widely contain groundwater in exploitable quantities but where possible some bedrock formations can locally yield water supplies. It may also be likely that there is no reliably available source of groundwater on which the NVC communities can depend. Therefore, they 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 of these habitats are considered to be sensitive, and a level of protection is required to minimise and, if necessary, mitigate any impacts that may occur.

The main habitat lost to the proposed repowering infrastructure is wet dwarf shrub heath (M15) with a loss of 0.17Ha, wet dwarf shrub heath (M15), and closely followed by dry heath (H10b) with a loss of 0.15Ha, and blanket bog (M17) at 0.12ha. However, the Proposed Development may have indirect impacts on the surrounding blanket bog and upland heaths, therefore, a Habitat Management & Monitoring Plan (HMMP) is to be outlined which considers biodiversity enhancement, upland heath and peatland restoration which also benefits and maintains important hydrological connectivity throughout.

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. Watercourses, including ditch systems, connect to the Abhainn Ceann an Ora and into Loch na Sgeireagan Mor with connectivity to Loch na Sgeireagan Beag and Loch a'Mhorghain. The Abhainn Ceann an Ora flows south-west into the sea Loch Bun Abhainn Eadarra. The Abhainn Glaic a' Choin duinn watercourse is part of the Lewis and Harris Coastal catchment and flows south-west into the sea Loch Bun Abhainn Eadarra.

- Mitigation and pollution prevention plans are required (as part of the CEMP) to avoid pollution of all aquatic features.

Wetland habitats are known to be sensitive to changes in their water supply, whether this is from groundwater, surface water or rainwater.

- 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.

