Technical Appendix 6.1: Assessment Methodology Report

Technical Appendix 6.1 Assessment Methodology Report

Watchman Energy Park

Watchman Energy Park Limited

Prepared by:

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Basis of Report

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1.0 Introduction

On behalf of Watchman Energy Park Ltd (the Applicant), SLR Consulting Limited (previously MacArthur Green[1]) has prepared this Assessment Methodology appendix to accompany **Chapter 6: Ecology (EIAR Volume 2)** of the Environmental Impact Assessment (EIA) Report (EIAR).

The assessment methodology, including criteria for identifying and assessing sensitivity of ecological receptors, magnitude of change, cumulative effects, and significance criteria is outlined below.

The significance of the potential effects of the Proposed Development has been assessed by professional consideration of the sensitivity of the ecological features and the spatial and temporal magnitude of the potential effects.

The assessment method follows Chartered Institute of Ecology and Environmental Management (CIEEM) (2024)[2] guidance, which is in line with the EIA Regulations[3].

The assessment involves the following process:

- identification of the potential ecological effects of the Proposed Development on ecological features, including both positive and negative;
- considering the likelihood of occurrence of potential effects;
- defining the nature conservation value and conservation status of the ecological features present to determine sensitivity;
- establishing the magnitude of change associated with the potential effect (both spatial and temporal);
- based on the above information, making a professional judgement as to whether or not the resultant effect is significant in terms of the EIA Regulations;
- if a potential effect is determined to be significant, measures to avoid or reduce the effect are suggested, where required;
- considering opportunities for enhancement, where appropriate; and
- confirming residual effects after mitigation (including enhancement) and, in the event the remaining residual effects are assessed as significant, considering appropriate proposals for compensation (see CIEEM, 2024).

2.0 Sensitivity of Ecological Features

The sensitivity of the baseline conditions, including the importance of ecological features on or near to the Site, or the sensitivity of potentially affected receptors, has been assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

Determination of the level of sensitivity of an ecological feature is based on a combination of the feature's nature conservation value and conservation status. Nature conservation value

[1] Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

[2] CIEEM (2024). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

[3] Scottish Government (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents

is defined on the basis of the geographic context shown in **Table 2-1**, which follows CIEEM (2024) guidance.

Attributing a value to an ecological feature is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of an importance level. For example, a Special Area of Conservation (SAC) designated under the Habitats Directive is implicitly of European (international) importance.

In the case of species, assigning value is less straightforward as contextual information about distribution and abundance is fundamental, including trends based on historical records. This means that even though a species may be protected through legislation at a national or international level, the relative value of the population on site may be quite different (e.g., the population within a site may consist of a single transitory animal, which within the context of a thriving local / regional / national population of a species, is therefore of local or regional value as opposed to national or international).

Determination of the level of importance of ecosystems, habitats and species is based on professional judgement and a combination of factors, such as level of protection, rarity, conservation status, population trends, and quality/extent of the feature in the study area. Published evaluation criteria (e.g., the Scottish Biodiversity List (NatureScot, 2020)[4] and the Joint Nature Conservation Committee (JNCC) on the selection of biological Sites of Special Scientific Interest (SSSIs) (2022)[5]) are used where relevant.

In line with the CIEEM (2024) guidance, it is not necessary to carry out detailed assessment on features that are sufficiently widespread, unthreatened, and resilient to effects of the Proposed Development. However, those ecological features affected by the Proposed Development and deemed to be of at least local importance are termed Important Ecological Features (IEFs) and are taken forward for assessment.

Table 2-1 Approach to Valuing Ecological Features[6]

Value of Feature in Geographical Context	Description
International / European	An internationally designated site (e.g., SAC), or undesignated areas that meet the criteria for international designations, or qualifying species whose presence contributes to the maintenance of such a site.
	Species present in internationally important numbers (>1 % of biogeographic populations).
National (UK)	A nationally designated site (e.g., SSSI, or a National Nature Reserve (NNR)), or sites meeting the criteria for national designation or qualifying species whose presence contributes to the maintenance of such a site.
	Species present in nationally important numbers (>1 % of UK population).
Regional (Natural Heritage Zone or Local Authority Area)	Regionally significant and viable areas of key habitat identified in a regional Biodiversity Action Plan (BAP).
	Species present in regionally important numbers (>1 % of Natural Heritage Zone (NHZ) population).
	Areas of key habitat falling below criteria for selection as a SSSI (e.g., areas of semi-natural ancient woodland larger than 0.25 hectares (ha)).
Local	A site within the local area designated for nature conservation (e.g., Local Nature Reserves (LNRs)).
	Areas of semi-natural ancient woodland smaller than 0.25 ha.
	Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g., species-rich flushes or hedgerows
Negligible	Usually widespread and common habitats and species that do not meet the above criteria. Features falling below local value are not normally considered in detail in the assessment process.

[4] NatureScot (2020). Scottish Biodiversity List. Available online from: https://www.nature.scot/doc/scottish-biodiversity-list

[5] JNCC (2022). Guidelines for selection of biological Sites of Special Scientific Interest (SSSIs). Available online from: https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/

[6] As adapted from Hill, D., Fasham, M., Tucker, G., Shewry, M and Shaw, P. (2005). Handbook of Biodiversity Methods – Survey, Evaluation and Monitoring. Cambridge University Press, Cambridge.

3.0 Magnitude of Effect

The magnitude of potential effects refers to changes in the extent and integrity of an ecological feature. The following definition of ecological 'integrity' is found within Scottish Executive circular 6/1995 (updated by Scottish Executive (2000)):

"The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".

Although this definition is used specifically regarding European level designated sites (e.g., an SAC), it is applied to wider countryside habitats and species for the purposes of this assessment.

The magnitude of potential effects will be identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development, how the ecological features are likely to respond to the Proposed Development, the duration and reversibility of an effect and the application of professional judgement, best practice guidance and legislation. This change can occur during construction or operation of the Proposed Development, and effects can be beneficial, neutral or adverse.

Effects are determined in terms of magnitude in space and time. There are five levels of spatial effects and five levels of temporal effects, described in **Table 3-2**.

Table 3-1 Definition of Spatial Effect Magnitude upon the IEFs

Magnitude of Effect	Definition
Very High	Would cause the loss, gain or improvement of the majority of a feature (>80%) or would damage/enhance a feature sufficiently to immediately affect its integrity.
High	Would have a major effect on the feature or its integrity, for example more than 20% habitat loss/damage or gain / improvement.
Medium	Would have a moderate effect on the feature or its integrity, for example between 10 and 20% habitat loss/damage or gain / improvement.
Low	Would have a minor effect upon the feature or its integrity, for example, less than 10% habitat loss/damage or gain / improvement.
Negligible	Minimal change on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.

Table 3-2 Definition of Temporal Effect magnitude upon the IEFs

Magnitude of Effect	Definition
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as >30 years), except where there is likely to be substantial improvement after this period in which case the category Long Term may be more appropriate.
Long Term	Between 15 years up to (and including) 30 years.
Medium Term	Between 5 years up to (but not including) 15 years.
Short Term	Up to (but not including) 5 years.
Negligible	No effect.

4.0 Significance of Effect

The significance of potential effects is determined through a standard method of assessment based on professional judgement and available evidence, considering the sensitivity (nature conservation value and conservation status) of the IEF, and the nature and magnitude of change, in a reasoned way.

A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for IEFs or for biodiversity generally. Broadly, significant effects include those which result from impacts on the structure and function of defined sites, habitats or ecosystems, and the conservation status of habitats and species (including extent, abundance and distribution)[7].

Table 4-1 details the significance criteria that have been used in assessing the effects of the Proposed Development.

[7] CIEEM (2024), at section 5.25 – 5.26

Table 4-1 Significance Criteria

Magnitude of Effects	Definition
Major	The effect is likely to result in a long term adverse or beneficial effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitat and species.
Moderate	The effect is likely to result in a medium term or partial adverse or beneficial effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species.
Minor	The effect is likely to adversely or beneficially affect the feature at a low level by virtue of its limited duration and / or extent, but there will probably be no effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species. The level of effect would be Minor and Not Significant.
Negligible	No material effect. The effect is assessed to be Not Significant.

Using these definitions in **Table 4-1,** it must be decided whether there would be any effects which would be sufficient to adversely affect the IEF to the extent that its conservation status deteriorates from that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).

Major and moderate effects are considered to be significant within the context of the EIA Regulations.

Where adverse effects are identified, mitigation and/or compensation is considered to reduce or offset effects where possible, including avoidance or reduction through implementation of, and compliance with, best practice guidance and protected species legislation.

Residual effects are characterised as either adverse, neutral or beneficial and either significant or not significant, taking mitigation proposals into account.

5.0 Cumulative Assessment

Cumulative effects can result from individually insignificant, but collectively significant actions taking place over a period of time or concentrated to a particular location. NatureScot guidance (NatureScot, 2025[8]) sets out that cumulative effects require the assessment of the effects of the Proposed Development together with other developments, projects or activities[9].

In the interests of focusing on the potential for significant effects, this assessment considers the potential for cumulative effects with other onshore wind farm EIA developments within 5 km of the Proposed Development. The context in which these effects are considered is heavily dependent on the ecology of the features assessed. For example, for water vole (*Arvicola amphibius*) it may be appropriate to consider effects specific to individual catchments, should the distance between neighbouring catchments be sufficient to assume no movement of animals between them, whereas for blanket bog, the region or NHZ may be the relevant spatial scale. Therefore, where it is considered necessary, an assessment of cumulative effects will be made for each feature, appropriate to its ecology.

[8] NatureScot (2025). Guidance - Assessing the cumulative impacts of onshore wind farms on birds. Available online from: https://www.nature.scot/doc/guidance-assessing-cumulative-impacts-onshore-wind-farms-birds

[9] Note that while this guidance focuses on ornithology, the principle applies considering cumulative impacts on non-avian ecology (similarity seen in NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments).

Making Sustainability Happen

Technical Appendix 6.2a: National Vegetation Classification (NVC) and Habitats Survey Report

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Figures (refer to EIAR, Volume 3a)

Annexes

Acronyms and Abbreviations

AWI	Ancient Woodland Inventory
BAP	Biodiversity Action Plan
BESS	Battery Energy Storage System
EIAR	Environmental Impact Assessment Report
GWDTE	Groundwater Dependent Terrestrial Ecosystems
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
LEPO	Long-established woodlands of plantation origin
NVC	National Vegetation Classification
PAWS	Plantations on Ancient Woodland Sites
PCA	Peatland Condition Assessment
SBL	Scottish Biodiversity List
SEPA	Scottish Environmental Protection Agency
SLC	South Lanarkshire Council
SSSI	Site of Special Scientific Interest
TN	Target Note

1.0 Introduction

MacArthur Green (now SLR Consulting Limited[1]) was commissioned by Watchman Energy Park Ltd (the 'Applicant') to carry out a National Vegetation Classification (NVC) and habitats survey, with subsequent peatland condition assessment (PCA) and notes on general habitat condition (refer to **Technical Appendix 6.2b, EIAR Volume 4**), for the proposed Watchman Energy Park (hereafter referred to as the 'Proposed Development').

The NVC survey aims to identify and map the vegetation communities present within the survey area to identify those areas of greatest ecological interest (i.e., Annex I habitats[2]; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE)[3]; and Scottish Biodiversity List (SBL) priority habitats[4]).

This report details the findings of the NVC surveys with an evaluation of those communities described.

2.0 The Site and Survey Area

2.1 Overview

The Site covers an area of approximately 1,089 hectares (ha) and is located approximately 10 km south of Crawford and 12 km to the west of Moffat, South Lanarkshire between the valley of the Daer Water and commercial forestry to the north, Daer Reservoir and commercial forestry to the east, open moorland of the Southern Uplands to the south, and further open moorland with the A702 road beyond to the west. The Proposed Development is fully described within **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.

This Technical Appendix reports on the habitats recorded within the survey area, i.e., the entire area covered by NVC field surveys, covering a total of 1,512 hectares (ha).

The survey area in some cases extends beyond the boundary of the Site, which reflects earlier and larger survey areas which have been refined during the iterative design process (see **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**), and to also provide sufficient survey buffers to account for the possible presence of potential GWDTE (where land access allowed). The survey area in relation to the Site Boundary is shown on **Figure 6.3 (EIAR Volume 3a)**. There is a small section within the Site Boundary that has not been covered by NVC surveys (approximately 500 m in length) (**Figure 6.3.4, EIAR Volume 3a**); this close to the Western Access track, where a temporary diversion during construction for the core path is proposed along an existing forestry track within conifer plantation. No works are proposed in this area.

The appropriate scale and 'study area' for the assessment of effects with regards habitat loss has been deemed to be the Site Boundary (as defined in **Chapter 6: Ecology, EIAR Volume 2**).

[1] Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

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

[3] SEPA (2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems. https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/

[4] NatureScot (2025). Scottish Biodiversity List. Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

2.2 Designated Sites

There is one statutory designated site containing habitat related, or botanical, qualifying features within 5 km of the Site Boundary, i.e., Shiel Dod Site of Special Scientific Interest (SSSI) which abuts the Site to the south. The details of, and qualifying features for, this designation relevant to this appendix are detailed in **Table 2-1**; see also **Figure 6.1 (EIAR Volume 3a)**.

Table 2-1 Designated Sites with Botanical Qualifying Features within 5 km of the Site Boundary

Designated Site	Distance from application boundary and nearest new infrastructure (m)	Qualifying feature	Last assessed condition and date
Shiel Dod SSSI	0 m from Site Boundary and 168 m from hardstanding for Turbine 8	Upland habitat assemblage	Favourable, maintained 06 October 2009

2.3 Ancient Woodland

There are several areas of ancient woodland (as present on the Ancient Woodland Inventory (AWI)[5]) within 5 km of the Site Boundary, but none within the Site; the closest area is 4.1 km away at Castlehill near Durisdeer (see **Figure 6.1, EIAR Volume 3a**).

The definition of ancient woodland is land that is currently wooded and has been continually wooded at least since 1750. It is not related to the age of the trees that are currently growing there, and they do not have to be ancient or elderly, as it is the historical continuity of the woodland habitat that makes a woodland ancient. The AWI holds information on the location and extent of ancient woodland within Scotland, and categorises each stand as follows:

- **Ancient Woodland (1a and 2a)** - Interpreted as semi-natural woodland from maps of 1750 (1a) or 1860 (2a) and continuously wooded to the present day. If planted with non-native species during the 20th century they are referred to as Plantations on Ancient Woodland Sites (PAWS).
- **Long-established woodlands of plantation origin (LEPO) (1b and 2b)** - Interpreted as plantation from maps of 1750 (1b) or 1860 (2b) and continuously wooded since. Many of these sites have developed semi-natural characteristics, especially the oldest stands, which may be as rich as ancient woodland.
- **Other woodlands on Roy maps (3)** - Shown as un-wooded on the 1st Edition of the Ordnance Survey maps (produced in circa 1850), but as woodland on the Roy maps (produced in circa 1750). Such sites have, at most, had only a short break in continuity of woodland cover and may still retain features of ancient woodland.

The majority of ancient woodland within 5 km of the Site is categorised as Long-Established (of planted origin), with a few small patches of Ancient (of semi-natural origin).

[5]Ancient Woodland Inventory (Scotland). Available at: https://opendata.nature.scot/datasets/snh::ancient-woodland-inventory/explore

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2.4 Carbon and Peatland Map 2016

The Carbon and Peatland Map 2016[6] was consulted to determine likely peatland classes present within the survey area. The map is a predictive tool that provides an indication of the likely presence of peat at a coarse scale. The Carbon and Peatland map has been developed as a high-level planning tool and identifies areas of nationally important carbon-rich soils, deep peat and priority peatland habitat[7] as Class 1[8] and Class 2[9] peatlands.

Figure 6.2 (EIAR Volume 3a) indicates that, according to this predictive tool and map, there are relatively limited areas of Class 1 peatland across the survey area, which are predominantly located in the southern portion, the largest of which is north and west of Rodger Law and south and east of Hirstane Rig. A very small area of Class 2 peatland is present in the west of the survey area, north of Hirstane Rig. The majority of the remaining area is made up of Class 3[10] and Class 0 (mineral)[11] soils, with some smaller scattered patches of Class 4[12] and Class 5[13] soils.

3.0 Methodology

3.1 National Vegetation Classification

The vegetation was surveyed by suitably qualified and experienced botanical surveyors using the NVC scheme (Rodwell, 1991-2000; 5 volumes[14]) and in accordance with NVC survey guidelines (Rodwell, 2006[15]). The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats and ensures that surveys are carried out to a consistent level of detail and accuracy.

Homogeneous stands and mosaics of vegetation were identified and mapped by eye and drawn as polygons on high resolution aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species present. The surveyors worked progressively across the survey area to ensure that no areas were missed, and that mapping was accurate.

NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991-2000[14]). Stands were classified to sub-community level where possible, although in many cases the vegetation

[6] SNH (2016) Carbon and Peatland 2016 map. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map

[7] Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

[8] Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value. Indicative vegetation – Peatland.

[9] Class 2 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential. Indicative vegetation – Peatland or areas with high potential to be restored to peatland.

[10] 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.

[11] Mineral soil - Peatland habitats are not typically found on such soils (Class 0). Indicative vegetation - no peatland vegetation.

[12] Class 4 - Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils. Indicative vegetation - heath with some peatland.

[13] Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded.

[14] Rodwell, J.S. (Ed), et al. (1991 – 2000). British Plant Communities (5 volumes). Cambridge University Press, Cambridge.

[15] Rodwell, J.S. (2006). NVC Users' Handbook. ISBN 978 1 86107 574 1.

was mapped to community level only because the vegetation was too species-poor or patches were too small to allow meaningful sub-community determination; or because some areas exhibited features or fine-scale patterns of two or more sub-communities.

Quadrat sampling was not used in this survey because experienced NVC surveyors do not need to record quadrats in order to reliably identify NVC communities and sub-communities (Rodwell, 2006[15]). Notes were made about the structure and flora of larger areas of vegetation in many places (such as the abundance and frequency of species, and in some cases condition and evident anthropogenic impacts). It can be better to record several larger scale qualitative samples than one or two smaller quantitative samples; furthermore, qualitative information from several sample locations can be vital for understanding the dynamics and trends in local vegetation patterns (Rodwell, 2006[15]).

Due to small scale vegetation and habitat variability and numerous zones of habitat transitional between similar NVC communities, many polygons can represent complex mosaics of two or more NVC communities. Where polygons have been mapped as mosaics an approximate percentage cover of each NVC community within the polygon is given so that the dominant community and character of the vegetation can still be ascertained.

3.2 Phase 1 Habitat Characterisation

The NVC and mapping data was also correlated to their equivalent habitats according to the Phase 1 habitat classification (JNCC), 2010[16]), considering the species composition and habitat quality. The Phase 1 characterisation has been utilised to allow a broader visual representation of the habitats within the survey area. Polygons or areas where there are mosaic NVC communities have generally been assigned a single Phase 1 classification based on the dominant NVC type (despite some polygons containing multiple Phase 1 types, often in low percentages). Therefore, the Phase 1 characterisation is generally a broader overview, and the NVC data should be referred to for further detail in any specific area.

Botanical nomenclature in this report follows that of Stace (2019[17]) for vascular plants, Atherton *et al.* (2010)[18] for bryophytes and Smith *et al.* (2009)[19] for lichens.

4.0 Survey Details and Limitations

NVC and habitat surveys were undertaken within the NVC survey area as follows:

- 19 June to 22 June 2023 inclusive;
- 9 September to 11 September 2024 inclusive;
- 5 and 6 June 2025; and
- 17 July 2025.

The surveys were therefore carried out during the optimal season for habitat surveys. The weather conditions were amenable to survey; bright, with broken cloud and relatively light to moderate winds, and with infrequent light showers. All areas of the survey area were accessible.

The NVC system does not cover all possible semi-natural vegetation or habitat types that may be found. Since the NVC was adopted for use in Britain in the 1980's, further survey work and an increased knowledge of vegetation communities has led to additional communities being described that do not fall within the NVC system (e.g., see Rodwell *et al.*, 2000[20]; Averis *et al.*, 2004[21]; Mountford, 2011[22]; and Averis and Averis, 2020[23]). Where such communities are found and recorded, they are given a non-NVC community code and are described.

It should be noted that the results from this survey, and the matches made in describing communities, represent a current community evaluation at the time of survey (as opposed to one seeking to describe what the community was before any human interference, or what it might become in the future). In light of this, a clear constraint of the vegetation survey and evaluation process, as used in this and other surveys, is that it offers only a snapshot of the vegetation communities present and should not be interpreted as a static long-term reference.

Ecological surveys are limited by factors which affect the presence of plants such as the time of year and weather. The ecological surveys undertaken to inform this project have not therefore produced a complete list of plants and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it would not be present in the future. However, the results of these surveys are considered to be sufficient to undertake the assessment.

5.0 Results

5.1 Summary of Habitat Types and NVC Communities

The survey recorded 34 NVC communities and 18 non-NVC communities within the survey area, and these corresponded to 33 Phase 1 habitat types.

These communities and habitat types, and their respective correlations specific to the survey area are summarised below in **Table 5-1**.

[16] Joint Nature Conservancy Council (JNCC). (2010). Handbook for phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.

[17] Stace, C.A. (2019). New Flora of the British Isles. 4th Edition. Cambridge University Press.

[18] Atherton, I., Bosanquet, S. & Lawley, M. (2010). Mosses and Liverworts of Britain and Ireland: a field guide. British Bryological Society.

[19] Smith, C.W., Aptroot, A., Coppins, B.J., Fletcher, A., Gilbert, O.L., James, P.W. & Wolseley, P.A. (Eds.) (2009). The Lichens of Great Britain and Ireland. The British Lichen Society.

[20] Rodwell, J., Dring, J.C., Averis, A.B.G., Proctor, M.C.F., Malloch, AJ.C., Schaminee, J.H.J. and Dargie, T.C.D. (2000). Review of coverage of the National Vegetation Classification. JNCC Report, No. 302. JNCC, Peterborough.

[21] Averis, A., Averis, B., Birks, J., Horsfield, D., Thompson, D., & Yeo, M. (2004). An Illustrated Guide to British Upland Vegetation. JNCC, Peterborough. ISBN 1 86107 553 7.