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6 FIGURES

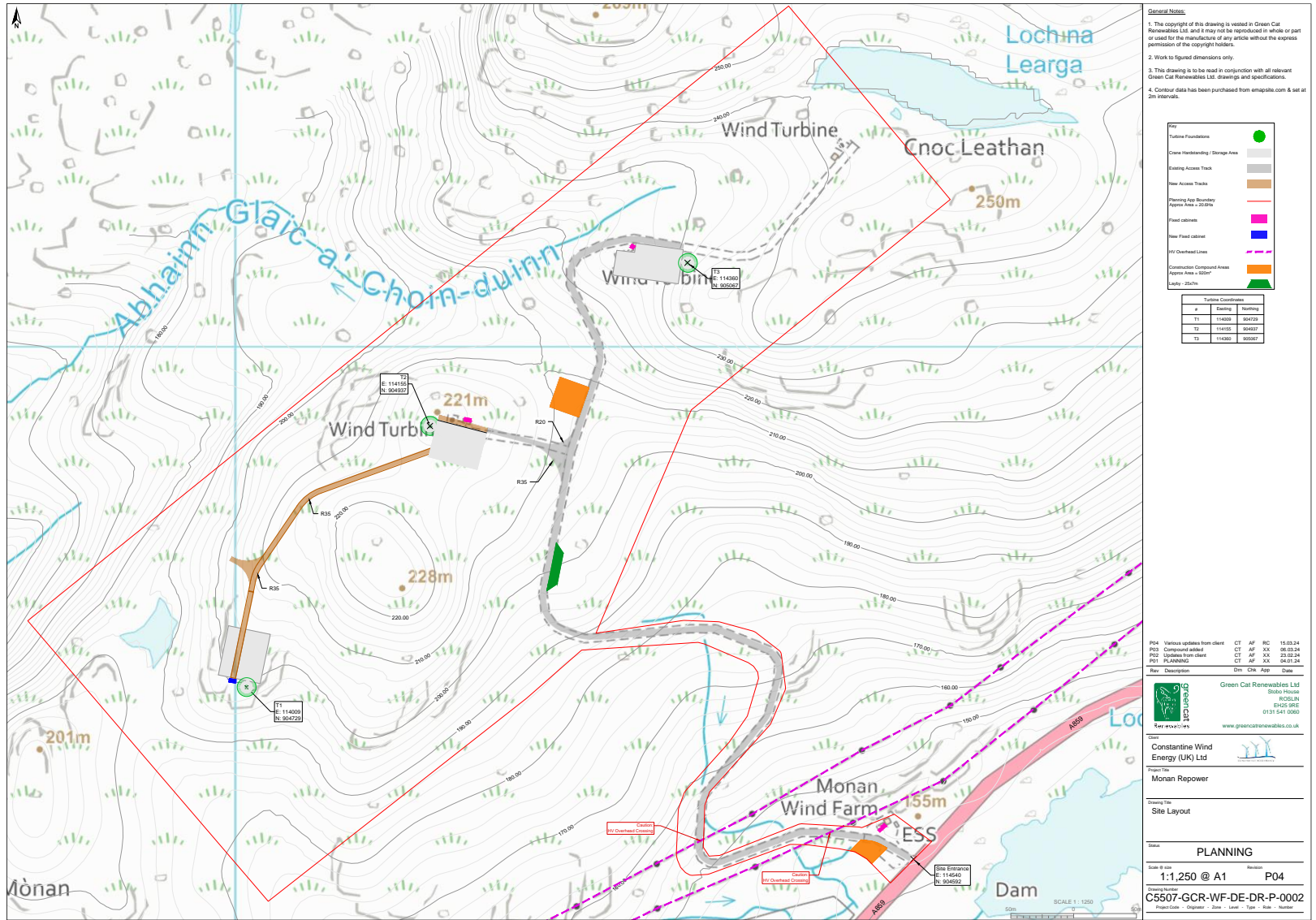


Figure 1: Site Layout Plan for Monan Repower.

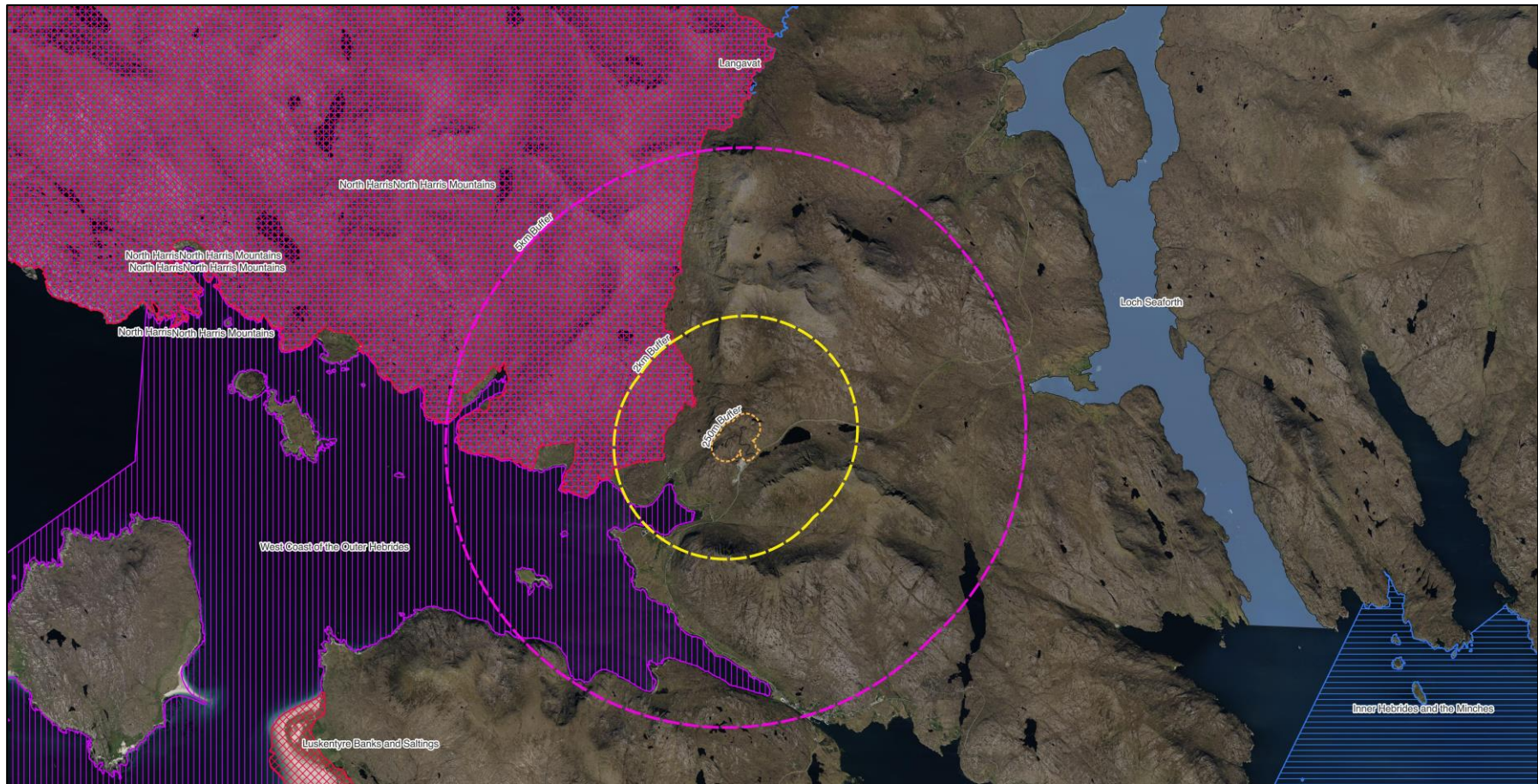


Figure 2. Designated Sites within 5km buffer of the Proposed Wind Farm infrastructure.