[22] Mountford, E. (2011). A compilation of proposed additions and revisions to vegetation types in the National Vegetation Classification, JNCC Report No. 448. JNCC, Peterborough, ISBN 0963-8091

[23] Averis, B and Averis, A. (2020). Plant Communities found in surveys by Ben and Alison Averis but not described in the UK National Vegetation Classification. http://www.benandalisonaveris.co.uk/wp/wp-content/uploads/2020/11/non-nvc_vegetation_types_found_by_ben_and_alison_averis_2020-06__version_with_image_resolution_reduced_.pdf

Table 5-1 Phase 1 Habitat Type Equivalents of NVC Communities and other Habitats Recorded

Phase 1 Habitats	NVC Communities and Other Non-NVC Habitats/Features Recorded
A1.1.1 Broadleaved Semi-Natural Woodland	W4 *Betula pubescens – Molinia caerulea* woodland W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland W11 *Quercus petraea – Betula pubescens – Oxalis acetosella* woodland
A1.1.2 Broadleaved Plantation Woodland	W4(p)[24] *Betula pubescens – Molinia caerulea* woodland W7(p) *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland YBP Broadleaved Plantation (non-NVC type)
A1.2.2 Coniferous Plantation Woodland	CP Coniferous Plantation (non-NVC type) YCP Young Coniferous Plantation (non-NVC type)
A2.1 Scrub – Dense/Continuous	W21 *Crataegus monogyna – Hedera helix* scrub
A3.1 Scattered Broadleaved Trees	SBT Scattered Broadleaved Tree (non-NVC type)
A3.2 Scattered Conifer Trees	SCT Scattered Conifer Tree (non-NVC type)
A4.2 Recently Felled Coniferous Woodland	CF>H9 (non-NVC type)[25] CF>Je (non-NVC type) CF>M15b (non-NVC type) CF>M25a (non-NVC type) CF>U2 (non-NVC type) CF>U4a (non-NVC type) CF>W4 (non-NVC type)
B1.1 Unimproved Acid Grassland	U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland U5 *Nardus stricta – Galium saxatile* grassland U6 *Juncus squarrosus – Festuca ovina* grassland
B1.2 Semi-Improved Acid Grassland	U4b *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland *Holcus lanatus – Trifolium repens* sub-community
B2.1 Unimproved Neutral Grassland	MG1 *Arrhenatherum elatius* grassland MG9 *Holcus lanatus – Deschampsia cespitosa* grassland
B3.1 Unimproved Calcareous Grassland	CG10 *Festuca ovina – Agrostis capillaris – Thymus polytrichus* grassland
B4 Improved Grassland	MG6 *Lolium perenne – Cynosurus cristatus* grassland
B5 Marsh/Marshy Grassland	MG10 *Holcus lanatus – Juncus effusus* rush-pasture

[24] The suffix (p) indicates that although the area has been attributed a NVC code and the vegetation is broadly referable to that community, the area is clearly, or very likely, of plantation origin and therefore not semi-natural.

[25] The non-NVC code “CF” refers to clear-felled woodland.

Phase 1 Habitats	NVC Communities and Other Non-NVC Habitats/Features Recorded
	M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture M25 *Molinia caerulea – Potentilla erecta* mire M27 *Filipendula ulmaria – Angelica sylvestris* mire Mx *Carex* spp. neutral sedge mire (non-NVC type) Je *Juncus effusus* acid grassland community (non-NVC type) Ja *Juncus acutiflorus* acid grassland community (non-NVC type) MG10(Ja) *Juncus acutiflorus* neutral grassland community (non-NVC type)
C3.1 Tall Herb & Fern: Tall Ruderal	OV25 *Urtica dioica – Cirsium arvense* community OV27 *Chamerion angustifolium* community
C3.2 Tall Herb & Fern: Non-Ruderal	U16 *Luzula sylvatica – Vaccinium myrtillus* tall-herb community
D1.1 Dry Dwarf Shrub Heath - Acid	H9 *Calluna vulgaris – Deschampsia flexuosa* heath H18 *Vaccinium myrtillus – Deschampsia flexuosa* heath
D2 Wet Dwarf Shrub Heath	M15 *Trichophorum germanicum – Erica tetralix* wet heath
D3 Lichen/Bryophyte Heath	H14 *Calluna vulgaris – Racomitrium lanuginosum* heath
D5 Dry Heath/Acid Grassland Mosaic	Mosaics of D1 and B1 communities
D6 Wet Heath/Acid Grassland Mosaic	Mosaics of D2 and B1 communities
E1.6.1 Blanket Bog	M2 *Sphagnum cuspidatum/fallax* bog pool community M3 *Eriophorum angustifolium* bog pool community M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire
E1.7 Wet Modified Bog	M20 *Eriophorum vaginatum* blanket mire M25a^ *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community[26]
E2.1 Acid/Neutral Flush/Spring	M4 *Carex rostrata - Sphagnum fallax* mire M6 *Carex echinata - Sphagnum fallax/denticulatum* mire M32 *Philonotis fontana – Saxifraga stellaris* spring
E2.2 Basic Flush/Spring	M9 *Carex rostrata – Calliergon cuspidatum/giganteum* mire M10 *Carex dioica - Pinguicula vulgaris* mire
E4 Bare Peat	ExP Exposed Peat (non-NVC type)
F1 Swamp	S9 *Carex rostrata* swamp S10 *Equisetum fluviatile* swamp

[26] Areas of M25a^ are classified as wet modified bog where generally appearing on peat of greater than 0.5 m in depth or containing a notable abundance of characteristic bog species, in particular *Eriophorum vaginatum*. In these circumstances, the M25a is denoted with a caret; i.e., M25a^. Whereas marshy grassland is identified as M25a (no caret).

Phase 1 Habitats	NVC Communities and Other Non-NVC Habitats/Features Recorded
G1 Open Water	SW Standing Water (non-NVC type)
G2 Running Water	RW Running Water (non-NVC type)
I1.4.1 Other rock exposure - acid	RK Rock (non-NVC type)
J1.1 Arable	AR Arable (non-NVC type)
J1.2 Amenity Grassland	PG Private Gardens & Lawns, Parks etc (non-NVC type)
J3.6 Buildings	BD Buildings (non-NVC type)
J4 Bare Ground	BG Bare Ground, Tracks, Hardstandings etc. (non-NVC type)

The following sections describe each of these Phase 1 habitat types and the communities underpinning these within the survey area. Habitats are described in the order they appear within the Phase 1 classification. The survey results are displayed in **Figure 6.3 (EIAR Volume 3a)** which combines Phase 1 symbology with NVC data.

A number of target notes (TNs) were also made during surveys, often to pinpoint areas or species of special interest. These target notes are shown in **Figure 6.3 (EIAR Volume 3a)** and detailed within **Annex A** of this report, with target note photographs included within **Annex B** and further photographs of a number of the typical habitat types found within the survey area provided within **Annex C** of this report.

5.2 Woodland and Scrub

5.2.1 A1.1.1 Broadleaved Semi-Natural Woodland

Semi-natural broadleaved woodland is relatively uncommon within the survey area, being restricted to a few relatively small areas generally around watercourses. The largest and most continuous stands are along Daer Water in the north. Smaller stands are found along Carsehope Burn in the south and along the Western Access.

The majority of woodland recorded in the survey area is W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland*,* however there are also very small patches of W11 *Quercus petraea – Betula pubescens – Oxalis acetosella woodland and* W4 *Betula pubescens – Molinia caerulea* woodland.

The W7 recorded often comprised *Betula* spp. and *Salix* spp., with occasional *Sorbus aucuparia* and *Alnus glutinosa*. The majority of the stands have a field layer characterised by *Deschampsia cespitosa, Juncus effusus*, *Juncus acutiflorus* and *Filipendula ulmaria.* These areas of woodland were recorded to community level only.

The small patch of W11a comprised a canopy of *Sorbus aucuparia*, the ground flora contains a typical acid grassland flora reflecting U5 grassland compositions as well as the frequent presence of *Dryopteris dilatata*.

The area of W4a consisted of *Betula* spp. and *Sorbus aucuparia*, over a relatively dry field layer consisting of *Luzula sylvatica*, *Potentilla erecta*, *Trichophorum germanicum* and abundant *Molinia caerulea*, with very little *Sphagnum*.

5.2.2 A1.1.2 Broadleaved Plantation Woodland

Broadleaved plantation woodland was recorded in a number of locations, mostly in the north of the survey area along the Western Access and around Meikle Burn and Old Town Burn.

The stands along the access track generally consist of young *Betula* spp. and *Sorbus aucuparia*. As these patches have only been recently planted, there are no defining characteristics to attribute an NVC code and have as such been classified as Young Broadleaved Plantation (YBP).

The rest of the broadleaved plantation woodland generally comprised of a mixed canopy of young *Betula* spp*., Alnus glutinosa, Sorbus aucuparia* and *Salix* spp. over existing marshy grassland habitat. These woodland areas are closely referable to W4(p)[24] *Betula pubescens – Molinia caerulea* woodland, with smaller patches of W7(p) *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland. The W4(p) habitat contains a field layer mostly dominated by *Molinia caerulea*, with *Juncus acutiflorus* and *Eriophorum vaginatum* present in places. The areas of W7(p) habitat generally have wet field layers, with species such as *Deschampsia cespitosa, Juncus effusus*, *Juncus acutiflorus, Chamaenerion angustifolium* and *Filipendula ulmaria* present.

5.2.3 A1.2.2 Coniferous Plantation Woodland

Coniferous Plantation (CP) and Young Coniferous Plantation (YCP) woodland was recorded in a number of locations in the north of the survey area, with the most extensive areas consisting of commercial blocks of *Picea sitchensis* along the Western Access. It is found in a small number of other locations, often planted as shelter belts within fields or close to farmhouse buildings along the Daer Water corridor. Most of these stands consist of even-aged, mature *Pinus sylvestris*, with other species such as *Picea sitchensis* also present.

These types of typically dense plantation woodlands are of negligible botanical and ecological value due to over-shading and loss of the field flora.

5.2.4 A2.1 Dense/Continuous Scrub

Dense / continuous scrub is scarce and is represented by three hedgerows of W21 *Crataegus monogyna-Hedera helix* scrub found around Daerside and Nunnerie farm in the north of the Site and recorded as target notes (see **Annex A**). All three examples are planted along field margins and are dominated by *Crataegus monogyna*, with a field layer characteristic of the improved grasslands found in the adjacent fields (see Section 5.3.4).

5.2.5 A3.1 / A3.2 Scattered Broadleaved Tree and Scattered Coniferous Tree

Occasionally some habitats have individual or low numbers of scattered broadleaved trees (SBT) or scattered coniferous trees (SCT) forming a minor part of the vegetative composition. These individual or small groups of trees were not of a scale to be mapped as woodland. The scattered conifer trees tend to be young *Picea sitchensis* that have self-seeded from the large commercial forestry blocks found adjacent to the survey area.

5.2.6 A4.2 Recently Felled Coniferous Woodland

Several small areas along the access track corridors were recorded as recently clear-felled (CF) conifer plantation.

Several areas that have been clear-felled for longer and not yet re-planted are now re-vegetating and re-establishing with secondary temporary / transitional semi-natural vegetation types through the remnant stumps and brash. The majority of re-vegetating clear-fell areas are denoted by the '>' symbol (see **Figure 6.3, EIAR Volume 3a**) and **Table 5-1**). The '>' also indicates the closest-fit NVC community to which the clear-felled area now appears, or is developing towards, e.g., 'CF > M15' indicates that mire vegetation resembling the M15 community is recolonising the clear-fell area. Throughout the survey area sections of clear-fell appear in transition to a number of different communities (as per **Table 5-1**). In a few areas young self-seeded trees are invading, and in time fragments of woodland communities such as W4 would likely develop.

5.3 Grasslands and Marsh

5.3.1 B1.1 / B1.2 Unimproved and Semi-Improved Acid Grassland

Unimproved acid grassland was found to be extensive and scattered widely throughout the survey area. To a much lesser extent, there were also clusters of more semi-improved acid grassland, which were more localised to the upland margins along the eastern half of the survey area.

The acid grassland within the survey area is of the U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland community, U5 *Nardus stricta – Galium saxatile* grassland community, and U6 *Juncus squarrosus – Festuca ovina* grassland community. U5 is the most commonplace and extensive of these communities within the survey area, followed by U4, and then several scattered patches of U6 comprising a much smaller proportion. These grassland communities were recorded as homogenous stands and also within mosaics and transitional zones with several other grassland, mire and bog communities.

The U4 community often contained a variable mix of *Agrostis capillaris*, *Festuca ovina* and *Anthoxanthum odoratum*. The herbs *Potentilla erecta* and *Galium saxatile* are common, and in some stands there can also be smaller quantities of other vascular species such as *Holcus lanatus, Nardus stricta, Avenella flexuosa, Cynosurus cristatus, Juncus squarrosus, Prunella vulgaris, Ranunculus repens, Cerastium fontanum, Achillea millefolium, Trifolium repens, Luzula* spp., and *Cirsium* spp. Mosses are frequent, especially *Pleurozium schreberi* and *Rhytidiadelphus squarrosus*. As well as community level U4, the U4a Typical sub-community and U4b *Holcus lanatus-Trifolium repens* sub-community were recorded in several patches across the survey area.

While the majority of the *Nardus stricta* dominated U5 was recorded at community level, the U5a Species-poor sub-community was also recorded. The largest areas of U5 habitat is found on the slopes of Comb Law towards the centre of the survey area. Many of the grassland species found within the U5 communities replicate many of the species found within U4 as described above, but with *Nardus stricta* being the dominant and most characteristic species. Some patches of U5 contain a high proportion of *Carex panicea*, particularly on the higher ground, but are not flushed enough to be classified as the U5c *Carex panicea-Viola riviniana* sub-community, and are fairly species-poor apart from *Luzula multiflora, Juncus squarrosus* and occasional *Polytrichum commune*.

The U6 community was recorded at community level and as the U6a *Sphagnum* sub-community, with the community being identified by the dominance of *Juncus squarrosus* in the sward. The flora of most of the U6 here has much in common with that of the U4 and U5 acid grassland communities described above, but with *Juncus squarrosus* obviously dominant. The community varied at times and appears both as pure stands of U6 or within mosaics with other mire and grassland communities. These patches are mostly located in the west of the survey area at higher elevations.

Areas of semi-improved acid grassland (B1.2) are characterised by the U4b *Holcus lanatus-Trifolium repens* sub-community only. This sub-community is generally located across the lower slopes of Ewe Gair in the south of the survey area and in the north where there are fields in which there has been some form of historical improvement or a long history of intensive grazing and / or nutrient enrichment. The sward tends to be dominated by a semi-improved assemblage which includes typical species such as *Holcus lanatus, Agrostis* spp*., Cynosurus cristatus, Lolium perenne*, *Trifolium repens* and *Ranunculus repens*.

5.3.2 B2.1 Unimproved Neutral Grassland

Unimproved neutral grassland is a habitat restricted to the north of the survey area along the margins of Daer Water and its tributaries.

These neutral grasslands are represented by MG1 *Arrhenatherum elatius* grassland and MG9 *Holcus lanatus – Deschampsia cespitosa* grassland, with the latter often forming mosaics with marshy grassland communities. Both patches of MG1 were recorded at the sub-community level as the MG1c *Filipendula ulmaria* sub-community. MG9 was more abundant and recorded at community level only.

The vegetation within MG1c contains a mix of *Filipendula ulmaria*, *Arrhenatherum elatius, Dactylis glomerata*, *Holcus lanatus, Deschampsia cespitosa, Agrostis* spp*., Poa* spp*., Rubus fruticosus, Plantago lanceolata, Lotus corniculatus, Trifolium repens*, *Trifolium pratense, Urtica dioica*, *Succisa pratensis*, *Chamaenerion angustifolium* and *Cirsium arvense*.

Within MG9, *Deschampsia cespitosa* dominates with other associates such as *Juncus effusus, Juncus acutiflorus, Poa trivialis* and *Holcus lanatus*. These areas were often found in a mosaic with marshy grassland and tall ruderal communities, characterised by *Filipendula ulmaria* and *Chamerion angustifolium* respectively.

5.3.3 B3.1 Unimproved Calcareous Grassland

Unimproved calcareous grassland is present in localised areas within the survey area.

It is represented by CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland at the community level and as the CG10a *Trifolium repens-Luzula campestris* sub-community.

Two larger patches of CG10 are present in areas with more exposed rock and rock debris on the steeper slopes of Catlaw Dod. Smaller patches are found on the riverbanks and near areas of shingle along Daer Water, where it often forms mosaics with U4 and U5 grassland communities. It generally contains many of the same community constants as the grassland communities with a more acid character, but with an abundance of *Thymus praecox* and absence of *Galium saxatile*.

5.3.4 B4 Improved Grassland

Improved grasslands are found mostly around Wintercleugh and Nunnerie farms area to the north of the survey area, with many of the enclosed and improved fields used for livestock grazing. These areas are characterised by MG6 *Lolium perenne – Cynosurus cristatus* grassland. where the fields and swards have been improved over time through fertiliser application, drainage and grazing/cropping.

Species diversity is often limited with the main dominants being *Lolium perenne, Cynosurus cristatus, Poa* spp*., Trifolium repens* with scattered tufts of *Juncus effusus.* The moss *Rhytidiadelphus squarrosus* can be abundant in small patches. On several occasions, within areas of wetter ground, this habitat often formed a mosaic with marsh/marshy grassland habitats.

5.3.5 B5 Marsh / Marshy Grassland

Marshy grassland is the most extensive habitat type within the survey area.

It is habitat that includes several different sward types in which *Molinia caerulea*, *Juncus* spp. and/or *Carex* spp. can be prominent. This habitat type is widespread throughout the entire length of the survey area, and is commonly found in mosaics with a variety of other habitats such as wet heath, dry heath, acid/neutral flushes, blanket bog and acid grassland.

Within the survey area, the M23 (a & b), M25 (a & b), M27 and MG10a NVC communities are included within its limits along with the non-NVC communities 'Mx', 'Je', 'Ja' and 'MG10(Ja)'. In the Phase 1 methodology MG10 can fall within either marshy grassland or neutral grassland classifications, however here due to the abundance of *Juncus* spp. it has been included within marshy grassland. These communities also commonly form mosaics and transitional areas with each other, in particular the rushy areas, and also with adjoining grassland and mire communities. M25a on shallow soils is the most abundant and extensive marshy grassland community within the survey area; M25b is also relatively common.

The rush dominated communities present are M23a *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community, M23b *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, *Juncus effusus* sub-community, MG10a *Holcus lanatus – Juncus effusus* rush-pasture, typical sub-community, as well as the non-NVC types *Juncus acutiflorus* acid grassland (Ja), *Juncus acutiflorus* neutral grassland (MG10(Ja)) and *Juncus effusus* acid grassland (Je).

The areas of M23 are often species poor with *Juncus* spp. being the dominant species, and it regularly grades in and out of MG10, Ja or Je (see below). Generally, areas of M23 are dominated by mixtures of *Juncus acutiflorus* and / or *Juncus effusus* with patches of a low diversity of grasses such as *Holcus lanatus, Anthoxanthum odoratum, Molinia caerulea* and *Agrostis* spp. Within the sward, a variety of other graminoids and herbs are more occasional to rare and included *Cirsium palustre, Rumex acetosa, Ranunculus repens, Potentilla erecta* and *Carex* spp. Wefts of mosses are also common through M23 between these species including *Calliergonella cuspidata*, *Kindbergia praelonga*, and *Rhytidiadelphus squarrosus*.

MG10 is less common in the survey area than the other marshy grassland communities. This community is dominated by *Juncus effusus*, with often a damp field layer containing *Deschampsia cespitosa* and *Holcus lanatus* in variable amounts.

The 'Ja' and 'Je' non-NVC grassland communities are present here as patches of a *Juncus* spp. dominated calcifuge grassland, at times found as extensive areas or as a small component of a wider mosaic with other grassland and mire communities. This is vegetation in which dominant and tall *Juncus effusus* or *Juncus acutiflorus* grow abundantly among a few shorter 'acid grassland' swards including frequent to occasional A*grostis capillaris, Holcus lanatus, Rumex acetosa, Potentilla erecta* and *Galium saxatile*. Other occasional species include *Carex nigra, Molinia caerulea* and *Ranunculus repens*.

Mosses typical of acid communities are also abundant, the most common mosses are *Hylocomium splendens, Pleurozium schreberi, Polytrichum commune, Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*. This vegetation does not fit into any NVC community as it lacks the wetland element and key indicators of M6 and M23 *Juncus* spp. mires and has a more acidophilous flora than MG10 *Juncus effusus* rush-pasture; it is therefore classed separately. The 'MG10(Ja)' non-NVC damp neutral grassland community is essentially similar to the MG10 community but is not so well grazed and *Juncus acutiflorus* replaces *Juncus effusus* as the dominant rush species in this more neutral setting.

Small patches of M27 *Filipendula ulmaria-Angelica sylvestris* mire, recorded at the community level only, are found within the northern part of the survey area along the Daer

Water. It almost always appears within a mosaic of communities, aside from one homogenous stand near Daerside. *Filipendula ulmaria* is very abundant in these patches with occasional *Epilobium palustre*, *Succisa pratensis*, *Rumex acetosa*, *Holcus lanatus*, *Phragmites australis*, *Deschampsia cespitosa* and *Galium aparine*.

The neutral sedge mire (Mx) non-NVC community consists of vegetation that has much in common with M23 *Juncus effusus / acutiflorus-Galium palustre* rush pasture but with swards of *Carex* spp. rather than *Juncus* spp. The only example of Mx found within the survey area was part of a flushed mosaic along a tributary of Carsehope Burn in the southwest. This patch contained *Carex panicea, Carex nigra, Carex echinata*, *Potentilla erecta* and *Cirsium palustre*.

The M25 NVC community is the most abundant form of marshy grassland habitat across the survey area. It was classified as marsh / marshy grassland where it was present at the community level, the M25a *Erica tetralix* (when likely on shallow organo-mineral or peaty soil) and M25b *Anthoxanthum odoratum* sub-communities. These were areas either wholly dominated by *Molinia caerulea* (M25) or where *Molinia caerulea* was accompanied by a mixture of heath species (M25a) or grassland species (M25b). Other species recorded in M25a included lesser amounts of *Trichophorum germanicum, Erica tetralix, Calluna vulgaris, Narthecium ossifragum, Potentilla erecta, Galium saxatile* and *Vaccinium myrtillus*; the basal layer often included *Sphagnum fallax, S. capillifolium, Polytrichum commune* and *Pleurozium schreberi*. The M25b was dominated by *Molinia caerulea* and was found to form mosaics with the other marshy grassland, acid grassland and wet heath communities. In some places where the *Molinia caerulea* was not purely dominant, species included variable abundances of *Potentilla erecta, Galium saxatile, Anthoxanthum odoratum, Holcus lanatus, Rumex acetosa, Agrostis capillaris, Juncus squarrosus, Juncus effusus* and *Juncus acutiflorus;* the mosses *Hylocomium splendens, Polytrichum commune* and *Pleurozium schreberi* are also common. M25a and M25b areas tend to be found on shallow peaty / organo-mineral soils.