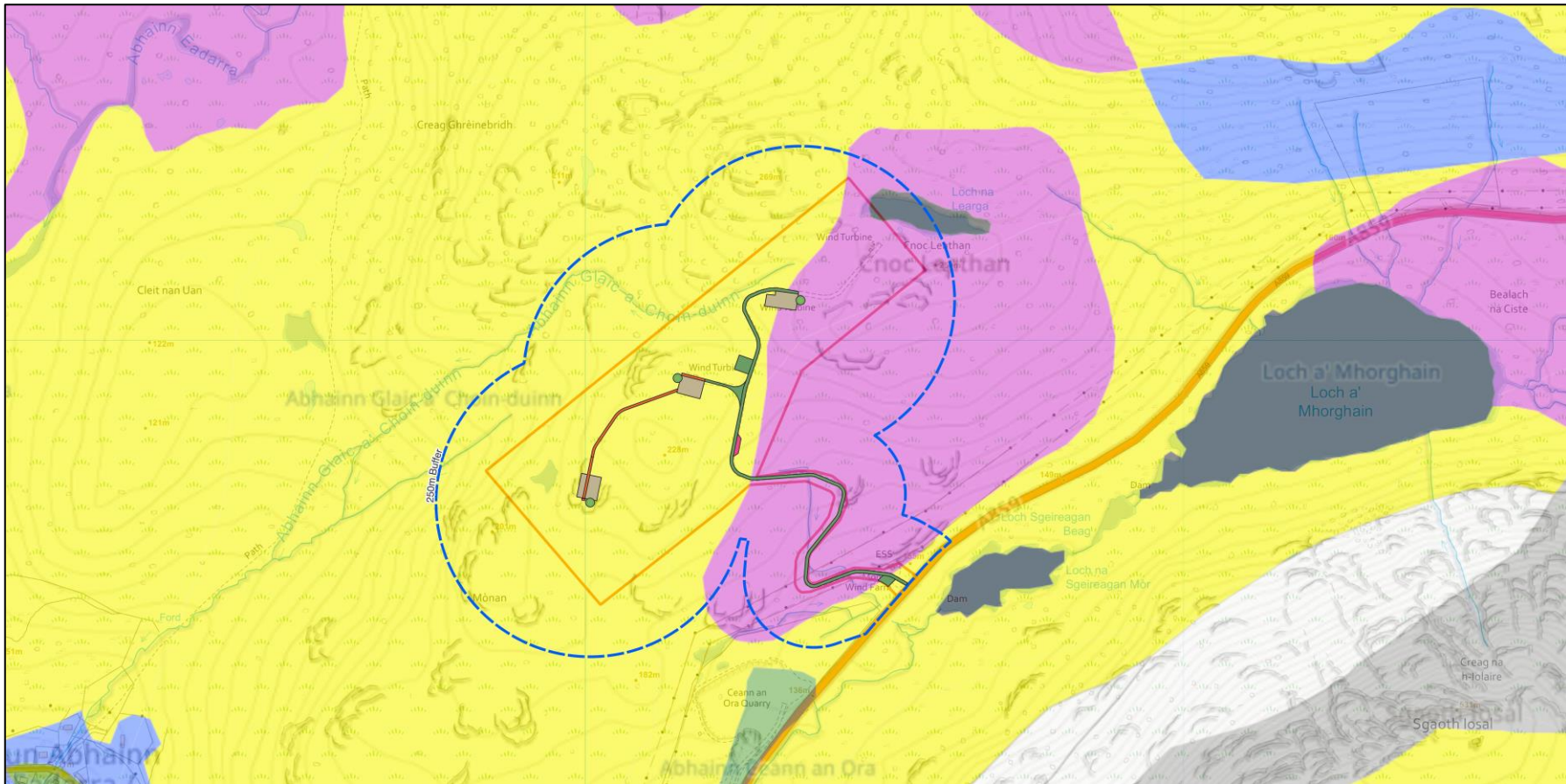










Figure 3. The Carbon and Peatland soil map of the Proposed Wind Farm infrastructure. (Map Legend Below)

Map Legend Table (accessed Scotland's Soils Website³³) 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 |