5.4 Tall Herb and Fern

5.4.1 C3.1 Tall Ruderal

Within the survey area, this habitat type is represented by the OV25 *Urtica dioica – Cirsium* arvense and OV27 *Chamerion angustifolium* communities.

The OV25 consists of a patch of *Urtica dioica* on waste ground on a trackside verge and comprises their characteristic community dominants. This community is also often found as part of wider mosaics, notably with acid and marshy grasslands. OV27 is only found across the survey area as a small constituent in mosaics, usually including marshy grassland and neutral grassland communities.

5.4.2 C3.2 Non-Ruderal

The U16 *Luzula sylvatica – Vaccinium myrtillus* tall-herb community is relatively uncommon within the survey area, being restricted to the higher elevations along the western portion. It was recorded at community level, but also as the U16c species-poor sub-community. Generally, the species include *Luzula sylvatica* and *Vaccinium myrtillus*. Weft of mosses such as *Rhytidiadelphus loreus*, *R. squarrosus*, *Hypnum jutlandicum, Hylocomium splendens*, *Pleurozium schreberi* and *Pseudoscleropodium purum*.

5.5 Heathland

5.5.1 D1.1 Dry Dwarf Shrub Heath – Acid

Acid dry dwarf shrub heath is sparse and of relatively low total cover within the survey area, represented by H9 *Calluna vulgaris - Avenella flexuosa* heath and H18 *Vaccinium myrtillus – Avenella flexuosa* heath communities.

Small areas of H9 heath were recorded on the disturbed margins of forestry tracks along the western access track corridor. Commonly species include *Calluna vulgaris* and *Avenella flexuosa*. These were often recorded as a part of mosaics along with grassland communities.

The areas of H18 heath are mostly found on the higher ground and slopes in the south-western portion of the survey area and have likely been derived from a long history of grazing pressure. These patches are often scattered within mosaics dominated by grassland communities. H18 was recorded to the community level in places, but also to the H18a *Hylocomium splendens – Rhytidiadelphus loreus* sub-community, where *Vaccinium myrtillus*, *Avenella flexuosa*, *Potentilla erecta*, *Blechnum spicant*, *Nardus stricta* and *Hylocomium splendens* are all abundant. The H18b *Alchemilla alpina-Carex pilulifera* sub-community was also recorded much more infrequently, where *Calliergonella cuspidata* was also abundant.

5.5.2 D2 Wet Dwarf Shrub Heath

Wet heath is very common within the survey area, particularly in the southern portion where it covers large areas of Ewe Gair and Rodger Law. It all consists of the M15 *Trichophorum germanicum – Erica tetralix* wet heath community. The majority of the wet heath present is of the M15b Typical sub-community, however the M15a *Carex panicea* sub-community and M15d *Vaccinium myrtillus* sub-community are also scattered throughout, with only two small areas of the M15c *Cladonia* spp. sub-community recorded. Many of these areas have been poached and intensively grazed by livestock.

The M15b wet heath present is generally at the drier end of the spectrum and is considered to be in a fairly poor and degraded condition. The *Calluna vulgaris* in particular has been heavily grazed and is much reduced in places. The habitat frequently mosaics and transitions in and out of acid grassland. The areas of M15b were generally a co-dominant mixture of *Trichophorum germanicum, Calluna vulgaris* and *Molinia caerulea,* in addition to *Vaccinium myrtillus, Avenella flexuosa, Nardus stricta, Potentilla erecta, Eriophorum angustifolium* and scattered *Eriophorum vaginatum.* The mosses *Hylocomium splendens, Racomitrium lanuginosum* and *Pleurozium schreberi* are common, along with *Sphagnum capillifolium* and *Sphagnum fallax* appearing within the wetter patches of ground.

The M15a *Carex panicea* sub-community present is over wet peaty ground and commonly contains the above species as well as *Narthecium ossifragum, Drosera rotundifolia, Galium saxatile, Carex nigra* and *Carex echinata.* The M15d assemblage here contains a sward with a dominance of *Trichophorum germanicum, Vaccinium myrtillus* and *Nardus stricta*. The *Calluna vulgaris* in these areas tends to be sparse and very heavily-grazed. In some particularly dry and grazed patches, the *Trichophorum germanicum* is diluted by a number of grass species including *Avenella flexuosa* and *Anthoxanthum odoratum*.

Two small areas of M15c were present and contained a higher abundance of *Cladonia* spp.

5.5.3 D3 Lichen / Bryophyte Heath

Lichen / bryophyte heath is very uncommon and of low total cover within the survey area and is only found in a few small areas at high elevation around Rodger Law. They appear in patches along the summit ridges or just below them often across bare rocky areas and are occasionally found in mosaics with acid grassland. The lichen / bryophyte heath recorded

was all of the H14 *Calluna vulgaris – Racomitrium lanuginosum* heath community and characterised by a short wind-clipped sward of *Calluna vulgaris* along with abundant lichens including *Cetraria islandica, Cladonia* spp*.,* and *Ochrolechia frigida*.

5.5.4 D5 Dry Heath/Acid Grassland Mosaic

Mapped mosaics of D1 (**Section 5.5.1**) and B1.1 (**Section 5.3.1**) communities.

5.5.5 D6 Wet Heath/Acid Grassland Mosaic

Mapped mosaics of D2 (**Section 5.5.2**) and B1.1 (**Section 5.3.1**) communities.

5.6 Mire

5.6.1 E1.6.1 Blanket Bog

Blanket bog has a widespread distribution throughout the survey area. It is generally found in more contiguous tracts in the more elevated parts and watershed plateaus of the west and south of the survey area and smaller scattered patches at lower elevations in the east and north. It commonly transitions and mosaics with wet modified bog, wet heath and acid grassland.

Blanket bog here is mainly represented by the M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire community and M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire community. These communities appear both as pure stands and within mosaics with other mire communities. The M2 *Sphagnum cuspidatum / fallax* bog pool community and M3 *Eriophorum angustifolium* bog pool community were also infrequently recorded within these blanket bog areas (see **Annex A**).

Areas of M2 were recorded at community level, and as the M2b *Sphagnum fallax* sub-community. These were generally dried out at the time of the survey, and comprise *Sphagnum fallax*, *Sphagnum cuspidatum*, *Eriophorum vaginatum* and very occasional *Calluna vulgaris*. This community forms mosaics with the other bog communities, where it occupies the wetter depressions, and forms an unconsolidated surface. The M3 community is species-poor, generally characterised by colonising *Eriophorum angustifolium* on bare peat, with *Sphagnum papillosum* and *Sphagnum fallax* appearing in some patches.

M17 was recorded at the community level and also as the M17a *Drosera rotundifolia - Sphagnum* spp. sub-community, M17b *Cladonia* spp. sub-community and M17c *Juncus squarrosus-Rhytidiadelphus loreus* sub-community. Within M17 overall, there is a mix of *Trichophorum germanicum* and *Eriophorum vaginatum*, although the densities can be variable in places. The sward also contains a mix of other species ranging from frequent and occasional, to locally abundant, species present include *Erica tetralix*, *Eriophorum angustifolium*, *Juncus squarrosus*, *Vaccinium myrtillus, Nardus stricta, Avenella flexuosa, Anthoxanthum odoratum, Narthecium ossifragum, Rubus chamaemorus*, *Molinia caerulea* and *Calluna vulgaris.* The basal layer includes *Sphagnum papillosum*, *S. fallax*, *S. palustre*, *S. cuspidatum*, *S. capillifolium* and *S. compactum* as well as typical pleurocarpous mosses. The M17a sub-community contains most of the community constants but is wetter and more diverse, while the more abundant M17c is generally much drier and dominated by graminoids. The M17b sub-community is differentiated by the greater presence of the moss *Racomitrium lanuginosum* and *Cladonia* spp.

The M19 community appears within this blanket bog habitat occurring on peat-covered level to gently sloping ground within the survey area. It is represented at community level and as the M19a *Erica tetralix* sub-community and the M19b *Empetrum nigrum* sub-community. The community is generally distinctive with the bulk of the vegetation consisting of a mixture of

Calluna vulgaris and *Eriophorum vaginatum*. There is commonly at least a little *Vaccinium myrtillus* and / or *Avenella flexuosa*. The mosses *Hylocomium splendens*, *Polytrichum commune, Pleurozium schreberi*, *Hypnum jutlandicum* and *Sphagnum capillifolium* are collectively very abundant, forming deep and extensive moss carpets.

The blanket bog within the survey area is in relatively poor condition and has been impacted over time in several ways. Historical and ongoing impacts on blanket bog (and wet modified bog) at the survey area include livestock grazing, agricultural improvement and drainage. This is evident in some of the relatively larger patches of bogs that exhibit some severe hagg and gully features, particularly in the area south of Hirstane Rig and west of Rodger Law. It is apparent that some patches of M17 are in the processing of transitioning to M19 and/or M15, likely as a result of these grazing and drainage pressures.

Following completion of NVC surveys and the identification of NVC communities that correspond with priority peatland habitats on-site, according to NatureScot Guidance[27], further peatland condition surveys were undertaken for the Proposed Development – these are fully detailed and discussed within **Technical Appendix 6.2b (EIAR Volume 4).**

5.6.2 E1.7 Wet Modified Bog

Wet modified bog has a scattered distribution throughout the survey area and is mainly found at the lower elevations on the fringes of the survey area in the north and east. It is mostly represented by the M25a^ *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community. M25a^ being classified as wet modified bog and not marshy grassland here due to generally appearing on peat of greater than 0.5 m in depth (c.f. **Section 5.3.5**) or containing more, or higher cover of, species with affinities to blanket bog vegetation (e.g., *Eriophorum vaginatum*). In these circumstances, the M25a is denoted with a caret (i.e., M25a^). Smaller areas of M20 *Eriophorum vaginatum* blanket mire community were also noted. Both forms of wet modified bog were often found in mosaics with other bog and acid grassland communities. It mainly appears to have been derived from blanket bog through a long history of grazing that has led to the scarcity or absence of *Calluna vulgaris* in the sward.

The M25a^ area was identified due to *Molinia* overwhelmingly dominating the sward but with an associated flora containing some mire species. The majority of the subordinate and associate species found within this M25a^ assemblage were occasional *Calluna vulgaris, Eriophorum vaginatum, Erica tetralix, Vaccinium myrtillus, Eriophorum vaginatum* and patches of *Sphagnum capillifolium*.

M20 was recorded at community level only. This is mire vegetation in which tussocks of *Eriophorum vaginatum* are abundant to dominant but with little or no *Calluna vulgaris*, the scarcity or absence of *Calluna vulgaris* precludes its classification as M19. In some patches the *E. vaginatum* had experienced intense grazing pressure. Other common species found in this habitat include *Vaccinium myrtillus, Eriophorum angustifolium* and *Empetrum nigrum*. Grasses found include *Anthoxanthum odoratum*, *Agrostis capillaris*, *Nardus stricta* and *Avenella flexuosa*. The basal layer in many of these areas was wet and contained abundant *Sphagnum fallax*.

[27] NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management

5.6.3 E2.1 Acid / Neutral Flush/Spring

Acid / neutral flushes are widespread across the survey area, tending to be relatively small patches of habitat and usually following the route of watercourses. They also commonly form mosaics and transitional areas with the *Juncus* spp. dominated marshy grassland communities (**Section 5.3.5**).

The majority of this habitat is represented by M6 *Carex echinata – Sphagnum fallax/denticulatum* mire. The M6 in the survey area is predominately of the M6d *Carex echinata – Sphagnum fallax/denticulatum* mire, *Juncus acutiflorus* sub-community, however there are also frequent patches of the M6c *Juncus effusus* sub-community. The M4 *Carex rostrata - Sphagnum fallax* mire community was also recorded less frequently across the survey area. Additionally, M32a *Philonotis fontana – saxifraga stellaris, Sphagnum denticulatum* sub-community springs were recorded 12 times within the survey area (see **Annex A**).

The M6c and M6d communities are rush mires on wet ground, often following the lines of watercourses. A tall sward of *J. effusus* over a species-poor lawn of *Sphagnum fallax, S. palustre* and *Polytrichum commune* indicates the M6c sub-community; *J. acutiflorus* dominates in M6d. In many stands its extent encompasses little more than these species listed. Where other species were recorded, they tended to be of very low cover, and included typical species such as *Rumex acetosa*, *Molinia caerulea, Myosotis secunda*, *Ranunculus repens, Cirsium palustre* and *Carex* spp.

The small patches of M4 were characterised by *Carex rostrata, Carex panicea*, *Carex echinata* and *Viola palustris* with a basal layer composed of *Sphagnum fallax, Sphagnum papillosum* and *Sphagnum capillifolium*.

The M32 springs were recorded at the community level and as the M32a *Sphagnum denticulatum* sub-community. They contained typical vegetation for the community, including abundant *Philonotis fontana*, as well as *Juncus effusus, Carex panicea, Pinguicula vulgaris, Anthoxanthum odoratum, Carex echinata, Agrostis stolonifera,* and *Myosotis* sp.

5.6.4 E2.2 Basic Flush/Spring

Several basic stony flushes were found within the survey area and recorded as target notes (see **Annex A**). These flushes are represented by the M10 *Carex dioica – Pinguicula vulgaris* mire community and by one patch of M9 *Carex rostrata-Calliergon cuspidatum / giganteum* mire.

The M10 vegetation present was recorded at the community level and as the M10a *Carex viridula – Juncus bulbosus* sub-community. This includes a sward of small *Carex* spp. with *Pinguicula vulgaris, Drosera rotundifolia, Eriophorum angustifolium, Trichophorum germanicum* and the community characteristic ‘brown mosses’ such as *Scorpidium scorpioides*.

The one area of M9 was noted to belong to the M9b *Carex diandra-Calliergon giganteum* sub-community, and is located on the eastern slopes of Rodger Law. *Carex rostrata* dominates with *Carex nigra, Carex echinata, Juncus effusus, Caltha palustris*, and *Viola palustris*, with occasional *Stellaria graminea*, and the mosses *Hylocomium splendens* and *Calliergonella cuspidata*.

5.6.5 E4 Bare Peat

Bare exposed peat (ExP) is a non-NVC community within the survey area, often found in areas of peat hagging or peat pans, or peatland areas devoid of vegetation through erosion.

The patches of bare peat are predominantly found in the west of the survey area around Hirstane Rig.

5.7 Swamp, Marginal and Inundation Habitats

5.7.1 F1 Swamp

Three patches of S9 *Carex rostrata* swamp were recorded along the Daer Water corridor, which comprised pure stands of *Carex rostrata* in shallow standing water. A stand of S10 *Equisetum fluviatile* swamp, in a mosaic with S9 *Carex rostrata* swamp, was also recorded in this area.

5.8 Open Water

5.8.1 G1 Standing Water

There are two standing waterbodies (SW) within the survey area, with the larger found in the north within an excavation along a field margin. A very small area of standing water with a margin of bare peat around it is found along Kirkhope Cleuch.

5.8.2 G2 Running Water

Several watercourses of running water (RW) are present within the within the survey area and surrounding area, including many named burns, the largest of which is Daer Water, which runs along the eastern edge of the survey area.

5.9 Rock Exposure and Waste

5.9.1 I1.4.1 Acid / Neutral Exposure

Several areas of exposed rock were recorded along the steep valley sides of watercourses in the south of the survey area. Small areas of river shingle were also recorded along the edge of Daer Water. These surfaces generally almost entirely lack in vegetation.

5.10 Miscellaneous

5.10.1 J1.1 Cultivated / Disturbed Land – Arable

Cultivated/disturbed land - Arable is a non-NVC community (AR) which represents two fields in the north of the survey area which contained a turnip crop at the time of the survey.

5.10.2 J1.2 Cultivated / Disturbed Land – Amenity Grassland

Amenity grassland is a non-NVC community used here for private gardens (PG) within the survey area. Most commonly these areas form lawns within the curtilage of private properties and in some instances may include scattered trees and hedges.

5.10.3 J3.6 Buildings

Buildings (BD) is a non-NVC community to identify buildings or built-up structures within the survey area, both inhabited and vacant, such as private dwelling houses and outbuildings / sheds.

5.10.4 J4 Bare Ground

Bare ground (BG) is a non-NVC community within the survey area and includes existing tracks, hardstanding and public roads. Any areas that were devoid of vegetation and that could not be classified as any other habitat are also included here.

5.11 Invasive Non-Native Species

No Invasive Non-Native Species (INNS) were incidentally recorded during the habitat surveys; however, this does not preclude their presence from the survey area.

5.12 Notable Species

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

6.0 Evaluation of Botanical Interest

6.1 Overview

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

- Scottish Environment Protection Agency (SEPA) guidance on Groundwater Dependent Terrestrial Ecosystems (GWDTEs)[3]**Error! Bookmark not defined.**;
- Habitats Directive (92/43/EEC) Annex I habitats[2]; and
- Scottish Biodiversity List (SBL) priority habitats[4].

6.2 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2024[3]). Many of the NVC communities on the list are very common habitat types across Scotland, and some are otherwise generally of low ecological value. 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 the hydrology assessment (see **Chapter 8: Hydrology, Hydrogeology, Geology and Soils, EIAR Volume 2**).

Using SEPA's (2024)[3] guidance, **Table 6-1** shows which communities recorded within the survey area may be considered a potential GWDTE.

Table 6-1 Communities within the survey area which may potentially be classified as GWDTE

NVC Code	NVC Community Name
W4	*Betula pubescens – Molinia caerulea* woodland
W7	*Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland

NVC Code	NVC Community Name
M4	*Carex rostrata - Sphagnum fallax* mire
M6	*Carex echinata – Sphagnum fallax/denticulatum* mire
M9	*Carex rostrata – Calliergon cuspidatum/giganteum* mire
M10	*Carex dioica - Pinguicula vulgaris* mire
M15	*Trichophorum germanicum – Erica tetralix* wet heath
M23	*Juncus effusus/acutiflorus – Galium palustre* rush pasture
M27	*Filipendula ulmaria – Angelica sylvestris* mire
M32	*Philonotis fontana – Saxifraga stellaris* spring
MG9	*Holcus lanatus – Deschampsia cespitosa* grassland
MG10	*Holcus lanatus – Juncus effusus* rush pasture
CG10	*Festuca ovina – Agrostis capillaris – Thymus polytrichus* grassland
U6	*Juncus squarrosus – Festuca ovina* grassland
U16	*Luzula sylvatica – Vaccinium myrtillus tall-herb* community
Je[28]	*Juncus effusus* acid grassland
Ja[28]	*Juncus acutiflorus* acid grassland
MG10(Ja)[28]	*Juncus acutiflorus* neutral grassland/rush pasture
Mx[29]	*Carex* spp. neutral sedge mire

The location and extent of all identified potential GWDTE are provided on **Figure 6.4 (EIAR Volume 3a)**.

Within **Figure 6.4 (EIAR Volume 3a)**, where relevant, the potential GWDTE classification of each polygon is classified as follows:

- 'Dominant' where potential GWDTE(s) dominate the polygon (i.e., >50% coverage);
- 'Sub-dominant' where potential GWDTE(s) make up a sub-dominant percentage cover of the polygon (1-50% coverage); and

GWDTE potential has been assigned solely on the SEPA listings (SEPA, 2024[3]). However, depending on a number of factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependant on groundwater. Determining the actual groundwater dependency of particular areas or habitat requires further assessment (see **Chapter 8: Hydrology, Hydrogeology, Geology and Soils, EIAR Volume 2**).

[28] In light of the SEPA classification on potential GWDTEs the non NVC types Je, Ja and MG10(Ja) should also qualify for potential GWDTE status; keeping in line with other similar *Juncus* spp. dominated grassland communities (e.g., MG10).

[29] In light of the SEPA classification on potential GWDTEs the non NVC type 'Mx' should also qualify for potential GWDTE status; keeping in line with the species description in Section 5.3.5 above, which shows its similarity to M23 rush-pasture.

6.3 Annex I Habitats

6.3.1 Overview

A number of NVC communities can also correlate to 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 constitute Annex I habitat. The Annex I status can depend on various factors such as quality, extent, species assemblages, geographical setting and substrates.

Using JNCC Annex I habitat listings and descriptions[30] and comparing these with the survey results and field observations, the following NVC communities within the survey area which constitute Annex I habitat have been determined and these are shown in **Table 6-2**.

Table 6-2 Annex 1 Habitats and corresponding NVC communities

Annex 1 Habitat	Corresponding NVC Communities & Other Non-NVC Habitats / Features Recorded
4010 North Atlantic wet heaths with *Erica tetralix*	M15 *Trichophorum germanicum – Erica tetralix* wet heath
4030 European dry heaths	H9 *Calluna vulgaris - Avenella flexuosa* heath H18 *Vaccinium myrtillus – Avenella flexuosa* heath
4060 Alpine and boreal heaths	H14 *Calluna vulgaris – Racomitrium lanuginosum* heath
6230 Species-rich *Nardus* grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe)	CG10 *Festuca ovina – Agrostis capillaris – Thymus polytrichus* grassland
7130 Blanket bog	M2 *Sphagnum cuspidatum/fallax* bog pool community M3 *Eriophorum angustifolium* bog pool community M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire M20 *Eriophorum vaginatum* blanket mire M25^ *Molinia caerulea – Potentilla erecta* mire
7140 Transition mires and quaking bogs	M4 *Carex rostrata - Sphagnum fallax* mire
7230 Alkaline fens	M9 *Carex rostrata – Calliergon cuspidatum/giganteum* mire M10 *Carex dioica - Pinguicula vulgaris* mire

Further details on the inclusion or omission of certain NVC communities / sub-communities and / or Annex I types are also provided below.

6.3.2 7130 Blanket Bog

The blanketing of the ground with a variable depth of peat gives the 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, particularly

[30] Available at: https://sac.jncc.gov.uk/habitat/

illustrated by the variety of patterning of the bog surface in different parts of the UK. 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.

Annex I type 7130 Blanket bog therefore correlates directly with a number of NVC communities within the survey area such as the M17, M19 and M20 mires. However, 7130 Blanket bog can also include bog pool communities (M1 to M3) where these occur within blanket mires such as M17 to M20. As such M2 and M3 within the survey area are also assigned to the blanket bog Annex I type, as they are often associated with areas of M17, M19 and M20 mire.

As noted above, M25 mire can also fall within the blanket bog Annex I type, usually where the underlying peat depth is greater than 0.5 m and the habitat is wet and contains peat forming species. These areas (denoted here as M25a^ - see Section 5.6.2) have also been classified as potential Annex I blanket bog, to represent a worst-case scenario.

Further to the NVC survey, surveys of the peatland and a peatland condition assessment were also carried out for the Proposed Development and are detailed in **Technical Appendix 6.2b (EIAR Volume 4)**.

6.3.3 7140 Transition mires and quaking bogs

All examples of M4 *Carex rostrata - Sphagnum fallax* mire within the survey area were assigned to the Annex I type Transition mires and quaking bogs. The term 'transition mire' relates to vegetation that in floristic composition and general ecological characteristics is intermediate between acid bog and alkaline fen.

6.3.4 7230 Alkaline fens

Alkaline fens consist of a complex assemblage of vegetation types, characteristic of sites where there is tufa and / or peat formation with an elevated water table and a calcareous base-rich water supply. The core vegetation is short sedge mire. All examples of M9 and M10 mire in the survey area are considered to fall within this Annex I habitat type.

6.3.5 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. All examples of M15 wet heath were included within the 4010 Northern Atlantic wet heaths category.

6.3.6 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 dry heath communities recorded – H9 and H18 – both fall within this Annex I type. These NVC types can also be included within the Annex I type H4060 Alpine and Boreal heaths, but only where they are at higher altitudes and include arctic-alpine floristic elements. The patches of H9 and H18 within the survey area are lower altitudinal examples so they all fall under the 4030 European dry heaths Annex I type.

6.3.7 4060 Alpine and boreal heaths

Alpine heaths develop above the natural altitudinal tree-line, and boreal heaths below the tree-line in gaps among scrubby high-altitude woods or as replacements for those subalpine woods historically lost due to grazing and burning. On lower slopes, boreal heaths grade into floristically-similar 4030 European dry heaths. The dominant plants are usually dwarf-shrubs such as *Calluna vulgaris, Vaccinium myrtillus* or *Juniperus communis*, which are low-growing or prostrate owing to exposure to high winds or prolonged snow cover at moderately high altitudes.

Alpine and boreal heaths occur on acid rocks on mountains, both on exposed lower summits and ridges and on sheltered slopes. Exposure or snow-lie, which suppress the growth of dwarf-shrubs, also favours the growth of characteristic lichens and bryophytes. Some of these heath types are particularly susceptible to disturbance, especially by fire or trampling. The small patches of H14 heath present within the survey area falls into alpine heaths.

6.3.8 6230 Species-rich *Nardus* grassland on siliceaous substrates in mountain areas

Species-rich *Nardus* grasslands on siliceous substrates in mountain areas (and submountain areas in continental Europe) tend to develop where there is flushing through base-rich strata on siliceous bedrock. These may include moderately base-rich metamorphic and igneous rocks. Species-rich *Nardus* grasslands on limestone are excluded from the definition of this Annex I habitat because limestone lacks silica. Two main types of grassland belonging within the species-rich *Nardus* grassland Annex I habitat occur in the UK: CG10 *Festuca ovina – Agrostis capillaris – Thymus polytrichus* grassland and CG11 *Festuca ovina – Agrostis capillaris – Alchemilla alpina* grassland. This Annex I type is of relatively low cover within the survey area and is accounted for by some small areas of CG10 (see Section 5.3.3 above).

6.3.9 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

This Annex I type comprises woods dominated by *Alnus glutinosa* and *Salix* spp. on floodplains in a range of situations from islands in river channels to low-lying wetlands alongside the channels. The habitat typically occurs on moderately base-rich, eutrophic soils subject to periodic inundation. Many such woods are dynamic, being part of a successional series of habitats. Their structure and function are best maintained within a larger unit that includes the open communities, mainly fen and swamp, of earlier successional stages. On the drier margins of these areas other tree species such as *Fraxinus excelsior* and *Ulmus* spp., may become abundant. In other situations, the *Alnus glutinosa* woods occur as a stable component within transitions to surrounding dry-ground forest.

The ground flora is correspondingly varied. Some stands are dominated by tall herbs, reeds and sedges, with species such as *Urtica dioica*, *Phragmites australis*, *Carex paniculata* and *Filipendula ulmaria*. Other stands have lower-growing communities with *Ranunculus repens*, *Galium palustre*, *Chrysosplenium oppositifolium* and *Caltha palustris*.

In the UK this Annex I habitat falls mainly within the W2a, W5, W6 and W7 NVC types. Riparian trees are excluded from the Annex I type except where these form part of a wider network of alluvial woodland and wetland communities.

A few areas of W7 woodland are present within the survey area, although all stands are either thin strips of riparian trees or of planted origin away from floodplains or the appropriate setting for this Annex I type. As a result, no stands of W7 woodland within the survey area were considered to possibly belong to this Annex I habitat type.

6.3.10 91D0 Bog woodland

Under certain combinations of physical circumstances, scattered trees can occur across the surface of a bog in a relatively stable ecological relationship as open woodland, without the loss of bog species. This true bog woodland is much rarer than the progressive invasion of bogs by trees through natural colonisation or afforestation following changes in the drainage pattern which leads eventually to the loss of the bog vegetation.

Secondary *Betula* spp. woodland on degraded bogs, and woodland encroachment resulting from falling water tables, are excluded from the Annex I definition. A few NVC types (e.g., W3, W4c and W18) could fall within this Annex I type, but none of these communities within the survey area were considered to be Annex I Bog woodland. Within the survey area, trees found within mire habitats were due to *Betula* spp. and scrub invasion of drying mire surfaces.

6.3.11 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

This habitat type comprises a range of woodland types dominated by mixtures of *Quercus* spp. and *Betula* spp. It is characteristic of base-poor soils in areas of at least moderately high rainfall in northern and western parts of the UK. The habitat corresponds particularly to NVC types W10e, W11, W16b and W17.

One stand of W11 was recorded within the survey area, but it was not deemed to be of Annex I status because the canopy consisted entirely of *Sorbus aucuparia*, with no *Betula* spp. or *Quercus* spp. and it generally lacks any characteristics such as a rich bryophyte assemblage which would refer to it as ‘old sessile oak woods’.

6.4 Scottish Biodiversity List Priority Habitats

The SBL[4] 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 2004.

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 many NVC types.

The relevant SBL priority habitat types (full descriptions of which can be found on the NatureScot website[31]), and associated NVC types recorded within the survey area are as follows:

- Wet woodland: W7;
- Blanket bog: M17, M19, M20, M25a^, M2 and M3 (M2 and M3 where associated with M17, M19, M20);
- Upland flushes, fens and swamps: M4, M6, M9, M10, M23a, M32 and Mx;
- Upland heathland: M15, H9, H18;
- Mountain heaths and willow scrub: H14;
- Upland calcareous grassland: CG10; and

[31] https://www.nature.scot/scotlands-biodiversity/habitat-definitions

- Lowland fens: M27, S9, S10.

These SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats[32].

6.5 Sensitivity Summary

Table 6-3 provides a summary of all the NVC communities and non-NVC types recorded within the survey area and any associated habitat sensitivities as described in the sections above.

Table 6-3 Summary of survey area communities and sensitivities

NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat	SBL Priority Habitat Type
Mires & Wet Heath			
M2	n/a	7130 Blanket bogs (examples associated with M17-M20)	Blanket bog
M3	n/a	7130 Blanket bogs (examples associated with M17-M20)	Blanket bog
M4	Yes	7140 Transition mires and quaking bogs	Upland flushes, fens and swamps
M6c, M6d	Yes	n/a	Upland flushes, fens and swamps
M9b	Yes	7230 Alkaline fens	Upland flushes, fens and swamps
M10	Yes	7230 Alkaline fens	Upland flushes, fens and swamps
M15, M15a, M15b, M15c, M15d	Yes	4010 Northern Atlantic wet heaths with *Erica tetralix*	Upland heathland
M17, M17a, M17b, M17c	n/a	7130 Blanket bogs	Blanket bog
M19, M19a, M19b	n/a	7130 Blanket bogs	Blanket bog
M20	n/a	7130 Blanket bogs	Blanket bog
M23a, M23b	Yes	n/a	Upland flushes, fens and swamps (applies to M23a only)
M25, M25a, M25b, M25a^	n/a	7130 Blanket bogs (where peat depth >0.5 m)	Blanket bogs (where peat depth >0.5 m)
M27, M27a	Yes	n/a	Lowland fens
M32, M32a	Yes	n/a	Upland flushes, fens and swamps
Dry Heaths			
H9	n/a	4030 European dry heaths	Upland heathland

[32] http://jncc.defra.gov.uk/page-5718

NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat	SBL Priority Habitat Type
H14	n/a	4060 Alpine and boreal heaths	Mountain heaths and willow scrub
H18, H18a, H18b	n/a	4030 European dry heaths	Upland heathland
Calcifugous Grasslands			
U4, U4a, U4b	n/a	n/a	n/a
U5, U5a, U5b	n/a	n/a	n/a
U6, U6a	Yes	n/a	n/a
U16, U16c	Yes	n/a	n/a
Mesotrophic Grasslands			
MG1, MG1c	n/a	n/a	n/a
MG6	n/a	n/a	n/a
MG9	Yes	n/a	n/a
MG10a	Yes	n/a	n/a
Calcicolous Grasslands			
CG10, CG10a	Yes	6230 Species-rich *Nardus* grassland, on siliceous substrates in mountain areas	Upland calcareous grassland
Woodland & Scrub			
W4, W4a	Yes	n/a	n/a
W7	Yes	n/a	Wet woodland
W11, W11a	n/a	n/a	n/a
W21	n/a	n/a	n/a
Swamps & Tall-Herb Fens			
S9	n/a	n/a	Lowland fens
S10	n/a	n/a	Lowland fens
Vegetation of Open Habitats			
OV25	n/a	n/a	n/a
OV27	n/a	n/a	n/a
Non-NVC Types			
AR	n/a	n/a	n/a
BD	n/a	n/a	n/a
BG	n/a	n/a	n/a
CF>	n/a	n/a	n/a
CP	n/a	n/a	n/a
ExP	n/a	n/a	n/a
Je	Yes	n/a	n/a

NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat	SBL Priority Habitat Type
Ja	Yes	n/a	n/a
MG10(Ja)	Yes	n/a	n/a
Mx	Yes	n/a	Upland flushes, fens and swamps
PG	n/a	n/a	n/a
RK	n/a	n/a	n/a
RW	n/a	n/a	n/a
SBT	n/a	n/a	n/a
SCT	n/a	n/a	n/a
SW	n/a	n/a	n/a
YBP	n/a	n/a	n/a
YCP	n/a	n/a	n/a

7.0 Summary

MacArthur Green (now SLR) carried out NVC and habitat surveys within the survey area from 19 June to 22 June 2023 inclusive, 9 September to 11 September 2024 inclusive, 5 and 6 June 2025 and 17 July 2025 in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 34 NVC communities were recorded within the respective survey area along with various associated sub-communities; 18 non-NVC habitat types were also present.

The survey area is mainly open upland habitats, the most common and widespread making up the bulk of the landscape are:

- wet heath of the M15 *Trichophorum germanicum – Erica tetralix* community;
- acid grassland of the U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* and U5 *Nardus stricta – Galium saxatile* communities;
- marshy grassland of the M25 *Molinia caerulea – Potentilla erecta* community; and
- blanket bog of the M17 *Trichophorum germanicum – Eriophorum vaginatum* and M19 *Calluna vulgaris-Eriophorum vaginatum* communities.

Breaking up the expanses of mire and wet heath are patches and pockets of other habitat types such as wet modified bog, acid / neutral flushes, unimproved calcareous grassland, broadleaved plantation woodland and dry dwarf shrub heath.

Although some large relatively homogeneous stands of vegetation occur, most of the communities often form complex mosaics and transitional areas across the survey area.

The survey results have also been compared to a number of sensitivity classifications, indicating the presence of Annex I, SBL and potential GWDTE habitats, and this is summarised in **Table 6-3**.

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ANNEX A NVC Target Notes

A number of target notes were also made during surveys, often to pinpoint springs / flushes, or an area or species of interest. These target notes are shown on **Figure 6.3 (EIAR Volume 3a)** and detailed within **Table A-1** below. A representative sample of corresponding target note photographs is provided in **Annex B**.

Table A-1 Survey Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Figure Reference (Photo Reference)
1	295547	605024	M10	Dominant species are *Pinguicula vulgaris*, *Eriophorum angustifolium*, *Drosera rotundifolia*, *Trichophorum germanicum* and the moss *Scorpidium scorpioides*.	6.3.15 (Photo B-1)
2	295537	605020	M10	M10 flush.	6.3.15
3	294526	604660	M32a	*Philonotis fontana*, *Juncus effusus*, *Carex panicea*, *Pinguicula vulgaris*, *Anthoxanthum odoratum, Carex echinata*, *Agrostis stolonifera*, *Myosotis* sp.	6.3.15 (Photo B-2)
4	294479	604738	M32a	*Philonotis fontana*, *Juncus effusus*, *Carex panicea*, *Pinguicula vulgaris*, *Anthoxanthum odoratum, Carex echinata*, *Agrostis stolonifera*, *Myosotis* sp.	6.3.15
5	294467	604813	M32a	M32 spring.	6.3.15
6	293651	604668	N/A	Area within SSSI dominated by *Nardus stricta*, with abundant *Galium saxatile, Vaccinium myrtillus* and *Polytrichum commune*, and occasional *Juncus squarrosus*, *Agrostis capillaris, Anthoxanthum odoratum*.	6.3.14
7	295037	605347	N/A	Pool with no Sphagna.	6.3.12
8	295716	605567	N/A	Area with pronounced peat hagging.	6.3.12
9	295223	605440	N/A	Peat hagging in area.	6.3.12
10	295155	605416	M2	Dried out with *Eriophorum vaginatum*, *Sphagnum cuspidatum*, *S. fallax*, very occasional *Calluna vulgaris*.	6.3.12 (Photo B-3)
11	295090	605874	M32a	M32 spring.	6.3.12
12	293862	605762	N/A	Peat hagging across this area.	6.3.11
13	295327	606196	N/A	Peat hagging along ridge top.	6.3.12

Target Note ID	Easting	Northing	NVC Community	Description	Figure Reference (Photo Reference)
14	296335	606405	M10	M10 flush.	6.3.13
15	295528	606872	M32a	M32 spring.	6.3.9
16	294650	606699	M32a	M32 spring.	6.3.9
17	293821	606515	N/A	Peat hagging in area.	6.3.11
18	294196	606906	M32a	Narrow spring head which follows a thin seepage line downhill.	6.3.8
19	295725	607630	M32a	M32 spring.	6.3.9
20	295190	604711	N/A	Scattered mature *Sorbus aucuparia* and *Betula* spp. along Carsehope Burn.	6.3.15 (Photo B-4)
21	295435	604287	M32	Bryophyte and herb-rich spring, measuring approximately 3x15 m.	6.3.15
22	295043	603789	M32	Bryophyte and herb-rich spring, measuring approximately 1x20 m.	6.3.17
23	295440	603682	M32	Bryophyte and herb-rich spring, measuring approximately 1.5x10 m.	6.3.17
24	296442	602973	N/A	Two mature *Fraxinus excelsior* along old drystone dyke.	6.3.18
25	295073	607698	M32	Large patch of M32 vegetation, around 3x15 m in area.	6.3.9
26	295224	608563	M10	Around 1x5 m in area.	6.3.7
27	295413	608650	M10	Around 1x6 m in area.	6.3.7
28	296700	609786	W21	Hawthorn hedgerow between fields.	6.3.5 (Photo B-5)
29	295713	612726	W21	Hawthorn hedgerow between fields.	6.3.1
30	295601	612863	W21	Hawthorn hedgerow between fields.	6.3.1

ANNEX B Target Note Photographs

The following photographs correlate to the target notes described within **Annex A**, **Table A-1**. Photographs are not provided here for all target notes, due to the similarity in many photographs.

Photo B-1 Target Note 1 – M10 Flush

Photo B-2 Target Note 3 – M32a Spring

Photo B-3 Target Note 10 – Dried Out M2 Bog Pool

Photo B-4 Target Note 20 – Scattered Broadleaved Trees

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Photo B-5 Target Note 28 – Hawthorn Hedgerow

ANNEX C General Community Photographs

The following selected photographs are provided to give a visual representation to a number of the community types and features present within the survey area.

Photo C-1 CG10a *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland *Trifolium repens-Luzula campestris* sub-community

Photo C-2 M15b *Trichophorum germanicum – Erica tetralix* wet heath Typical sub-community with peat hagging

Photo C-3 M4 *Carex rostrata - Sphagnum fallax* mire

Photo C-4 M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire, with young scattered conifer and broadleaved trees throughout

Photo C-5 H18a *Vaccinium myrtillus – Avenella flexuosa* heath *Hylocomium splendens – Rhytidiadelphus loreus* sub-community

Photo C-6 M25a *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community

Photo C-7 Degraded and heavily grazed M17c *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Juncus squarrosus-Rhytidiadelphus loreus* sub-community

Photo C-8 M17b *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Cladonia* spp. sub-community, with extensive peat hagging

Photo C-9 Peat hagg and gully erosion present south of Hirstane Rig

Photo C-10 Peat hagg and gully erosion through to underlying substrata

Photo C-11 M6c *Carex echinata – Sphagnum fallax / denticulatum* mire, *Juncus effusus* sub-community in steep gully

Photo C-12 U5 *Nardus stricta – Galium saxatile* grassland community

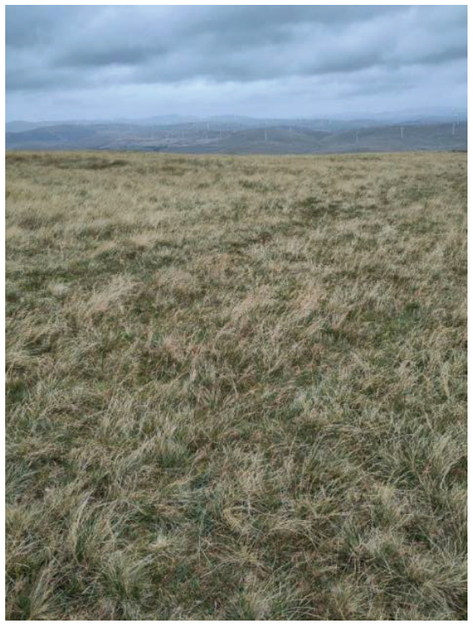

Photo C-13 W4(p) *Betula pubescens – Molinia caerulea* woodland of planted origin

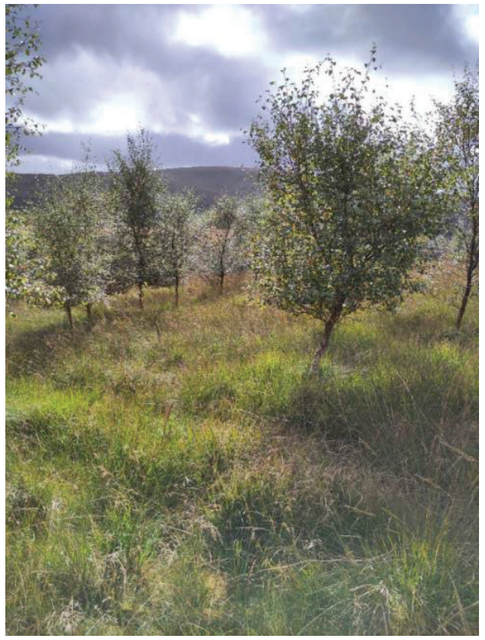

Photo C-14 MG1c *Arrhenatherum elatius* grassland *Filipendula ulmaria* sub-community

Photo C-15 M25a^ *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community on peat greater than 0.5 m in depth

Photo C-16 M17a *Trichophorum germanicum – Eriophorum vaginatum* blanket mire *Drosera rotundifolia - Sphagnum* spp. sub-community

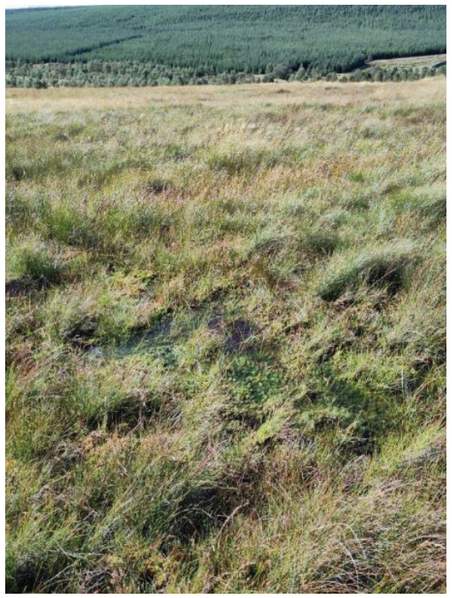

Photo C-17 M20 *Eriophorum vaginatum* blanket mire community

Photo C-18 U4b track verge within *P. sitchensis* plantation along the Western Access

Technical Appendix 6.2b: Peatland Condition Assessment Survey Report

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1.0 Introduction

Following completion of NVC surveys (refer to **Technical Appendix 6.2a (EIAR Volume 4)** and the identification of priority peatland communities on-site, according to NatureScot Guidance[1], further peatland condition assessment (PCA) surveys were undertaken for the Proposed Development.

The PCA survey aims to provide additional information and context with regards peatlands, and to identify and map the condition of peatland habitats within the Site. This information is used to inform the design process for the Proposed Development and the ecological assessment for the Watchman Energy Park Environmental Impact Assessment (EIA) Report (EIAR).

2.0 Study Area

The PCA Study Area covered areas in a 300 m buffer around all proposed infrastructure and tracks where the NVC surveys (refer to **Technical Appendix 6.2a, EIAR Volume 4**) recorded habitat as E1.6.1 blanket bog, E1.7 wet modified bog, D2 wet dwarf shrub heath, E4 bare peat, and mosaics containing these same habitat types (see **Figure 6.5, EIAR Volume 3a** for the area surveyed).

3.0 Sampling Strategy

Sampling and survey locations were distributed as follows:

- on a 200 m grid across the PCA Study Area;
- a sample at each turbine location; each of the two borrow pits; BESS compound footprint, or other construction or substation compounds regardless of prevailing habitat type; and
- a sample every 250 m along proposed new tracks within the PCA Study Area.

This resulted in the generation of a total of 123 PCA sample locations, as shown on **Figure 6.5 (EIAR Volume 3a)**.

4.0 Survey Methodology

MacArthur Green (now SLR Consulting Limited[2]) has developed a bespoke PCA methodology to gather a range of pertinent data relating to peatland condition, taking cognisance of NatureScot's relevant guidance and template for assessment of peatlands[3], Peatland Action condition criteria and guidance[3], JNCC guidelines on the selection of biological SSSIs[4], and other likely relevant variables from professional judgement and experience.

At each sample location the following data was collected:

[1] NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management.