³³ <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

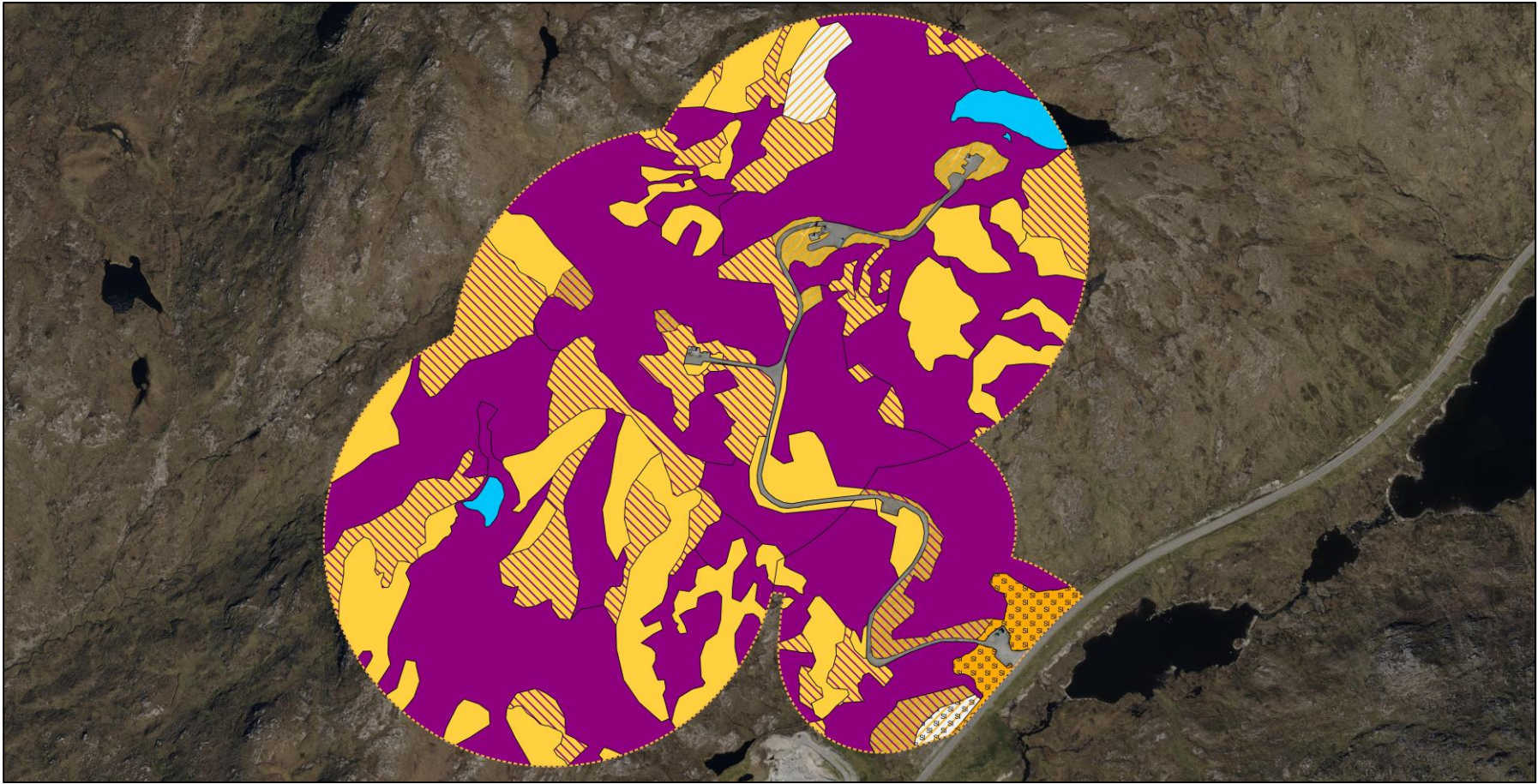


Figure 4. The Phase 1 habitat map of the Ecological Survey Area (ESA). (Map Legend Below)

Legend for Phase 1 habitat survey of the Proposed Development within the Ecological Survey Area.












| Code | Phase 1 Habitat Description |
|---|--|
|  | B1.1 Acid grassland - unimproved |
|  | B1.2 Acid grassland - semi-improved |
|  | B2.2 Neutral grassland - semi-improved |
|  | D1.1 Dry dwarf shrub heath - acid |
|  | D2 Wet dwarf shrub heath |
|  | D5 Dry heath/acid grassland |
|  | D6 Wet heath/acid grassland |
|  | E1.6.1 Blanket sphagnum bog |
|  | G1 Standing water |
|  | G2 Running water/ditch systems |
|  | Ecological Survey Area Buffer |



Figure 5. The Phase 1 habitat type and area of habitat lost for the new sections of Monan Repowering proposal.