[2] Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

[3] https://www.nature.scot/doc/peatland-action-peat-depth-and-peat-condition-survey-guidance-and-recording-form-guidance

[4] JNCC (1994). Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 8 Bogs. JNCC, Peterborough https://hub.jncc.gov.uk/assets/20534790-bb45-4f33-9a6c-2fe795fb48ce

1 The most applicable or best-fit category of the ten Peatland Action Peatland Condition Categories[3];

2 In a 30 m sample area around the survey location the following data was collected:

a) Presence / absence of manmade drains, if present then:

i. Whether they are open or occluded; and

ii. If they have eroded through to the underlying substrate.

b) Presence / absence of peat cutting;

c) Presence / absence of a natural surface pattern;

d) Presence / absence of wood/scrub invasion;

e) Presence / absence of Sphagna-rich ridges, if present then:

i. DAFOR[5] scale to indicate abundance.

f) Presence / absence of *Sphagnum-Betula nana* ridges;

g) Presence / absence of *Sphagnum fuscum / S. austinii* hummocks;

h) Presence / absence of peat mounds;

i) Presence / absence of *Rhynchospora fusca*;

j) Presence / absence of bog pools;

k) Presence / absence of muirburn, if present then:

i. Severity of muirburn – High, Moderate or Low.

l) Presence of bare peat in m^2 (0, 0 to 0.5, 0.5 to 2, or >2);

m) Presence / absence of peat haggs and / or gullies, if present then:

i. Is there erosion through to the underlying substrates.

n) Presence / absence of peat pans;

o) Evidence of large herbivore grazing, trampling or ground poaching;

p) Impact level of any *Calluna vulgaris* / other dwarf shrub browsing – High, Moderate or Low.

3 To determine the cover of peat forming species, or other particular indicator species, at each sample a 2 m x 2 m quadrat was sampled to determine the following:

a) Approximate percentage cover of the following species – *Calluna vulgaris, Eriophorum vaginatum, Eriophorum angustifolium, Trichophorum germanicum, Molinia caerulea, Vaccinium myrtillus, Juncus* spp., and grasses;

b) The presence / absence of *Erica tetralix, Empetrum nigrum, Vaccinium vitis-idaea, Vaccinium oxycoccos, Drosera* spp., *Rubus chamaemorus* and *Betula nana*;

c) In the basal layer the approximate percentage cover of the following – bare ground/peat, Sphagna, *Cladonia* spp. lichens, *Racomitrium lanuginosum, Polytrichum commune*, and other non-*Sphagnum* mosses; and

d) *Sphagnum* spp. present.

[5] DAFOR = Dominant, Abundant, Frequent, Occasional, Rare.

4 Notes – any further notes or sample location specific information relevant to peatland condition.

4.1 Survey Dates

PCA surveys were undertaken on the 16 and 17 July 2025.

5.0 Results and Discussion

5.1 Peatland Action Peatland Condition

Table 1 details the number of survey samples that fell within each Peatland Action Condition Category recorded during surveys (N.B. only categories that were recorded are shown). The results are also displayed on **Figure 6.5 (EIAR Volume 3a)**.

Table 1 Peatland Action Condition Category

Peatland Action Condition Category	Number of Samples	% of Samples
Actively Eroding	1	0.8
Actively Eroding: Hagg/Gully	14	11.4
Drained: Artificial	4	3.3
Forested / Previously Forested	1	0.8
Modified	67	54.5
N/A (not peatland)	36	29.3
Total	**123**	**100.1**[6]

As can be seen from **Table 1,** the most common peatland condition category within the study area is 'Modified'. However, collectively the drained and actively eroding categories account for a notable number of peatland samples (n = 19).

Overall, these results indicate much of the peatland within the study area is degraded or actively eroding (see also Photographs in **Annex A**). No 'Near-natural' peatland was recorded. Further information on the nature of the peatland present and its condition is presented below.

5.2 Peatland Condition Variables

Of the 123 survey locations sampled in the PCA survey, 36 were not regarded as being present on peatland due to the presence of extensive peatland / non-peatland habitat mosaics and are therefore excluded from the following analyses (these excluded samples tended to fall within areas of acid grassland). Of the 87 peatland samples the following summary information has been gathered from the data:

- Manmade drains were recorded at just four sample locations and were widely scattered, with no obvious or systematic intensive historic moor grip drainage evident. Of these four drains, two were considered open and two were occluded. Neither of the open drains were cut through to the underlying substrates.
- There is no evidence of peat cutting within the study area.

[6] Due to rounding, the percentage total may not add to 100%.

- No areas were considered to have a natural surface pattern (as per JNCC, (1994)[7]).
- Only one sample location showed evidence of woodland and scrub invasion. This was in the north of the Site along the Eastern Access. Several young *Betula* spp. and *Salix cinerea* have encroached into the plot from the nearby planted broadleaved woodland.
- Sphagna-rich ridges were considered present at only 15 of the 87 peatland samples. However, when present they were not abundant nor extensive, but were often comprised of patches of a single common species (see further analysis below regarding *Sphagnum* ssp.). In terms of abundance the following additional data was recorded at each relevant sample location using the DAFOR scale, indicating the general lack of abundant Sphagna-rich ridges:
  - Dominant – 0 samples;
  - Abundant – 1 sample;
  - Frequent – 1 sample;
  - Occasional – 5 samples; and
  - Rare – 8 samples.
- None of the following were recorded at sample locations or incidentally throughout the study area - *Sphagnum-Betula nana* ridges, *Sphagnum fuscum / S. austinii* hummocks, peat mounds, or *Rhynchospora fusca*.
- Bog pools were recorded at 6 of the 87 peatland sample locations. As noted in **Technical Appendix 6.2a (EIAR Volume 4)** some isolated M2 and M3 bog pools were recorded during the NVC surveys.
- There was no evidence of recent muirburn within the study area.
- Bare peat was recorded at 19 sample locations (six samples of 0 to 0.5 m^2, four samples 0.5 to 2 m^2 and nine samples >2 m^2).
- Peat hags and/or gully was recorded at 15 sample locations (four samples are through to underlying substrate). The samples were clustered in the severely eroding and deeper peatland south and south-east of Hirstane Rig; see **Figure 6.5 (EIAR Volume 3a)**.
- No peat pans were recorded at the Site.
- Evidence of grazing, trampling or poaching by large herbivores (i.e., deer, cattle and sheep) was present throughout the study area, with this impact recorded at all 87 peatland sample locations. Where *Calluna vulgaris* or other dwarf shrubs were present at a sample location (n = 85) an assessment was made as to the level of browsing impact (using several criteria contained within MacDonald *et al*. (1998)[8]). The results indicated that grazing impact was **High** at 19 samples, **Moderate** at 37 samples and **Low** at 29 samples (N.B. grazing impacts where generally high in the non-peatland samples as these areas tend to be areas of habitats such as acid grassland which are more suitable for grazing and tend to be preferentially grazed by livestock in comparison to peatland / bog habitats). Given the abundance,

[7] Joint Nature Conservancy Council (JNCC). (1994). Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 8 Bogs. JNCC, Peterborough https://hub.jncc.gov.uk/assets/20534790-bb45-4f33-9a6c-2fe795fb48ce

[8] MacDonald, A., Stevens, P., Armstrong, H., Immirzi, P. and Reynolds, P. (1998). A Guide to Upland Habitats, Surveying Land Management Impacts. Volume 2 - The Field Guide. Scottish Natural Heritage, Battleby.

distribution, height and character of the dwarf shrubs present within the study area (see **Section 5.3** below) it is likely the Site has a long history of intensive upland grazing and which may have been higher in the past, which has resulted in the current baseline of relatively sparse and low growing dwarf shrub cover.

5.3 Peat Forming Vegetation and Indicator Species

The following tables set out the data collected in relation to the various parts of the survey methodology described in **Section 4.0** above:

- **Table 2** presents the data on certain species abundance and cover as per part 3a[9] of the survey methodology;
- **Table 3** summarises the data collected as part of 3b[10] of the survey methodology;
- **Table 4** presents the information gathered as part of 3c[11] of the survey methodology; and
- **Table 5** summarises the data collected as part of 3d[12] of the survey methodology.

The abundance and distribution of some of the key and most common peatland vascular species, i.e., *Calluna vulgaris, Eriophorum vaginatum*, *Trichophorum germanicum* and *Molinia caerulea* is shown in **Table 2**.

Calluna vulgaris is generally of low abundance and cover within the Site, and where present it tends to be low growing and never more than 1 to 2 decimetres tall. It was recorded at 33 of 87 quadrats, although only three quadrats recorded 50% cover or more; these were located in the southwest of the study area near Hirstane Rig and generally correlated with currently less grazed areas of M17 communities.

Eriophorum vaginatum was recorded at 40 of 87 quadrats, again cover was often relatively low, with just 16 quadrats with an estimated cover of 30% or more. Areas with higher abundance of *Eriophorum vaginatum* generally corresponded to the areas of M17 or M20 mires.

Trichophorum germanicum was recorded at 55 of 87 quadrats, with 21 quadrats recorded 30% cover or more; this species was common in both bog and wet heath communities.

Molinia caerulea is commonplace and was recorded at 52 of 87 quadrats, where the cover was often relatively high, with 34 quadrats with an estimated cover of 30% or more. Other typical mire species such as *Eriophorum angustifolium* were generally frequently present but in low cover.

As per **Table 3**, *Betula nana* was not recorded in the study area. *Vaccinium oxycoccos* was only recorded at one quadrat (1.1% of peatland samples), with *Drosera* spp. and *Vaccinium vitis-idaea* only recorded at three and four quadrats (3.4% and 4.6% of peatland samples, respectively). *Rubus chamaemorus* and *Erica tetralix* were slightly more frequent across the study area, with both being present in 11 quadrats each (12.6% of peatland samples). *Empetrum nigrum* was recorded at 16 quadrats (18.4% of peatland samples).

[9] Approximate percentage cover of the following species – *Calluna vulgaris, Eriophorum vaginatum, Eriophorum angustifolium, Trichophorum germanicum, Molinia caerulea, Vaccinium myrtillus, Juncus* spp., and grasses.

[10] The presence / absence of *Erica tetralix, Empetrum nigrum, Vaccinium vitis-idaea, Vaccinium oxycoccos, Drosera* spp., *Rubus chamaemorus* and *Betula nana*

[11] In the basal layer the approximate percentage cover of the following – bare ground/peat, Sphagna, *Cladonia* spp. lichens, *Racomitrium lanuginosum, Polytrichum commune*, and other non-*Sphagnum* mosses

[12] *Sphagnum* spp. present.

Sphagna are of great importance to the development and maintenance of many mires. They are often the major peat-forming species due to their high resistance to decomposer microbes (Lindsay, 1995[13]) and they also help to create the characteristically acidic environment of mires (Clymo, 1963[14]). They also contribute to the regulation of the water balance of a mire's surface, through the storage of water and a 'mulching' effect during dry periods with a capacity for 'bleaching' when drought-stressed which helps to reflect solar radiation (Wheeler and Shaw, 1995[15]). Sphagna are adapted to various ecological niches, particularly in relation to the water table. For instance, *Sphagnum capillifolium* commonly grows some way above the water table and can persist in relatively dry situations, *Sphagnum papillosum* and *Sphagnum medium* grow just above the water table are indicative of better-quality mire habitat due to their low tolerance to dry conditions and requirement to be close to the water table throughout the year, and species such as *Sphagnum cuspidatum* usually grow in the water or close to it (Clymo, 1983[16]). *Sphagnum papillosum* is the least resistant to desiccation and generally requires a persistently wet mire surface (Clymo, 1997[17]). The presence and abundance of *Sphagnum fallax* in blanket bog can also indicate the effects of disturbance. **Table 4** shows that Sphagna were recorded at only 37 (42.5%) of peatland sample locations, with the most common and abundant species being *S. capillifolium*, recorded at 35 (40.2%) of samples. *S. fallax* was found to be present at nine (10.3%) of samples. The good mire indicator and important peat-forming species *S. papillosum* was only recorded at 11 (12.6%) of sample locations, whilst *Sphagnum medium* was not recorded at any sample locations, indicating that in general the water table is too far below the surface, or not close to the surface enough of the year, for these species to thrive. Other *Sphagnum* species were of rare occurrence (**Table 5**). Sphagna abundance was generally low, with just 25 quadrats (21.8%) with a 20% or more basal coverage of Sphagna.

Polytrichum commune was recorded at 35 (40.2%) peatland sample locations, occasionally in relatively high cover (5 samples with 30% or more cover of *P. commune*; **Table 4**). *Polytrichum commune* is often associated with some of disturbance and adverse influences on mire vegetation, e.g., trampling or some nutrient enrichment. The cover of other non-*Sphagnum* mosses is also generally high across the study area (**Table 4**), indicating the relatively dry surface nature of much of the mire present.

6.0 Summary

PCA surveys undertaken for the Proposed Development have shown the peatland within the study area to comprise a patchwork of modified and degraded bog along with areas of actively eroding peatland (**Figure 6.5, EIAR Volume 3a**).

The various data collected, and summarised above, generally indicates the peatland on-site lacks many of the key positive or desirable indicators that would suggest the priority peatland communities present are of national interest.

[13] Lindsay, R. (1995) Bogs: The Ecology, Classification and Conservation of Ombrotrophic Mires. SNH, Battleby, Perth.

[14] Clymo, R.S. (1963). Ion exchange in Sphagnum and its relation to bog ecology. Annals of Botany, New Series, 27, 309-324.

[15] Wheeler, B.D., and Shaw, S.C. (1995) Restoration of Damaged Peatlands. Department of the Environment. HMSO, London.

[16] Clymo, R.S. (1983). Peat. In Gore, A.J.P. (Ed). Ecosystems of the World 4A Mires: Swamp, Bog, Fen and Moor. Elsevier, Oxford, pp. 159-224.

[17] Clymo, R.S. (1997). The Roles of Sphagnum in Peatlands. In Parkyn, L., Stoneman, R.E. and Ingram, H.A.P. (Eds). Conserving Peatlands. CAB International, Wallingford, pp. 95-102.

Whilst there are variable amounts of peatland with peat forming species present, there are various indicators of negative impact as well, for instance the levels of peat hagging / gulling present and active erosion, grazing, and areas of bare peat.

The PCA data collected, and the consideration of peatland condition, influencing factors, and distribution has indicated there is potential for peatland restoration measures within the Site, and the PCA has helped to inform certain proposals and prescriptions within the Outline Biodiversity Enhancement and Management Plan (OBEMP) (see **Technical Appendix 6.7, EIAR Volume 4**).

Table 2 Foliar Cover %

Sample ID [18]	Sample Type [19]	*C. vulgaris*	*E. vaginatum*	*E. angustifolium*	*T. germanicum*	*M. caerulea*	*V. myrtillus*	*Juncus* spp.	Grasses
001	Grid / General Study Area	0	35	0	0	70	0	10	15
002	Track	0	20	10	35	0	0	40	0
003	Track	5	25	2	25	40	10	5	15
004	Grid / General Study Area	25	45	3	30	5	5	0	0
005	Infrastructure	0	0	0	0	35	0	60	15
008	Grid / General Study Area	0	0	0	0	65	0	30	15
009	Grid / General Study Area	0	0	0	0	90	3	2	15
010	Grid / General Study Area	10	30	0	25	25	5	3	0
011	Grid / General Study Area	0	0	0	10	60	3	40	15
012	Turbine	0	0	0	0	5	10	80	45
015	Grid / General Study Area	0	40	0	5	70	0	5	5
017	Track	0	0	0	15	40	0	20	55
018	Turbine	0	0	0	0	60	5	0	55
020	Track	0	0	0	30	0	0	25	15
022	Track	0	0	0	40	0	0	60	20
023	Turbine	0	0	0	0	65	0	0	50
024	Track	1	25	0	15	0	5	10	5
025	Grid / General Study Area	0	0	0	0	100	0	0	3
026	Grid / General Study Area	0	0	0	0	90	2	0	5

[18] Sample ID can be cross-referenced to **Figure 6.5 (EIAR Volume 3a)** for location. Only peatland samples contained within table data (n = 87).

[19] The sample type refers to whether the survey location was a Grid / General survey area sample or specific to a proposed infrastructure location, such as turbine, track, or other ancillary infrastructure.

Sample ID [18]	Sample Type [19]	*C. vulgaris*	*E. vaginatum*	*E. angustifolium*	*T. germanicum*	*M. caerulea*	*V. myrtillus*	*Juncus* spp.	Grasses
027	Turbine	0	0	0	0	70	0	0	40
029	Grid / General Study Area	5	15	0	20	0	5	0	2
030	Grid / General Study Area	0	0	0	0	95	0	0	5
031	Grid / General Study Area	0	0	0	20	40	5	0	3
032	Track	0	0	5	15	0	10	30	25
035	Grid / General Study Area	0	0	0	0	30	2	0	70
037	Grid / General Study Area	0	0	0	20	30	5	1	10
038	Track	0	0	0	0	70	8	0	15
039	Grid / General Study Area	25	15	5	50	0	1	2	0
041	Track	15	60	10	5	0	3	0	1
042	Grid / General Study Area	3	15	1	50	0	0	50	5
043	Grid / General Study Area	5	30	2	20	0	2	40	5
044	Grid / General Study Area	4	0	0	75	0	4	3	7
045	Grid / General Study Area	0	0	2	0	60	10	0	10
046	Grid / General Study Area	0	0	0	0	10	2	1	70
050	Grid / General Study Area	0	35	0	2	0	2	0	5
053	Track	0	25	0	0	0	5	0	5
054	Track	0	20	0	0	1	5	20	10
055	Track	0	5	0	25	0	0	70	0
056	Grid / General Study Area	40	40	1	2	0	4	3	1
057	Grid / General Study Area	10	20	0	40	0	2	5	3
058	Grid / General Study Area	10	15	0	15	10	3	3	15
059	Grid / General Study Area	0	20	0	0	5	0	2	10
060	Grid / General Study Area	5	60	0	5	2	5	1	0

Sample ID [18]	Sample Type [19]	*C. vulgaris*	*E. vaginatum*	*E. angustifolium*	*T. germanicum*	*M. caerulea*	*V. myrtillus*	*Juncus* spp.	Grasses
061	Grid / General Study Area	3	60	0	3	0	5	3	5
062	Grid / General Study Area	0	0	0	15	5	0	5	25
064	Track	10	20	2	5	0	2	5	1
065	Track	0	0	0	0	70	1	0	20
066	Turbine	20	15	5	0	0	2	0	0
067	Turbine	0	15	0	20	0	2	10	10
068	Track	20	40	0	10	0	4	35	1
069	Track	0	0	0	25	5	10	5	20
071	Grid / General Study Area	5	1	20	70	0	0	0	0
072	Grid / General Study Area	20	2	1	70	0	2	0	1
073	Grid / General Study Area	35	40	3	40	0	3	0	0
076	Grid / General Study Area	0	0	0	5	35	35	5	30
078	Grid / General Study Area	0	0	0	10	25	15	0	40
079	Grid / General Study Area	0	0	0	0	40	0	0	60
080	Grid / General Study Area	0	0	0	0	30	0	0	70
082	Track	0	0	0	0	70	1	0	20
084	Track	20	2	1	80	0	1	2	0
085	Grid / General Study Area	20	70	1	2	0	2	5	2
086	Grid / General Study Area	40	2	0	80	0	1	0	0
087	Grid / General Study Area	15	10	1	15	0	15	0	8
088	Grid / General Study Area	3	70	0	20	0	5	5	10
091	Grid / General Study Area	0	0	0	65	5	25	1	10
092	Grid / General Study Area	0	0	0	40	2	30	0	25
093	Grid / General Study Area	0	0	0	0	30	10	0	45

Sample ID [18]	Sample Type [19]	*C. vulgaris*	*E. vaginatum*	*E. angustifolium*	*T. germanicum*	*M. caerulea*	*V. myrtillus*	*Juncus* spp.	Grasses
094	Grid / General Study Area	0	0	0	0	30	5	0	45
099	Track	65	20	3	35	0	2	0	0
102	Grid / General Study Area	60	15	5	35	0	2	0	0
103	Grid / General Study Area	55	15	2	65	0	0	0	0
104	Grid / General Study Area	0	0	0	15	3	25	15	65
106	Grid / General Study Area	0	0	0	0	0	5	65	45
107	Grid / General Study Area	3	55	0	0	3	10	45	5
108	Grid / General Study Area	0	0	2	3	50	40	0	30
110	Track	0	0	0	0	55	3	10	80
111	Turbine	0	0	0	40	3	10	35	40
112	Grid / General Study Area	0	0	0	30	0	15	0	60
113	Grid / General Study Area	0	0	0	0	45	20	0	65
114	Grid / General Study Area	3	0	0	0	70	25	5	20
115	Grid / General Study Area	40	45	5	15	5	5	5	0
116	Grid / General Study Area	0	0	0	35	5	20	5	50
117	Grid / General Study Area	0	0	0	15	65	15	0	30
118	Turbine	25	10	1	0	0	5	40	25
119	Track	0	0	0	20	30	35	0	40
120	Turbine	0	0	0	0	70	0	0	40
121	Grid / General Study Area	0	0	0	15	55	25	0	25

Table 3 Other Peatland Species Presence/Absence[20]

Species	No. Samples Present	No. Samples Absent
Erica tetralix	11	76
Empetrum nigrum	16	71
Vaccinium vitis-idaea	4	83
Vaccinium oxycoccos	1	86
Drosera spp.	3	84
Rubus chamaemorus	11	76
Betula nana	0	87

Table 4 Basal Cover %

Sample ID[18]	Sample Type[19]	Bare ground /peat	Sphagna	*Cladonia* spp. lichens	*Racomitrium lanuginosum*	*Polytrichum commune*	Other Non-Sphagnum mosses
001	Grid / General Study Area	0	0	0	0	0	85
002	Track	10	85	0	0	2	3
003	Track	0	40	0	0	0	55
004	Grid / General Study Area	0	70	0	0	0	25
005	Infrastructure	0	25	0	0	0	45
008	Grid / General Study Area	0	0	0	0	0	80
009	Grid / General Study Area	0	0	0	0	0	80
010	Grid / General Study Area	0	85	0	0	3	15
011	Grid / General Study Area	0	85	0	0	2	10
012	Turbine	0	0	0	0	35	65

[20] Only peatland samples included (n = 87).

Sample ID[18]	Sample Type[19]	Bare ground /peat	Sphagna	*Cladonia* spp. lichens	*Racomitrium lanuginosum*	*Polytrichum commune*	Other Non-Sphagnum mosses
015	Grid / General Study Area	0	20	0	0	15	70
017	Track	0	0	0	0	0	70
018	Turbine	0	0	0	0	15	85
020	Track	0	0	0	0	50	3
022	Track	0	0	0	0	30	5
023	Turbine	0	0	0	0	20	10
024	Track	0	2	0	0	2	20
025	Grid / General Study Area	0	0	0	0	0	5
026	Grid / General Study Area	0	0	0	0	0	10
027	Turbine	0	0	0	0	0	10
029	Grid / General Study Area	0	30	0	0	7	10
030	Grid / General Study Area	0	0	0	0	0	50
031	Grid / General Study Area	0	0	0	0	2	40
032	Track	0	0	0	0	15	10
035	Grid / General Study Area	0	0	0	0	0	30
037	Grid / General Study Area	0	0	0	0	1	5
038	Track	0	0	0	0	0	20
039	Grid / General Study Area	0	15	0	0	1	10
041	Track	0	25	0	0	0	5
042	Grid / General Study Area	0	65	0	0	0	5
043	Grid / General Study Area	0	25	0	0	0	5
044	Grid / General Study Area	0	2	0	0	0	45
045	Grid / General Study Area	0	0	0	0	25	10
046	Grid / General Study Area	0	5	0	0	30	10

Sample ID[18]	Sample Type[19]	Bare ground /peat	Sphagna	*Cladonia* spp. lichens	*Racomitrium lanuginosum*	*Polytrichum commune*	Other Non-Sphagnum mosses
050	Grid / General Study Area	0	0	0	0	0	17
053	Track	0	0	0	0	50	10
054	Track	0	0	0	0	5	5
055	Track	0	50	0	0	0	10
056	Grid / General Study Area	0	3	0	0	0	75
057	Grid / General Study Area	0	5	1	0	0	5
058	Grid / General Study Area	0	10	0	0	5	55
059	Grid / General Study Area	0	0	0	0	0	20
060	Grid / General Study Area	0	20	0	0	5	15
061	Grid / General Study Area	0	5	0	0	0	20
062	Grid / General Study Area	0	0	0	0	0	10
064	Track	0	35	0	0	1	2
065	Track	0	0	0	0	1	5
066	Turbine	0	8	0	0	0	15
067	Turbine	0	0	0	0	10	5
068	Track	0	1	0	0	0	20
069	Track	0	0	0	0	0	15
071	Grid / General Study Area	0	5	1	0	0	5
072	Grid / General Study Area	20	0	1	3	0	65
073	Grid / General Study Area	0	20	0	3	0	5
076	Grid / General Study Area	0	0	0	0	2	50
078	Grid / General Study Area	0	0	0	0	0	15
079	Grid / General Study Area	0	0	0	0	0	5
080	Grid / General Study Area	0	0	0	0	0	3

Sample ID[18]	Sample Type[19]	Bare ground /peat	Sphagna	*Cladonia* spp. lichens	*Racomitrium lanuginosum*	*Polytrichum commune*	Other Non-Sphagnum mosses
082	Track	0	0	0	0	0	5
084	Track	0	2	1	0	0	25
085	Grid / General Study Area	0	5	0	0	0	50
086	Grid / General Study Area	0	20	0	0	0	10
087	Grid / General Study Area	15	5	3	3	0	70
088	Grid / General Study Area	0	5	0	0	15	65
091	Grid / General Study Area	0	0	0	0	0	70
092	Grid / General Study Area	0	0	0	0	1	15
093	Grid / General Study Area	0	0	0	0	0	20
094	Grid / General Study Area	0	0	0	0	0	10
099	Track	0	15	1	0	0	80
102	Grid / General Study Area	2	35	2	5	0	50
103	Grid / General Study Area	0	20	2	0	0	65
104	Grid / General Study Area	0	0	0	0	15	60
106	Grid / General Study Area	0	0	0	0	1	85
107	Grid / General Study Area	0	10	0	0	20	55
108	Grid / General Study Area	0	0	0	0	0	80
110	Track	0	0	0	0	0	70
111	Turbine	0	0	0	0	5	90
112	Grid / General Study Area	0	0	0	1	0	70
113	Grid / General Study Area	0	0	0	0	0	90
114	Grid / General Study Area	0	0	0	0	3	90
115	Grid / General Study Area	0	85	0	0	0	3
116	Grid / General Study Area	0	0	0	0	5	85

Sample ID[18]	Sample Type[19]	Bare ground /peat	Sphagna	*Cladonia* spp. lichens	*Racomitrium lanuginosum*	*Polytrichum commune*	Other Non-Sphagnum mosses
117	Grid / General Study Area	3	0	0	0	0	70
118	Turbine	0	15	0	2	15	65
119	Track	0	0	0	0	0	70
120	Turbine	0	0	0	0	3	85
121	Grid / General Study Area	0	0	0	0	0	70

Table 5 Sphagnum Species

Sphagnum species	No. Samples Present (out of 87)[20]	Percentage Total (%)
Sphagnum capillifolium	35	40.2
Sphagnum fallax	9	10.3
Sphagnum palustre	5	5.7
Sphagnum papillosum	11	12.6
Sphagnum tenellum	1	1.1
Sphagnum cuspidatum	1	1.1

ANNEX A Peatland Photographs

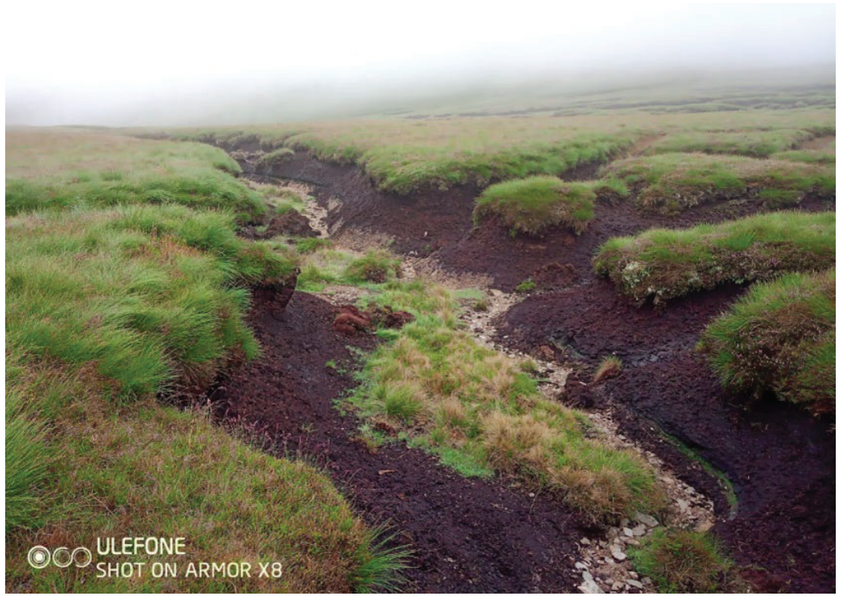
The following selected photographs are provided to give a visual representation of peatland condition within the survey area.

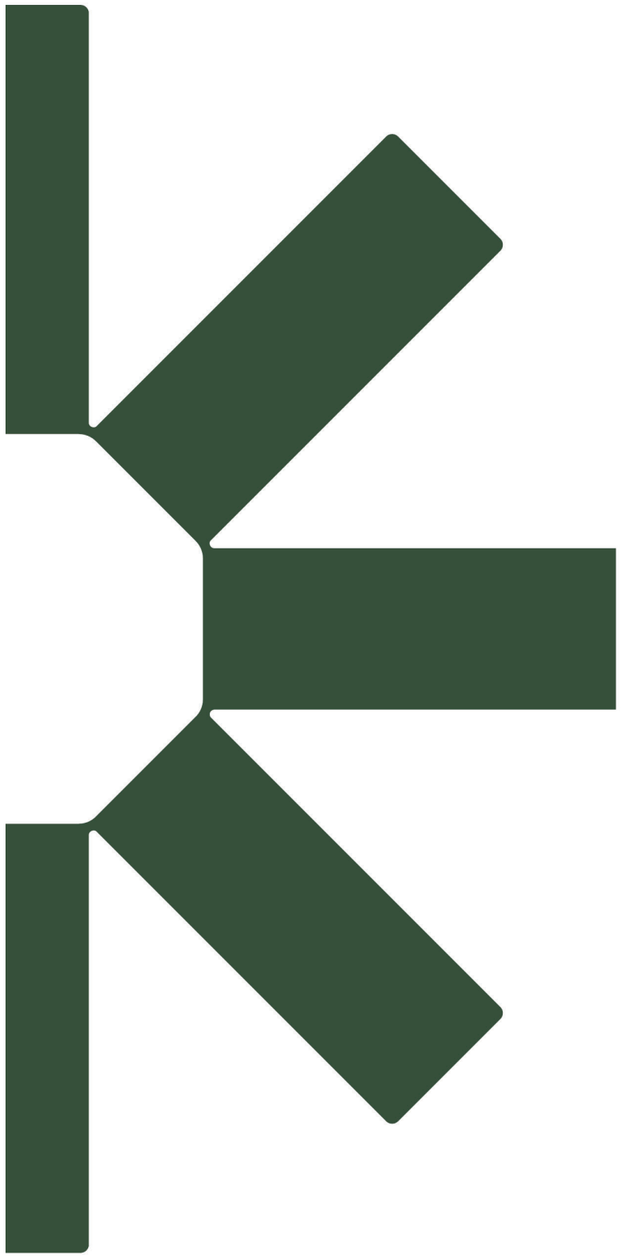
Photo 1 M15b Trichophorum germanicum – Erica tetralix wet heath Typical sub-community with peat hagging

Photo 2 M17b Trichophorum germanicum – Eriophorum vaginatum blanket mire Cladonia spp. sub-community, with extensive peat hagging

Photo 3 Peat hagg and gully erosion present south of Hirstane Rig

Photo 4 Peat hagg and gully erosion through to underlying substrata





Making Sustainability Happen

Technical Appendix 6.3: Protected Species Survey Report

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Tables in Text

Annexes

1.0 Introduction

MacArthur Green (now SLR Consulting Ltd[1]) was commissioned by Watchman Energy Park Limited (the Applicant) to carry out protected species surveys at the proposed Watchman Energy Park (hereafter referred to as the 'Proposed Development').

These surveys primarily focussed on otter (*Lutra lutra*), water vole (*Arvicola amphibius*), badger (*Meles meles*), red squirrel (*Sciurus vulgaris*), and pine marten (*Martes martes*).

A watching brief was also kept throughout these surveys, and during all ecological surveys at the Site. Signs were recorded for other protected species potentially inhabiting the Site and respective survey areas such as hare and reptile species.

Surveys for bats and fish were carried out and are reported separately in **Technical Appendices 6.4 and 6.5 (EIAR Volume 4)** respectively.

These protected species surveys were undertaken to aid and inform the design and ecological assessment of the Proposed Development for the Environmental Impact Assessment (EIA) Report (EIAR).

2.0 The Site and Survey Area

The Site (see **Figure 6.1**, **EIAR Volume 3a**) covers an area of 1,089 hectares (ha) and is located approximately 10 km south of Crawford and 12 km to the west of Moffat, South Lanarkshire between the valley of the Daer Water and commercial forestry to the north, Daer Reservoir and commercial forestry to the east, open moorland of the Southern Uplands to the south, and further open moorland with the A702 road beyond to the west.

The Site is upland in character with a mix of wet heath, blanket and wet modified bog, and marshy/acid grassland mosaics. Several watercourses drain the Site, feeding into Daer Water, Kirkhope Cleuch and Daer Reservoir located to the east, with a very small area (<5% of the total Site area) that drains in a north westerly direction to Potrail Water.

The 'survey area' in which protected species surveys were undertaken is shown in **Figure 6.6 (EIAR Volume 3a)** and incorporates the land within the Site Boundary (i.e., the Site), as well as some areas beyond this due to design iterations and best practice survey guidance[2].

3.0 Legal Protection

Details of the legal protection of the protected species surveyed for are given in **Annex A** of this report.

4.0 Methodology

4.1 Desk Study

A desk-based study was undertaken to inform the field surveys and assessment with regards the presence of designated sites and species of interest within the Site and Study Area.

[1] Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

[2] NatureScot (2025). Planning and Development: Protected Species. Online. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-protected-species

This desk based study consisted of the consultation of various online resources such as the National Biodiversity Network (NBN) Atlas[3], NatureScot Sitelink[4], Saving Scotland's Red Squirrels[5], Red Squirrel Stronghold Areas[6], the British Deer Society (BDS) Deer Distribution Survey[7] and Scottish Wildcat Priority Areas[8]. The desk-study also reviewed the respective EIARs and associated documents of nearby wind energy developments and proposed developments (e.g., Lion Hill[9], Kinnelhead Wind Farm[10], Rivox Wind Energy Hub[11], Clyde South[12] and Daer Wind Farm[13]).

4.2 Field Surveys

Surveys to record the presence or likely absence of otter, water vole, badger, red squirrel, and pine marten have been undertaken, with all habitats suitable for protected species surveyed within the survey area (**Figure 6.6, EIAR, Volume 3a**).

A watching brief for any protected species signs was also undertaken during other survey visits (e.g., ornithology / vegetation/other ecology surveys) throughout the year. The signs found indicate type and intensity of activity and consequently help in the assessment of the importance of a particular area for the protected species. The survey methods used are described below and are in line with NatureScot guidance[2].

4.2.1 Badger

Land with the potential to support badger within the survey area was searched for field signs with particular attention given to areas around woodland and areas underlain by mineral soils. Field signs of badger are described in Scottish Badgers[14] and field evidence searched for included:

- **Setts:** single and/or groups of holes;
- **Prints:** badgers have characteristic footprints that can be found in soft ground and muddy areas;
- **Latrines and dung pits:** these are small, excavated pits in which droppings are deposited. Latrines are a collection of dung pits used as territorial markers;
- **Hairs:** tufts of hair can often be found on fences, or in the entrances to setts;
- **Feeding signs:** small scrapes, also known as snuffle holes, where badgers have searched for insects and plant tubers. Feeding signs can also include dug up wasp or bee nests and ripped up dung of other species including cattle;

[3] NBN Atlas Scotland (2025). Online. Available at: https://nbnatlas.org/

[4] NatureScot (2025). SiteLink. Online. Available at: https://sitelink.nature.scot/home

[5] Scottish Squirrels. (2025). Saving Scotland's Red Squirrels. Online. Available at: https://scottishsquirrels.org.uk/

[6] Available at: https://forestry.gov.scot/publications/21-map-of-red-squirrel-stronghold-areas

[7] The British Deer Society (2023). Deer Distribution Survey Results. Available online: https://bds.org.uk/science-research/deer-surveys/deer-distribution-survey/

[8] NatureScot. (2023). Wildcat Priority Areas. Online. Available at https://www.data.gov.uk/dataset/3491a9b0-1dd5-4f86-904f-55ca833e9aef/wildcat-priority-areas

[9] Lion Hill Wind Farm Limited (2013). Environmental Statement: Lion Hill Wind Farm

[10] RES (2025). Kinnelhead Wind Farm Scoping Report.

[11] LUC (2023). Rivox Wind Energy Hub EIA (2023). Appendix 7.3 Protected Species Survey Report.

[12] Clyde South Energy Park Limited (2025). EIA Scoping Report

[13] RWE (2021). Daer Wind Farm EIAR. Chapter 6: Ecology.

[14] Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1.

- **Scratching posts:** marks on trees (including fallen trees) where badgers have scratched leaving claw marks or ripped at areas of rotten bark to search for food; and
- **Paths:** these are routes that badgers take when moving between setts and foraging areas.

Where setts were recorded their sett type and sett entrance classification were noted, in line with the definitions outlined in Scottish Badgers guidance[14], which are reproduced below in **Table 4-1** and **Table 4-2**.

Table 4-1 Categories of sett and associated descriptions

Category	Description
Main	Main setts usually have several holes with large spoil heaps, and the sett generally looks well used. There are obvious paths to and from the sett and between sett entrances. In the British National Badger Survey the average number of holes for a main sett was twelve, although main setts may be much smaller, even a single hole in exceptional circumstances. Although normally the breeding sett and in continuous use, it is possible to find a main sett that has some disused or dormant entrances.
Annexe	These are often close to a main sett, normally less than 150 m away, and are connected to the main sett by one or more well-worn paths. Usually there are several holes but the sett may not be in use all the time, even if the main sett is very active. The average number of holes per annexe sett in the British survey was eight.
Subsidiary	These are usually at least 50 m from a main sett, and do not have an obvious path connecting with another sett. They are not continuously active. The average number of holes per subsidiary sett in the British survey was four.
Outlier	These often have little spoil outside the holes, have no obvious path connecting them with another sett, and are only used sporadically. When not in use by badgers, they are often taken over by foxes or even rabbits. However, they can still be recognised as badger setts by the shape of the tunnel (not the actual entrance hole), which is at least 25 cm in diameter, and rounded or a flattened oval shape (i.e., broader than high). Fox and rabbit tunnels are smaller and often taller than they are broad. The average number of holes per outlying sett in the British survey was two.
Other	In some cases, it can be difficult to assess the status of a sett, and it is open to interpretation. It is therefore recommended that if there is uncertainty as to the type of sett present, setts should be referred to as 'Other'.

Table 4-2 Sett entrance classifications and associated descriptions

Classification	Description
Well Used	Are clear of debris and vegetation, sides worn smooth but not necessarily excavated recently.
Partially Used	Are not in regular use and have debris e.g. twigs and leaves in the entrance. They could be used after only a minimal amount of clearance.
Disused	Not in use for some time, are partially blocked and could not be used without considerable effort. Rabbits and foxes may take over part of a sett and keep disused entrances open.
Collapses	Where a tunnel has collapsed.
Air Holes	Where badgers have made a small hole in a tunnel roof from below.

4.2.2 Otter

All accessible watercourses within the survey area were surveyed for otter field signs. Otter field signs and survey methods are described in Bang & Dahlstrøm[15], Sargent & Morris[16] and Chanin[17], and include:

- **Holts:** underground features where otters live. They can be tunnels within bank sides, underneath root-plates or boulder piles, and even man-made structures such as disused drains. Holts are used by otters to rest up during the day and are the usual location of natal or breeding sites. Otters may use holts permanently or temporarily;
- **Couches:** these are above ground resting-up sites. They may be partially sheltered, or fully exposed. Couches may be regularly used, especially in reed beds and on in-stream islands. They have been known to be used as natal and breeding sites. Couches can be very difficult to identify and may consist of an area of flattened grass or earth. Where rocks or rock armour are used as couches, these can be almost impossible to identify without observing the otter *in situ*;
- **Prints:** otters have characteristic footprints that can be found in soft ground and muddy areas;
- **Spraints:** otter faeces may be used to mark territories, often on in-stream boulders. They can be present within or outside the entrances of holts and couches. Spraints have a characteristic smell and often contain fish remains;
- **Feeding signs:** the remains of prey items may be found at preferred feeding stations. Remains of fish, crabs or skinned amphibians can indicate the presence of otter;
- **Paths:** these are terrestrial routes that otters take when moving between resting-up sites and watercourses, or at high flow conditions when they will travel along bank sides in preference to swimming; and
- **Slides and play areas:** slides are typically worn areas on steep slopes where otters slide on their bellies, often found between holts or couches and watercourses. Play areas are used by juvenile otters in play and are often evident by trampled vegetation and the presence of slides. These are often positioned in sheltered areas adjacent to the natal holt.

Any of the above signs (apart from paths) are diagnostic of the presence of otter. However, it is often not possible to identify couches with confidence unless other field signs are also present. Spraints are the most reliably identifiable evidence of the presence of this species.

4.2.3 Pine Marten

Signs of pine marten were searched for within the survey area following guidance from O'Mahony *et al*. (2006)[18] and Bright and Smithson (1997)[19], and include:

[15] Bang, P., and Dahlstrøm, P. (2001). Animal Tracks and Signs. Oxford University Press, Oxford.

[16] Sargent, G., and Morris, P. (2003). How to Find and Identify Mammals. The Mammal Society, London.

[17] Chanin, P. (2003). Monitoring the Otter (Lutra lutra). Conserving Natura 2000 Rivers Monitoring Series No.10 English Nature, Peterborough.

[18] O'Mahony D., O'Reilly, C. & Turner, P. (2006). National Pine Marten Survey of Ireland 2005. COFORD, Dublin.

[19] Bright, P.W., and Smithson, T.J. (1997). Ecology of den use by pine martens reintroduced to a commercial coniferous forest. Pages 58-64 in: Species Recovery Programme for the Pine Marten in England: 1995-96. English Nature Research Report No. 240. English Nature, Peterborough.

- **Scats**: searches for pine marten scats were made along linear features such as fence lines, stone walls or forestry tracks / rides. Also searches for scats on prominent features such as tree stumps, dead logs or stones, and around rock piles and dense scrub where the species could establish a den.
- **Dens**: identification of features which could be used as a den. Dens can include the utilisation of upturned trees, tree cavities, rocks or manmade structures such as log piles or large bird boxes.

4.2.4 Red Squirrel

Areas of woodland that have the potential to support red squirrel were surveyed for signs of squirrels, following guidance from Gurnell *et al.* (2009)[20], and include:

- **Sightings**: visual sightings of red squirrels;
- **Dreys**: dreys are usually built close to the main stem of a tree, over 3 m from ground level and over 50 x 30 cm in size; and
- **Feeding signs**: predated cone (cone cores) searches in areas of woodland.

4.2.5 Reptiles

Targeted reptile surveys were not undertaken, however, incidental records of reptile sightings, or signs such as shed skins, and features of particular importance (i.e., potential hibernacula) were recorded, using relevant guidance[21, 22].

4.2.6 Water Vole

All watercourses within the survey area were surveyed for water vole field signs following the methodology prescribed in NatureScot guidance[2] and Dean *et al*.[23]. This involved assessing the suitability of the habitat for water vole and searching for the following field signs:

- **Faeces:** recognisable by their size, shape, and content. If not too dried-out these are also distinguishable from rat droppings by their smell;
- **Latrines:** faeces, often deposited at discrete locations;
- **Feeding stations:** food items are often brought to feeding stations along pathways and hauled onto platforms. Recognisable as neat piles of chewed vegetation up to 10 cm long;
- **Burrows:** appear as a series of holes along the water's edge distinguishable from rat burrows by size and position;
- **Lawns:** may appear as grazed areas around land holes;
- **Nests:** where the water table is high above ground woven nests may be found;
- **Footprints:** tracks may occur at the water's edge and lead into bank side vegetation. May be distinguishable from rat footprints by size; and

[20] Gurnell, J., Lurz, P. McDonald, R. & Pepper, H. (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Practice Note.

[21] Edgar, P., Foster, J. and Baker, J. (2010). Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth.

[22] Cathrine, C. (2018). ARG UK Advice Note 10: Reptile Survey and Mitigation Guidance for Peatland Habitats. Amphibian and Reptile Groups of the United Kingdom.

[23] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.

- **Runways in vegetation:** low tunnels pushed through vegetation near the water's edge; these are less obvious than rat runs.

Dean *et al*. (2016)[23] states that water vole droppings are the only field sign that can be used to determine water vole presence reliably on their own. Experience is required to distinguish feeding signs, burrows and footprints of water voles from those of other species. A collection of these field signs found in close proximity can indicate water vole presence.