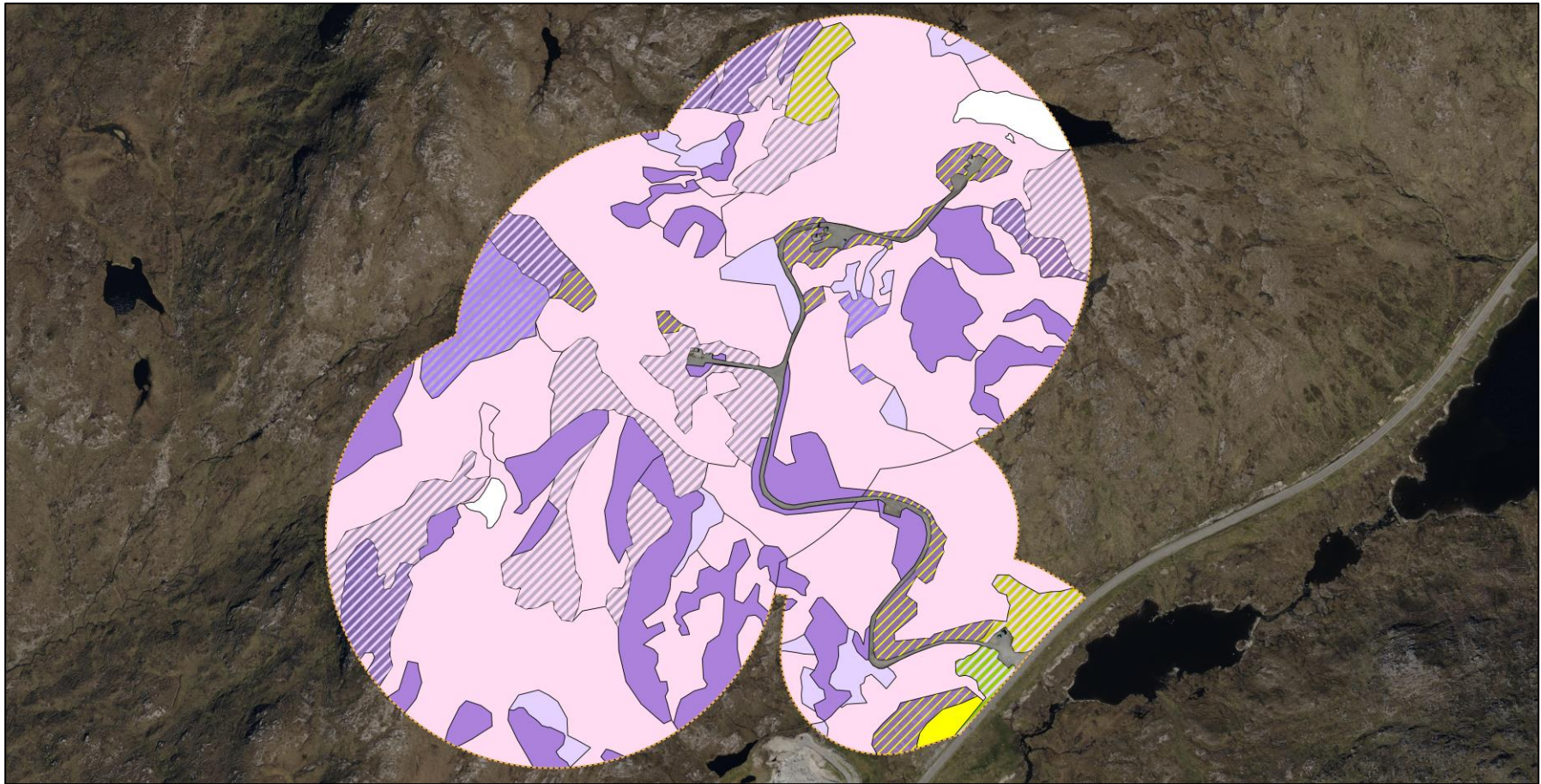












Figure 6. The NVC classifications map within the Ecological Survey Area (ESA). (Map Legend Below)

Proposed Development NVC Legend

Follows the suggested colour code system for NVC mapping by Ben Averis (2014)³⁴.

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 |
|---|---|
| <i>Calluna</i> heaths (H10b) |  |
| Wet heaths (M15a/c) |  |
| Bogs (M17b) |  |
| Acid grassland (U5e) |  |
| <i>Calluna</i> heaths (H10b)/ Acid grassland (U5e) mosaic |  |
| Wet heaths (M15a/c)/ Bogs (M17b) mosaic |  |
| <i>Calluna</i> heaths (H10b)/ Wet heaths (M15a/c) mosaic |  |
| Wet heaths (M15a/c)/ Acid grassland (U5e) mosaic |  |
| Unimproved neutral grasslands (MG10a)/ Wet heaths (M15a/c) mosaic |  |
| Anything else (bare ground, open water, urban etc) |  |

³⁴ https://studylib.net/viewer_next/web/study?file=%2F%2Fs3p.study...ata%2F007412064_1-3e2fa623f71659e5efada57360d18d70.png&ads=true

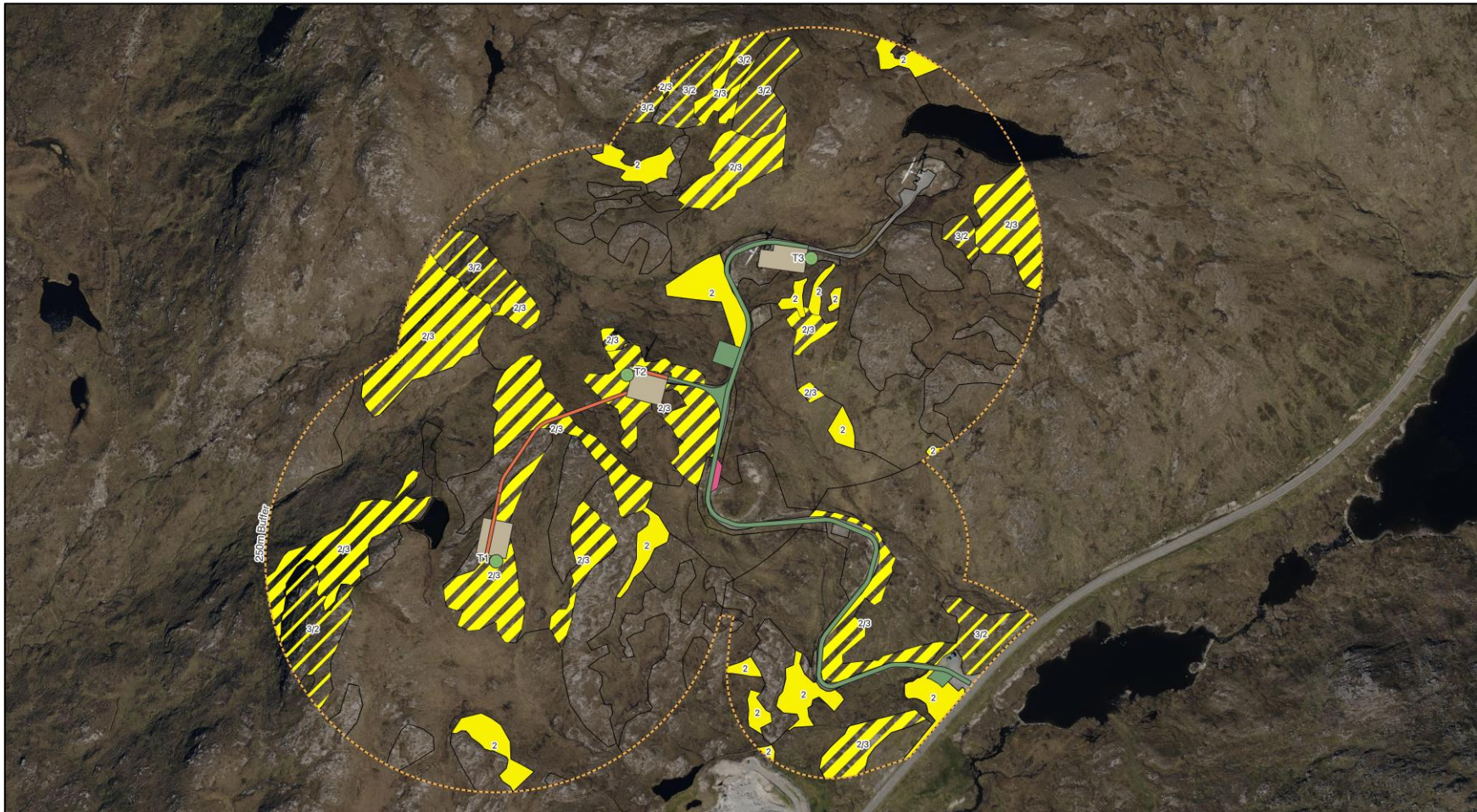


Figure 7. The GWDTE classifications map within the Ecological Survey Area (ESA). (Map Legend Below)





| | | |
|--------------------|------------------------------|---|
| Class 2 | Moderate (yellow) |  |
| Class 2 & 3 Mosaic | Yellow/Clear |  |
| Class 3 | None, or slight (Clear) |  |
| Non-GWDTE | No Associated Colour (Clear) |  |



Figure 8. MG10a community located in the southern section of the ESA, as a mosaic with acid grassland and bog habitat, close to the main road, in previously disturbed soil.



Figure 9. H10b dry heath with a low, dark-coloured canopy of *Calluna vulgaris* and *Erica cinerea* on a drier slope.



Figure 10. Upland wet heath community (M15a) on slope.



Figure 11. The community M17b dominates much of this landscape.



Figure 12. Loch na Learga and bog pools in among M17b habitat.



Figure 13. Some ditches have exposed peat soil at the sides, where the edges have no vegetation.

APPENDIX A – POLICY AND LEGISLATION

| | Legislation or Guidance Document |
|--------------------|---|
| Legislation | <p>Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011³⁵, 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)³⁶;</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)³⁷;</p> <p>The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law³⁸;</p> <p>Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive)³⁹;</p> <p>The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017⁴⁰;</p> <p>The Water Environment and Water Services (Scotland) Act 2003 (WEWS)⁴¹;</p> <p>The Water Environment (Controlled Activities) (Scotland) Regulations 2011^{42,43}, Amendment Regulations 2021⁴⁴;</p> <p>The Wildlife and Countryside Act 1981 (as amended)⁴⁵;</p> <p>Nature Conservation (Scotland) Act 2004 (as amended)⁴⁶;</p> <p>The Wildlife and Natural Environment (Scotland) Act 2011⁴⁷</p> <p>The Protection of Badgers Act 1992⁴⁸</p> |
| Policy | <p>Outer Hebrides Local Development Plan (2018-2023)⁴⁹;</p> <p>Fourth National Planning Framework Draft (NPF4)⁵⁰;</p> |