4.2.7 Other Species

A watching brief was maintained for all other protected, notable, and / or invasive species during surveys and presence or field signs recorded as appropriate (e.g., mountain and brown hares (*Lepus* spp.), reptile species (adder (*Vipera berus*), common or viviparous lizard (*Zootoca vivipara*), and slow worm (*Anguis fragilis*)), grey squirrel (*Sciurus carolinensis)* and American mink (*Neovison vison*)).

4.2.8 Species Scoped Out

Surveys for beaver (*Castor fiber*), wildcat (*Felis silvestris*) and great crested newt (*Triturus cristatus*) were scoped out of field surveys due to the absence of suitable habitat (great crested newt) or the survey area being located outwith their known range or distribution (wildcat and beaver).

5.0 Survey Details and Limitations/Constraints

Surveys for protected species were undertaken on 28 to 30 June 2023, 2 to 3 May 2024, 6 June 2025 and 17 July 2025.

The weather conditions during surveys were damp with drizzle in 2023, dry in 2024 and dry with scattered showers in 2025. The watercourses were at normal levels during all surveys.

There is uncertainty associated with identifying scats produced by pine marten due to their variability in composition and their similarity with those produced by other species such as fox. DNA analysis is often used as a method to increase reliability of identification, although it is often not possible to determine to species level with this method due to possible degradation of samples or the collection of scat samples from species that cannot be sequenced (Croose *et al.*, 2014)[24]. The scats recorded within survey area that were undeterminable between pine marten and fox were therefore considered as 'potential pine marten' and a precautionary approach is applied when discussing their presence and utilisation of the Site and the habitats within the wider area.

Due to protected species mobile nature, it is possible that new features may be created in the period between surveys and the commencement of construction. It is therefore recommended that pre-construction surveys are undertaken in advance of construction activities progressing across the Site.

[24] Croose, E., Birks, J.D.S., Schofield, H.W., and O'Reilly, C. (2014). Distribution of the pine marten (Martes martes) in southern Scotland in 2013. Scottish Natural Heritage Commissioned Report No. 740.

6.0 Results

6.1 Desk Study Results

6.1.1 Designated Sites

There are no ecologically (non-avian) designated sites with qualifying interests for protected species within 5 km of the Site.

There are no Local Nature Conservation Sites (LNCS) within 5 km of the Site, that are designated for protected species interests.

6.1.2 NBN Atlas Scotland

A search of the NBN Atlas Scotland[3] covering a 5 km buffer off the Site in the past 15 years (i.e., from 2010 onwards) returned records of the following protected or notable species:

- adder;
- brown hare (*Lepus europaeus*);
- common lizard;
- mountain hare (*Lepus timidus*);
- red squirrel; and
- Water vole.

Records of the invasive non-native species (INNS) grey squirrel (*Sciurus carolinensis*) and North American signal crayfish (*Pacifastacus leniusculus*) were also returned.

Details regarding licences and data providers for these records are included in **Annex B**.

6.1.3 Saving Scotland's Red Squirrels

Single sightings of red squirrels have been recorded by Saving Scotland's Red Squirrels within 5 km of the Site in 2021 and 2012[5].

The Site lies between two areas with a greater number of both red and grey squirrel sightings recorded; Moffat to the east and Thornhill to the southeast. These are more populated areas so it is possible that a relatively higher survey effort in these areas is the reason for the greater number of recordings, as opposed to the lack of sightings within the much more remote location in which the Site is located.

6.1.4 Red Squirrel Stronghold Areas

The Site does not lie within a red squirrel stronghold area or a priority grey squirrel control area[6].

6.1.5 Deer Distribution Survey

The Deer Distribution Survey[7] results indicated the presence of the following deer species in the wider local area of the Site:

- Roe deer (*Capreolus capreolus*);
- Red deer (*Cervus elaphus*);
- Sika deer (*Cervus nippon*); and
- Fallow deer (*Dama dama*).

6.1.6 Information from Nearby Developments

Documentation published in relation to existing, consented or submitted developments within 5 km of the Site was examined to further understand the wider distribution of protected species in the area.

Scoping documents submitted for Kinnelhead Wind Farm[10] notes presence of badger and otter within their survey area.

The Protected Species Survey Report for Rivox Wind Energy Hub[11] reported on evidence of otter and pine marten, as well as noting sightings of common lizards and amphibian species.

Presence of otter (resting sites and spraints), squirrel (feeding signs), badger (setts and latrine), and North American signal crayfish (within otter spraint) were recorded during surveys to inform the Daer Wind Farm EIAR[13].

The scoping documents for Clyde South wind farm[12], which lies to the north-east of the Proposed Development, and includes the sites of the consented Lion Hill and Crookedstane wind farms[25], recorded presence of bats (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Daubenton's, Natterer's and brown long-eared bat), otter, common lizard and brown trout, as well as signal crayfish (INNS). The Environmental Statement for Lion Hill[9] Wind Farm had recorded presence of otter.

6.1.7 Information from Consultation

In their Scoping Response, NatureScot highlighted the presence of Vendace (*Coregonus albula*), Britain's rarest freshwater fish, within Daer reservoir, where they were translocated in the mid-1990s and have become established in small numbers[26]. They are highly susceptible to declines in water quality, increased siltation and deoxygenation[27].

NatureScot also emphasised the presence of North American signal crayfish in the surrounding landscape, which is a key potential threat to vendace and wider fish populations in the area.

6.2 Field Survey Results

The survey results are summarised in **Table 6-1** below, with full detailed results provided within **Annex C**. Survey results are displayed on **Figure 6.6 (EIAR Volume 3a)**.

Table 6-1 Protected species survey results summary

Species	Survey Results Summary	General Habitat Suitability
Badger	No evidence of badger was recorded during surveys.	The Site is largely very open, with areas of peaty soils that are generally not preferred for sett building. The northern portion of the Site abuts and includes areas of commercial woodland which might provide more suitable habitat, with the Site providing some foraging opportunities.

[25] Renewco (2025). Clyde South Energy Park, Website. Available at: https://www.renewcopower.com/portfolio/united-kingdom/uk-projects/clyde-south-energy-park/

[26] Scottish Government Energy Consents Unit (2025). Watchman Energy Park – Scoping Opinion

[27] https://www.nature.scot/plants-animals-and-fungi/fish/freshwater-fish/vendace-and-powan

Species	Survey Results Summary	General Habitat Suitability
Otter	Many otter spraints were recorded in the course of the surveys, along Daer Water, Carsehope Burn, Kirkhope Cleuch, and Meikle Burn. The spraints recorded vary in age, suggesting continued long-term use of the Site's watercourses by otter.	The watercourses on-site are generally open with little shelter, making them suitable for foraging and commuting. The lack of shelter means that there are limited opportunities for holts and couches, although there is potential for the steep riverbanks to offer some suitability. Where existing watercourse crossings exist, the bridging structures may provide some opportunity for more long-term use.
Pine marten	Three instances of potential scat were recorded. A series of scats was recorded along the top of a drystone dyke between Old Town Burn and the edge of a forestry plantation, with a second location identified to the north of this at the edge of the same area of forestry. The third record was on a drystone dyke in a clearing in forestry plantation, west of the Western Access track skirting Pin Stane.	The Site is very open with few trees, and as such offers hunting and foraging opportunities, but with limited potential denning habitat. The northern portion of the Site is adjacent to several areas of forestry, and the Western access track passes through forestry, and as such lie close to areas that may be used by pine marten as denning habitat.
Red squirrel	No evidence of red squirrel was recorded during surveys.	The Site, with the exception of the access routes, does not incorporate areas of forestry and as such there is very little suitable habitat for red squirrel. The Site is adjacent to areas of forestry, and the Western access passes through commercial plantation, where red squirrel habitat is more likely to be present, and as such individuals may utilise the northern portion of the Site to move between areas of forestry.
Reptiles	Five sightings of common lizard were recorded, with individuals seen darting into vegetation or drystone dykes. These sightings were spread widely across the Site.	The open habitat and vegetation present across the Site provides good habitat for reptiles to forage. Numerous features suitable for use as hibernacula were also recorded, with a number of derelict drystone structures, drystone dykes, cairns and rock piles noted as part of the surveys.
Water vole	Signs of water vole, including burrows, feeding signs and runways, were recorded along Kirkhope Cleuch and Carsehope Burn, along the southern extent of the Site.	The watercourses on-site provide good suitability for water vole, with steep-sided channels and rushy / grassy vegetation present for feeding.
General	Numerous mammal holes were recorded for which a species could not be confidently attributed. Most of these were of a size suitable for use by water vole but lacked definitive field signs. Two larger mammal holes were recorded near Carsehope Burn, which appeared of a size that may be	N/A

Species	Survey Results Summary	General Habitat Suitability
	suitable for otter. However, no signs of use were present.	
Other Species	A mountain hare sighting was recorded incidentally during an ornithology survey, south of the Site Boundary on Mid Height.	N/A

ANNEX A Legal Protection

A full list of protected species and the associated legislation can be found on the NatureScot website[28].

The following provides a summary of legal protection; the actual legislation should be consulted for the definitive list of offences.

A.1 Otter

Otter receive protection in Scotland under the Conservation (Natural Habitats, &c.) Regulations (1994) (the "Habitats Regulations"), being classified as European protected species of animals[29].

For European protected species, NatureScot guidance[30] sets out that it is an offence to deliberately or recklessly:

- capture, injure or kill an animal;
- harass an animal or group of animals;
- disturb an animal while it is occupying a structure or place used for shelter or protection;
- disturb an animal while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny an animal use of a breeding site or resting place;
- disturb an animal in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb an animal in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- disturb an animal while it is migrating or hibernating;
- take or destroy an animal's eggs (GCN); or
- damage or destroy a breeding site or resting place of such an animal (these sites and places are protected even when the animal is not present)[31].

Regulation 44(2)(e) of the Habitats Regulations allows a licence to be granted for activities ordinarily prohibited, where that purpose is:

> "*Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*."

[28] NatureScot (2022). Table of all of Scotland's Protected Species. Online: https://www.nature.scot/doc/table-all-scotlands-protected-species

[29] Schedule 2.

[30] NatureScot. (2025). European protected species. Online: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/legal-framework/habitats-directive-and-habitats-regulations/european-protected

[31] Note that this is a summary of offences. Refer to Regulations 39 and 40 of the Habitats Regulations for legislative context.

A.2 Mountain Hare, Pine Marten and Red Squirrel

Mountain hare, pine marten and red squirrel and are protected in Scotland under the Wildlife and Countryside Act 1981[32].

Under Sections 9(1) and 9(2) of the 1981 Act, it is an offence to intentionally or recklessly kill, injure or take such an animal, or be in possession or control of such an animal (whether live or dead).[33]

Under Section 9(4)(a) and (b), it is an offence to intentionally or recklessly:

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5[34] uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose.

Further, Section 9(5) sets out that it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal; or
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

A.3 Water Vole

Water vole is protected in Scotland under Sections 9(4) and 10 of the Wildlife and Countryside Act 1981[35].

Under Section 9(4)(a) and (b) of the Wildlife and Countryside Act 1981, it is an offence to intentionally or recklessly:

- damage or destroy, or obstruct access to, any structure or place which any wild animal included in Schedule 5[36] uses for shelter or protection; or
- disturb any such animal while it is occupying a structure or place which it uses for that purpose.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

a) That the unlawful act was the incidental result of a lawful operation or other activity;

b) That the person who carried out the lawful operation or other activity:

[32] Schedule 5.

[33] See exceptions under Section 9(3).

[34] Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

[35] as amended by the Nature Conservation (Scotland) Act 2004.

[36] Animals which are protected under Section 9 of the Wildlife and Countryside Act 1981.

i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or

ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and

c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

A.4 Badger

Badger is protected in Scotland under the Protection of Badgers Act 1992 (the "Badgers Act")[37].

Under Section 1(1) of the Badgers Act, "*a person is guilty of an offence if, except as permitted by or under this Act, he wilfully kills, injures or takes, or attempts to kill, injure or take, a badger*."

Where it can reasonably be concluded that a person had been attempting to kill, injure or take a badger, then it will be presumed that that person had been attempting to do so, unless it can be proven otherwise[38].

Under Section 1(3), unless authorised under the Badgers Act, a person is guilty of an offence where "he has in his possession or under his control any dead badger or any part of, or anything derived from, a dead badger."

Under Section 3(1), unless authorised under the Badgers Act, it is an offence to interfere with a badger sett*. The following actions are described as interference:

- damaging a badger sett or any part of it;
- destroying a badger sett;
- obstructing access to, or any entrance of, a badger sett;
- causing a dog to enter a badger sett; or
- disturbing a badger when it is occupying a badger sett,

intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

It is also an offence if a person knowingly causes or permits any of the above actions to be carried out[39].

*Note: A badger sett is defined under the Badgers Act as any structure or place which displays signs of current use by a badger.[40]

[37] as amended by the Nature Conservation (Scotland) Act 2004 (as amended).

[38] Section 1(2) of the Badgers Act.

[39] Section 3(2).

[40] Section 14.

A.5 Reptiles

The three native species of reptile to Scotland, adder, slow worm and viviparous lizard, are protected under Section 9(1) (insofar as the action relates to killing or injuring the animal), and Section 9(5) of the Wildlife and Countryside Act 1981.

Under Section 9(5), it is an offence to:

- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal.
- publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Section 10(3)(c) provides for exceptions under Section 9, such that a person shall not be guilty of an offence where that person shows:

- that each of the conditions specified in subsection (3A) was satisfied in relation to the carrying out of the unlawful act; or
- that the unlawful act was carried out in relation to an animal bred and, at the time the act was carried out, lawfully held in captivity.

Subsection (3A) states those conditions referred to in Section 10(3)(c) are:

a) That the unlawful act was the incidental result of a lawful operation or other activity;

b) That the person who carried out the lawful operation or other activity:

i. took reasonable precautions for the purpose of avoiding carrying out the unlawful act; or;

ii. did not foresee, and could not reasonably have foreseen, that the unlawful act would be an incidental result of the carrying out of the lawful operation or other activity; and

c) That the person who carried out the unlawful act took, immediately upon the consequence of that act becoming apparent to the person, such steps as were reasonably practicable in the circumstances to minimise the damage or disturbance to the wild animal, or the damage or obstruction to the structure or place, in relation to which the unlawful act was carried out.

A.6 Other Protected Species

Signal Crayfish

In Scotland, all non-native species are covered by Section 14 of the Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2011).

The Act makes it an offence to:

- release or allow to escape from captivity any animal to a place outwith its native range; and/or
- cause any animal outwith the control of any person to be at place outwith its native range.

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ANNEX B NBN Atlas Scotland Data Providers and Licenses

Table B-1 Data Providers and Licence Details for NBN Atlas Scotland Records Used

Species	Reason for Inclusion	Data Citation	License
Adder	Protected species (Wildlife and Countryside Act 1981)	Amphibian and Reptile Conservation and Biological Records Centre. 2025. Records verified via iRecord.	CC-BY[41]
Brown hare	Scottish Biodiversity List	Mammal Society 2025. Mammal Mapper App Sighting Records.	CC-BY
Common lizard	Protected species (Wildlife and Countryside Act 1981)	Amphibian and Reptile Conservation and Biological Records Centre. 2025. Records verified via iRecord.	CC-BY
Grey squirrel	Invasive species	Scottish Wildlife Trust (2025). The Scottish Squirrel Database. Occurrence dataset accessed through the NBN Atlas.	CC-BY
Mountain hare	Protected species (Wildlife and Countryside Act 1981)	Mammal Society 2025. Mammal Mapper App Sighting Records.	CC-BY
Red squirrel	Protected species (Wildlife and Countryside Act 1981), Nature Conservation (Scotland) Act 2004)	Scottish Wildlife Trust (2025). The Scottish Squirrel Database. Occurrence dataset accessed through the NBN Atlas.	CC-BY
North American Signal crayfish	Invasive species	Records provided by Invasive non-native species records from SE Web, accessed through NBN Atlas website.	OGL[42]
Water vole	Protected species (Wildlife and Countryside Act 1981)	Mammal Society, and Biological Records Centre 2025	CC-BY

[41] Creative Commons with Attribution 4.0 (CC-BY) https://creativecommons.org/licenses/by/4.0/

[42] Open Government Licence (OGL) https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

ANNEX C Field Survey results

Table C-1 below details the relevant data collected for protected species during surveys, sorted by species, then survey date (see also **Figure 6.6, EIAR Volume 3a**).

Table C-1 Protected Species Survey Results

Species	Sign	Easting	Northing	Survey Date	Notes
General	Mammal Hole	295592	605010	28/06/2023	No obvious signs of use. Near watercourse.
General	Mammal Hole	295253	604818	28/06/2023	No obvious signs of use. Near watercourse.
General	Mammal Hole	296123	603329	28/06/2023	Burrow in silty bank of burn. Approximately 15 cm across. Not well-used, with spider web across entrance. Too small for otter and too large for water vole. No other field signs nearby.
General	Mammal Hole	296362	607358	29/06/2023	Burrow in grassy bank of Kirkhope Cleuch, potentially water vole.
General	Mammal Hole	294244	606265	29/06/2023	Two adjacent potential burrows, although entrances overgrown. Of size suitable for water vole.
General	Mammal Hole	294102	606100	29/06/2023	Two burrows large enough to be water vole, although many field vole holes also present in the area.
General	Mammal Hole	294093	606090	29/06/2023	One potential water vole burrow.
General	Mammal Hole	294079	606091	29/06/2023	Grassy mound by Kirkhope Cleuch with many field vole holes and droppings. Around six holes large enough to be used by water voles but no other field signs found nearby.
General	Mammal Hole	295448	612782	02/05/2024	Single burrow on far side of river. Correct size and shape for water vole but no other field signs found nearby.
General	Mammal Hole	295453	612770	02/05/2024	Two adjacent burrows of correct size and shape for water vole. No definitive field signs found nearby.
General	Mammal Hole	295907	612445	02/05/2024	Four burrows in steep exposed bank at water level. Correct size and shape for water vole but unable to reach far enough down to confirm.

Species	Sign	Easting	Northing	Survey Date	Notes
General	Mammal Hole	294142	611169	06/06/2025	Burrow in bank of Portrail Water. Approximately the size and shape for a water vole burrow but couldn't be closely examined as was on opposite bank of the watercourse. No other field signs noted nearby.
Hare	Mountain Hare Sighting	295300	603700	22/03/2023	Seen during ornithology survey, still in winter coat.
Otter	Spraint	295704	605016	28/06/2023	On mossy rock in centre of river. Fresh.
Otter	Spraint	295418	604947	28/06/2023	On mossy rock at edge of river. Old.
Otter	Spraint	295313	604847	28/06/2023	On mossy rock at edge of river. Old.
Otter	Spraint	296230	603354	28/06/2023	Small old spraint on soil bank of burn.
Otter	Spraint	296262	603339	28/06/2023	Small old spraint on upturned chunk of bank in burn.
Otter	Spraint	296421	603403	28/06/2023	Small old spraint on upturned chunk of bank in burn.
Otter	Spraint	296378	603495	28/06/2023	Two relatively fresh spraints on rock within Daer Water.
Otter	Spraint	296488	603544	28/06/2023	Small, relatively fresh spraint on rock in Daer Water.
Otter	Spraint	296479	603563	28/06/2023	Relatively fresh spraint on rock within Daer Water.
Otter	Spraint	296470	603658	28/06/2023	Relatively fresh spraint on rock within Daer Water.
Otter	Spraint	296216	605539	29/06/2023	On mossy rock in middle of watercourse. Old.
Otter	Spraint	294904	604645	29/06/2023	On mossy rock in middle of watercourse. Old.
Otter	Spraint	294758	604639	29/06/2023	Old otter spraint on rock in middle of watercourse.
Otter	Spraint	296577	607315	29/06/2023	Relatively fresh spraint on rock within Kirkhope Cleuch.
Otter	Spraint	296482	607281	29/06/2023	Small, old spraint on rock within Kirkhope Cleuch.
Otter	Spraint	296454	607304	29/06/2023	Relatively fresh spraint on upturned chunk of soil in Kirkhope Cleuch.
Otter	Spraint	296406	607359	29/06/2023	Two spraints, one old and one fresh, on rock on bank of Kirkhope Cleuch.
Otter	Spraint	296159	607372	29/06/2023	Relatively fresh spraint on rock within Kirkhope Cleuch.
Otter	Spraint	296014	607310	29/06/2023	Relatively small, fresh spraint on rock within Kirkhope Cleuch.

Species	Sign	Easting	Northing	Survey Date	Notes
Otter	Spraint	295864	607220	29/06/2023	Remains of old spraint (just dark, tarry streak remaining) on rock within Kirkhope Cleuch.
Otter	Spraint	295728	607141	29/06/2023	Remains of potential old spraint (just bones left) on rock within Kirkhope Cleuch.
Otter	Spraint	295496	606930	29/06/2023	Relatively old spraint on edge of rock within Kirkhope Cleuch.
Otter	Spraint	295380	606935	29/06/2023	Small, fresh spraint on rock within Kirkhope Cleuch.
Otter	Spraint	295325	606926	29/06/2023	Relatively fresh spraint on large boulder within Kirkhope Cleuch.
Otter	Spraint	296050	607466	29/06/2023	Two old spraints on rock within tributary of Kirkhope Cleuch.
Otter	Spraint	296436	605233	30/06/2023	On moss-covered rock in middle of watercourse.
Otter	Spraint	296619	604648	30/06/2023	On moss-covered rock in middle of watercourse.
Otter	Spraint	296414	605617	30/06/2023	One large fresh and one smaller older sprain on large rock under bridge over Daer Water.
Otter	Spraint	296582	605697	30/06/2023	Two relatively fresh spraints on rock on bank of Daer Water.
Otter	Spraint	295483	612772	02/05/2024	Relatively fresh spraint on large boulders on opposite bank of river.
Otter	Spraint	295660	612680	02/05/2024	Old spraint (only bones remaining) on grassy bank of river.
Otter	Spraint	296736	609684	02/05/2024	Old spraint (only bones) on rock in river.
Otter	Spraint	296236	610519	02/05/2024	Remains of old spraint on rock in river.
Otter	Spraint	296235	610725	02/05/2024	Old spraints (only bones remaining) on grassy bank of river.
Otter	Spraint	296206	610818	02/05/2024	Two very old, scattered spraints on large rock on riverbank.
Otter	Spraint	296204	610777	02/05/2024	Small, old spraint on grassy bank of river.
Otter	Spraint	295848	609619	03/05/2024	Small, old spraint on rock in watercourse.
Otter	Spraint	295926	609631	03/05/2024	Small, old spraint on small wooder bridge over watercourse.
Otter	Spraint	295986	609726	03/05/2024	Relatively fresh spraint on large rock within watercourse.
Otter	Spraint	296045	609835	03/05/2024	Relatively fresh spraint on large rock within watercourse.