³⁵ 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/>

³⁶ 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>

³⁷ 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

³⁸ 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/ukxi/1994/2716/contents/made>

³⁹ Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive: <https://ec.europa.eu/environment/eia/eia-legalcontext.htm>

⁴⁰ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; <https://www.legislation.gov.uk/ssi/2017/101/contents/made>

⁴¹ The Water Environment and Water Services (Scotland) Act 2003 (WEWS); <https://www.legislation.gov.uk/asp/2003/3/contents>

⁴² The Water Environment (Controlled Activities) (Scotland) Regulations 2011; <https://www.legislation.gov.uk/ssi/2011/209/contents/made>

⁴³ 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

⁴⁴ The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021 <https://www.legislation.gov.uk/ssi/2021/412/contents/made>

⁴⁵ 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>

⁴⁶ Nature Conservation (Scotland) Act 2004 (as amended); <https://www.legislation.gov.uk/asp/2004/6/contents>

⁴⁷ The Wildlife and Natural Environment (Scotland) Act 2011; <https://www.legislation.gov.uk/asp/2011/6/contents>

⁴⁸ The Protection of Badgers Act 1992; <https://www.legislation.gov.uk/ukpga/1992/51/contents>

⁴⁹ <https://www.cne-siar.gov.uk/planning-and-building/planning-service/development-planning/development-plan/local-development-plan/>

⁵⁰ <https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/>

| | Legislation or Guidance Document |
|-----------------|---|
| | <p>UK Post-2010 Biodiversity Framework (2012)⁵¹;</p> <p>Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity (2013)⁵²;</p> <p>Scottish Government (2017). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0⁵³;</p> <p>PAN 51: Planning, Environmental Protection and Regulation (revised 2006)⁵⁴;</p> <p>PAN 60: Planning for Natural Heritage (Scottish Government, 2000)⁵⁵; and</p> <p>Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000)⁵⁶</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.⁵⁷;</p> <p>Collins, J.(ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)⁵⁸;</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> <p>European Commission (2011). Wind energy developments and Natura 2000⁵⁹;</p> |

⁵¹ UK Post-2010 Biodiversity Framework (2012); <https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/>

⁵² 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/>

⁵³ 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/>

⁵⁴ PAN 51: Planning, Environmental Protection and Regulation (revised 2006); <https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/>

⁵⁵ PAN 60: Planning for Natural Heritage (Scottish Government, 2000); <https://www.gov.scot/publications/pan-60-natural-heritage/>

⁵⁶ 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>

⁵⁷ 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>

⁵⁸ 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>

⁵⁹ European Commission (2011). Wind energy developments and Natura 2000: <https://ec.europa.eu/environment/nature/info/pubs/docs/leaflets/windfarm/en.pdf>

| | Legislation or Guidance Document |
|--|--|
| | <p>European Commission (2011). EU Biodiversity Strategy⁶⁰;</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 List⁶¹;</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)⁶²;</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)⁶³;</p> <p>Scottish Natural Heritage (Version 2, 2016). Planning for Development: What to consider and include in Habitat Management Plans⁶⁴;</p> <p>Scottish Natural Heritage (2003). Best Practice Guidance - Badger Surveys. Inverness Badger Survey 2003. Commissioned Report No. 096;</p> <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 Scotland⁶⁵;</p> <p>Strachan et al., (2011). The Water Vole Conservation Handbook;</p> |

⁶⁰ European Commission. (2011). EU Biodiversity Strategy. http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm

⁶¹ Scottish Government. (2013). Scottish Biodiversity List. <https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL>

⁶² 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>

⁶³ 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>

⁶⁴ 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>

⁶⁵ Scottish Natural Heritage, (2018). Environmental Impact Assessment Handbook. Guidance for competent authorities, consultation bodies and others 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>

| | Legislation or Guidance Document |
|--|--|
| | <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 Developments⁶⁶;</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 System⁶⁷</p> <p>Scottish Natural Heritage (2016). General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms⁶⁸;</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 Strategy⁶⁹</p> |

⁶⁶ 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>

⁶⁷ UKhab Ltd: UK Habitat Classification System <https://ukhab.org>

⁶⁸ 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>

⁶⁹ The Scottish Government (2019): Scotland’s Forestry Strategy: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/>