Species	Sign	Easting	Northing	Survey Date	Notes
Otter	Spraint	296071	609847	03/05/2024	Relatively fresh spraint on large rock within watercourse.
Otter	Spraint	296108	609941	03/05/2024	Remains of old spraint on rock within watercourse.
Otter	Spraint	294151	611185	06/06/2025	Habitual sprainting site on rock with at least three spraints on the bank of Portrail Water.
Pine Marten	Potential Scat	295976	608893	03/05/2024	Series of potential pine marten droppings on top of drystone dyke near forestry plantation.
Pine Marten	Potential Scat	294029	910408	05/06/2025	Small, dark, coiled scat. Quite old and dry with little smell.
Pine Marten	Potential Scat	296279	609408	17/07/2025	Very old, thin, coiled scat on old drystone dyke in clearing in plantation.
Reptile	Common Lizard Sighting	293650	605930	14/04/2023	Corpse found near summit of Hirstane Rig.
Reptile	Potential Hibernaculum	295015	604777	28/06/2023	Sheep fold.
Reptile	Potential Hibernaculum	295030	604561	28/06/2023	Sheep fold.
Reptile	Common Lizard Sighting	296086	603546	28/06/2023	Darted into vegetation along burn.
Reptile	Potential Hibernaculum	296154	605608	29/06/2023	Sheep fold.
Reptile	Potential Hibernaculum	294620	604654	29/06/2023	Pile of rocks on side of hill.
Reptile	Potential Hibernaculum	294554	605885	29/06/2023	Pile of rocks (cairn) on side of hill.
Reptile	Potential Hibernaculum	295970	606121	29/06/2023	Pile of rocks (cairn) on side of hill.
Reptile	Common Lizard Sighting	294368	604974	29/06/2023	Common lizard observed in grass.
Reptile	Potential Hibernaculum	295433	606935	29/06/2023	Very old and collapsed overgrown drystone structure.
Reptile	Potential Hibernaculum	294475	606546	29/06/2023	Collapsed, overgrown portion of old sheep fold.
Reptile	Common Lizard Sighting	296642	607303	29/06/2023	Darted into drystone dyke at edge of plantation.
Reptile	Potential Hibernaculum	296566	605739	30/06/2023	Corrugated metal and overgrown collapsed drystone at old sheep fold.
Reptile	Potential Hibernaculum	296542	606844	30/06/2023	Old drystone sheep fold with some collapsed overgrown sections.
Reptile	Common Lizard Sighting	296628	609811	02/05/2024	Darted through grass on riverbank.
Reptile	Potential Hibernaculum	296137	610909	02/05/2024	Partially-collapsed drystone dyke, partly overgrown by moss.

Species	Sign	Easting	Northing	Survey Date	Notes
Reptile	Potential Hibernaculum	295857	610647	02/05/2024	Collapsed drystone building with remains of slate roof offering potential hibernacula.
Reptile	Potential Hibernaculum	295759	609613	03/05/2024	Large overgrown log pile.
Reptile	Potential Hibernaculum	294338	610859	06/06/2025	Old, collapsed drystone dyke overgrown with grass and moss.
Reptile	Potential Hibernaculum	294246	610800	06/06/2025	Old collapsed drystone dyke overgrown with grass and moss.
Reptile	Potential Hibernaculum	296277	609404	17/07/2025	Old drystone dyke partially-overgrown with moss.
Water Vole	Burrow	294996	604647	25/01/2023	Hole in grass. Feeding signs (nibbled rush at 45 degrees) found.
Water Vole	Burrow	293934	604790	28/06/2023	Fist-sized burrow. Feeding signs in area.
Water Vole	Burrow	295699	605014	28/06/2023	Fist-sized hole on riverbank with feeding signs surrounding.
Water Vole	Burrow	295151	604748	28/06/2023	Multiple fist-sized burrows. Feeding signs in area.
Water Vole	Burrow	294853	604136	28/06/2023	Multiple fist-sized hole near watercourse. Signs of feeding nearby.
Water Vole	Burrow	294875	603979	28/06/2023	Multiple fist-sized hole near watercourse. Signs of feeding nearby.
Water Vole	Burrow	295018	603818	28/06/2023	Multiple fist-sized hole near watercourse. Signs of feeding nearby.
Water Vole	Burrow	296369	607353	29/06/2023	Potential water vole burrow in grassy bank of Kirkhope Cleuch. Run leading from entrance to feeding station adjacent containing some rush clippings cut at 45 degrees.
Water Vole	Burrow	296128	607365	29/06/2023	Potential water vole burrow (correct size) on grassy bank of Kirkhope Cleuch. Several vole holes and field signs also nearby.
Water Vole	Burrow	296085	607363	29/06/2023	Potential water vole burrow (correct size) on grassy bank of Kirkhope Cleuch. Several vole holes and field signs also nearby.
Water Vole	Feeding Station / Clippings	294244	606257	29/06/2023	Potential feeding station with several rush fragments cut at 45 degrees.
Water Vole	Lawns / Vegetation Runways	294106	606102	29/06/2023	Network of runs and potential water vole feeding remains along bank of Kirkhope Cleuch, with some rush fragments cut at 45 degrees.
Water Vole	Burrow	296322	605052	30/06/2023	Multiple fist-sized burrows in embankment with carved-out paths from entrance to watercourse.
Water Vole	Burrow	296224	604978	30/06/2023	Multiple fist-sized burrows in embankment leading to watercourse.

Making Sustainability Happen

Technical Appendix 6.4: Bat Survey Report

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Tables in Text

Figures (EIAR Volume 3a)

Annexes

1.0 Introduction

MacArthur Green (now SLR Consulting Limited[1]) was commissioned by Watchman Energy Park Ltd. (the Applicant) to carry out bat surveys for the proposed Watchman Energy Park (hereafter referred to as the 'Proposed Development').

Bat surveys included:

- Desk study;
- A Preliminary Roost Assessment (PRA) (2023, 2024 and 2025); and
- Automated activity surveys (2023 and 2024).

The aim of the surveys was to quantify the usage of the Site by bats and variation in bat activity levels within the Site, and to inform the ecological impact assessment (EcIA) for the Environmental Impact Assessment (EIA) Report (EIAR).

2.0 The Site and Survey Area

The Site (**Figure 1.2, EIAR Volume 3a**) covers an area of 1,089 hectares (ha) and is located approximately 10 km south of Crawford and 12 km to the west of Moffat, South Lanarkshire.

The land cover within the Site Boundary primarily consists of a mix of typical upland habitats including blanket bog, flush, wet heath, dry heath and acid grassland, with coniferous plantation woodland and a small area of native woodland present along the Western and Eastern access tracks respectively. A full description of the habitats found within the Site is provided in **Technical Appendix 6.2a (EIAR Volume 4)**. The Site is predominantly used as rough grazing with commercial forestry production in the north at Watermeetings Forest.

The Site does not overlap with any statutory designated sites containing bat related qualifying features and interests.

The initial automated activity (ground-level static) survey area covered the proposed wind turbine infrastructure area in 2023 and consisted of 13 Anabat deployment locations. Following design iterations in 2024, further activity surveys were undertaken to cover additional areas of the Site, which consisted of five Anabat deployment locations.

The Preliminary Roost Assessment (PRA) survey area is shown on **Figure 6.7 (EIAR Volume 3a)**.

3.0 Bats and Wind Farms

3.1 Policy and Guidance

All bat species are protected under the following legislation:

- The Habitats Directive 92/43/EEC;
- The Wildlife and Countryside Act 1981; and
- The Conservation (Natural Habitats, &c.) Regulations 1994.

Details pertaining to the legal status of bats are included within **Annex A** and in **Table A-1**.

[1] Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

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In the UK and Europe, guidelines have been produced with regards to assessing the ecological impact upon bats from wind farm developments. These guidelines help to inform survey and mitigation strategies.

The following guidance documents have been used in the preparation of this report:

- Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London[2];
- Collins, J. (ed.) (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 4th Edition. The Bat Conservation Trust, London;
- Andrews, H. (2018) *Bat Roosts in Trees: a guide for identification and assessment for tree-care and ecology professionals*. Pelagic Publishing, Exeter;
- Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield;
- Russ, J. (2012) *British Bat Calls, A Guide to Species Identification*, Pelagic Publishing, Exeter; and
- NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

4.0 Methods

4.1 Desk-Based Study

A National Biodiversity Network (NBN) Atlas Scotland[3] search was completed to obtain bat records from 2010 to 2025 within 10 km of the Site.

4.2 Field Survey Methods

4.2.1 Preliminary Roost Assessment (PRA)

The PRA in 2023 followed the assessment methodology as set out in Collins (2016)[2] to identify any Potential Roost Features (PRFs) in trees, buildings and structures, which could support roosting bats and to search for evidence of roosting bats. Where PRFs were identified in 2023, they were assigned a value of low, moderate or high suitability which indicates the likelihood of bats being present and informs the requirement for further survey work, such as a climbing inspection and / or dusk and dawn bat activity surveys. Collins (2016) states the following descriptions for assessing the potential roosting suitability of features:

- Low – A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[4] and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e.,

[2] The surveys in 2023, methods and analysis followed the 3rd edition of the Bat Conservation Trust survey guidelines as surveys were completed before the 4th edition guidelines were published in September 2023.

[3] NBN Atlas occurrence download at https://nbnatlas.org

[4] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

unlikely to be suitable for maternity or hibernation[5]). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential[6].

- Moderate - A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions4 and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments are made irrespective of species conservation status, which is established after presence is confirmed).
- High - A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions4 and surrounding habitat.

The PRA in 2024 and 2025 followed the assessment methodology as set out in the updated guidelines, Collins (2023), undertaking a daytime walkover. Where PRFs were identified in 2024 and 2025, they were assigned a value of low, moderate or high suitability for buildings and structures (as classified previously) or PRF-I, PRF-M or FAR for trees:

- PRF- Individual (I) – PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
- PRF- Multiple (M) – PRF is suitable for multiple bats and may therefore be used by a maternity colony.
- FAR - Further assessment required to establish if PRFs are present in tree.

The PRA was carried out within the PRA survey area, as shown in **Figure 6.7 (EIAR Volume 3a)**, in 2023, 2024 and 2025.

4.2.2 Automated Activity Surveys

NatureScot *et al*. (2021) recommends that, "*Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments*."

The Proposed Development layout at the time of survey in 2023 included 20 proposed wind turbines, therefore requiring 13 detectors to be deployed. Detectors were placed and spread across potential wind turbine locations within the Site, deployed seasonally (three deployment periods) from May to August.

In 2024, design iterations meant that five additional locations were required to be surveyed within the previously surveyed area. These five locations were surveyed in 2024, deployed seasonally (three deployment periods) from April to September.

Detector locations from 2023 and 2024 are shown in **Figure 6.7 (EIAR Volume 3a).**

Anabat Swift detectors recording full-spectrum files were deployed for a minimum period of 14 consecutive nights at the noted detector locations (i.e., exceeding minimum survey requirements of ten days per season; spring April to May, summer June to mid-August; autumn mid-August to October) and were positioned at a height of 1 or 2 m (in 2023, some

[5] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al*., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

[6] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Anabats were on 1 m stakes due to cattle being present). Each detector was set up to record bats from dusk to dawn with detectors starting 30 minutes before dusk and finishing 30 minutes after dawn. Detector operating times and a description of the habitat type at each location are detailed in **Table B-1** of **Annex B**.

The full spectrum detector was deployed with the following settings:

- Sensitivity value of 14;
- Minimum frequency of 15 kHz;
- Maximum frequency of 250 kHz;
- Maximum file length of 15 s;
- Minimum event of -2 ms; and
- Sampling rate of 320 kHz.

Data was analysed using Kaleidoscope Pro Auto ID classifier which assigns a species label to a sound file (Reason *et al.,* 2023). To ensure that all bat calls (with the exception of common and soprano pipistrelle which were excluded) were identified correctly by the software, they were manually reviewed by an appropriately trained ecologist using Kaleidoscope Viewer software. This method of analysis is in line with current guidelines for data analysis which recommends the manual checking of all non-*Pipistrellus* (excluding Nathusius' pipistrelle) calls when using automated methods (Collins, 2023). Sound files labelled as noise were reviewed. Guidance on call parameters was taken from Russ (2012).

For the purpose of this report and for Ecobat analysis a single bat registration was classed as a single labelled Kaleidoscope file containing a sequence of bat pulses.

In line with NatureScot *et al*. (2021), further analysis of bat data was carried out using the secure online tool Ecobat (Mammal Society, 2024)[7], to gain a measure of relative bat activity at the Site. Ecobat data was then evaluated in accordance with NatureScot *et al.* (2021) guidance to determine the overall site risk level for bats. The Ecobat analysis automatically analyses data per month and not per season. The results are presented based on this analysis per month.

4.3 Methods for Analysing Bat Activity Levels and Risks

NatureScot *et al*. (2021) details the methodology for analysing bat activity levels. This method is summarised below and involves the following steps:

1. Estimating bat activity levels;
2. Categorising collision risk of the relevant species;
3. Identifying population relevant abundance (size of the populations);
4. Categorising the potential vulnerability of bat populations by combining collision risk with population abundance;
5. Categorising the site risk level;
6. Completing the overall risk assessment; and
7. An assessment of significance and mitigation.

The following sections outline the methods used in each step.

[7] Ecobat data is summarised in this Technical Appendix. The full Ecobat report is available upon request from the Project Team – details are provided in **Chapter 1: Introduction (EIAR Volume 2).**

4.3.1 Step 1: Bat Activity Levels

A measure of relative bat activity was obtained using the secure online tool Ecobat (Mammal Society, 2024) for automated data. NatureScot *et al.* (2021) explains that, ‘‘*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year and in comparable weather conditions… Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*”.

Table 4-1 below, taken from NatureScot *et al.* (2021), shows the five percentile categories for ease of reference. Only static data from automated activity surveys was analysed with the Ecobat tool.

The reference range data set were stratified to include:

- Only records from within +/- 1 month of the survey date;
- Only records from within the Region of the survey location; and
- Records using any make/model of bat detector.

Table 4-1 Percentile Score and Categorised Level of Bat Activity

Percentile Score	Bat Activity
81 to 100	High
61 to 80	Moderate to High
41 to 60	Moderate
21 to 40	Low to Moderate
0 to 20	Low

4.3.2 Step 2: Vulnerability to Collision

Appendix 3 of NatureScot *et al*. (2021) presents a generic assessment of vulnerability to collision for UK species, based on species behaviour, flight characteristics and casualties in the UK and Europe. **Table 4-2** provides a summary of the vulnerability of each bat species to collision.

Table 4-2 Vulnerability of Bat Species to Turbine Impact in the UK

Risk of Turbine Impact (Collision Risk)		
Low Risk	**Medium Risk**	**High Risk**
Myotis spp.	Serotine	Common pipistrelle
Long-eared bats	Barbastelle	Soprano pipistrelle
Horseshoe bats		Noctule
		Leisler’s bat
		Nathusius’ pipistrelle

Habitat characteristics at the location of wind turbines can have an important influence on the vulnerability of bat species to collision. For example, proximity to key feeding sites and commuting routes such as water features and woodland edge habitats is known to increase the likelihood of bat collision (NatureScot *et al*. 2021).

4.3.3 Step 3: Population Relative Abundance

NatureScot *et al.* (2021) details the sensitivity of a bat species to impact based on their population’s relative abundance in Scotland as detailed in **Table 4-3**. Species with the rarest relative abundance are more susceptible to significant effects.

Table 4-3 Population Relative Abundance of Bats in Scotland

Relative Abundance	Species
Common	Common pipistrelle (*Pipistrellus pipistrellus)*
	Soprano pipistrelle (*Pipistrellus pygmaeus*)
Rarer	Brown long-eared bat (*Plecotus auritus)*
	Daubenton's bat *(Myotis daubentonii)*
	Natterer's bat (*Myotis nattereri)*
Rarest	Whiskered bat (*Myotis mystacinus*)
	Brandt's bat (*Myotis brandtii*)
	Nathusius' pipistrelle (*Pipistrellus nathusii*)
	Noctule bat (*Nyctalus noctule*)
	Leisler’s bat (*Nyctalus leisleri*)

4.3.4 Step 4: Potential Vulnerability of Bat Populations

Table 4-4 below, sourced from NatureScot *et al.* (2021), uses the measure of collision risk, in combination with population relative abundance, to indicate the potential vulnerability of populations of British bat species. The overall potential vulnerability of bat populations is identified as: low (yellow), medium (orange), high (red).

Table 4-4 Level of Potential Vulnerability of Populations of British Bat Species

Relative Abundance of Bats in Scotland		Collision Risk		
		Low collision risk	**Medium collision risk**	**High collision risk**
	Common Species			Common pipistrelle Soprano pipistrelle
	Rarer Species	Brown long-eared bat Daubenton’s bat Natterer’s bat		
	Rarest Species	Whiskered bat Brandt’s bat		Nathusius’ pipistrelle Noctule bat Leisler’s bat

4.3.5 Step 5: Categorise the Site Risk Level

The site risk level is categorised through a combination of habitat risk and project size which is then entered into the table matrix as shown below in **Table 4-5** to calculate the overall site risk level. The full matrix table, as provided within NatureScot *et al.* (2021), is shown in **Annex C** of this report which includes descriptions on how to determine the habitat risk and project size for the Proposed Development.

Table 4-5 Initial Site Risk Assessment

Site Risk Level (1-5)*	Project Size			
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Key: Green (1-2) – low / lowest site risk; Amber (3) – medium site risk; Red (4-5) – high / highest site risk*				
** Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.*				

4.3.6 Step 6: Risk Assessment

The overall risk assessment is undertaken for high collision risk species identified on-site and involves combining site risk level (**Table 4-5**) with the Ecobat activity level (**Table 4-1**). The overall risk assessment matrix is shown in **Table 4-6** below where 'Low' site risk level (green) is 0 to 4, 'Medium' site risk level (amber) is 5 to 12, and 'High' site risk level (red) is 15 to 25.

Table 4-6 Overall Risk Assessment

Ecobat activity category (or equivalent justified categorisation)						
Site Risk Level	Nil (0)	Low (1)	Low-Moderate (2)	Moderate (3)	Moderate-High (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

4.3.7 Step 7: Assessment of Significance and Mitigation

The outputs of the risk assessment are then used to assess the significance of effect within the EIA. At this stage, other site-specific factors should be considered such as habitat characteristics (and how they may change), behaviour of species within the site, and the location of the site regarding the natural range of the species and how this could affect favourable conservation status.

Mitigation measures as detailed within NatureScot *et al.* (2021) are then considered where appropriate.

5.0 Bat Survey Details and Limitations

The guidance recommends the minimum level of pre-application survey required for ground level static detectors to be ten nights of recordings in each of spring (April to May), summer (June to mid-August) and autumn (Mid-August to October[8]).

Automated activity surveys should capture a sufficient number of nights (minimum of ten nights) with appropriate weather conditions for bat activity (i.e., temperatures of on or above 8ºC in Scotland at dusk, maximum ground level wind speed of 5 m/s and no, or only very light, rainfall). To account for the potential limitations of weather on the number of suitable nights recorded, surveys were carried out over longer deployment periods, with a minimum of 14 nights recorded.

Ground-level static surveys were carried out on the following dates:

- 2023: Spring 10/05/2023 to 24/05/2023; Summer 13/06/2023 to 28/06/2023; and Autumn 16/08/2023 to 30/08/2023.
- 2024: Spring 25/04/2024 to 09/05/2024; Summer 04/06/2024 to 18/06/2024; and Autumn 10/09/2024 to 24/09/2024.

The Ecobat analysis automatically analyses data per month and not per season. The results are presented based on analysis per month. The Ecobat report only records to genus level for *Nyctalus* spp.

Due to unforeseen errors with the detectors, microphones or batteries, it was not always possible to achieve 14 consecutive nights of recordings.

In 2023, one detector failed to record data for minimum ten nights during a deployment period (Location 4 in June). Two detectors had fallen during the deployment period (Locations 2 and 3 in August) but had recorded for the 14 nights. The majority of locations recorded for more than ten nights, with a total of 544 complete nights recorded which is beyond the minimum number of nights taking into account the required scope of the survey in line with NatureScot (2021) guidance (13 Anabats * 10 nights * 3 seasonable deployments = 390 nights of data). The survey timings can be seen in **Annex B**, **Table B-1**.

In 2024, two detectors failed to record data for minimum ten nights during a deployment period (Location 2 in June and September and Location 4 in September). Two detectors had fallen during the deployment period (Location 2 in June Location 1 in September) but had recorded for the 14 nights. Most of the locations recorded for more than ten nights, with a total of 183 complete nights recorded which is beyond the minimum number of nights required in line with NatureScot (2021) guidance (5 Anabats * 10 nights * 3 seasonable deployments = 150 nights of data). The survey locations and timings can be seen in **Annex B, Table B-2**.

Anabat detectors are a commonly used bat detector for acoustic monitoring at wind farm sites, however all bat detectors have limitations and will only monitor bat activity within a limited area, which for Anabats is usually around 30 m, depending on a variety of environmental factors. Furthermore, due to passive monitoring methodologies which depend on sound reaching the microphone, the detection rate of bat calls varies with a bias towards loud bat calls with quieter calls, namely brown long-eared bats (low collision risk species), potentially being under-recorded.

[8] Ideally mid-August to mid-September.

6.0 Survey Results and Analysis

6.1 Desk-Based Study

The NBN Atlas data search[3] returned records of the following bat species within 10 km of the Site between 2010 to 2025 inclusive:

- Brown long-eared bat*;*
- Common pipistrelle*;*
- Daubenton's;
- Leisler's;
- Natterer's;
- Noctule; and
- Soprano pipistrelle; and
- Whiskered / Brandt's bat.

Details regarding licences and data providers for these records are included in **Table 6-1.**

Table 6-1 Data Providers for NBN Atlas Scotland Records Used

Species	Data Provider	Licence
Brown long-eared bat	NatureScot (Southern Scotland Bat Survey)	OGL[9]
Common pipistrelle	NatureScot (Southern Scotland Bat Survey) & Bat Conservation Trust (BCT) (Bethan Wood, Ray Milliner)	OGL
Daubenton's	NatureScot (Southern Scotland Bat Survey)	OGL
Leisler's	NatureScot (Southern Scotland Bat Survey)	OGL
Natterer's	NatureScot (Southern Scotland Bat Survey)	OGL
Noctule	NatureScot (Southern Scotland Bat Survey) & Bat Conservation Trust (BCT) (Bethan Wood)	OGL
Soprano pipistrelle	NatureScot (Southern Scotland Bat Survey, Tom Hastings, Freda Seddon)	OGL
Whiskered / Brandt's	Bat Conservation Trust	OGL

6.2 Preliminary Roost Assessment

The PRA survey of the Proposed Development was undertaken in June 2023, May 2024, June 2025 and July 2025 within the respective survey area detailed on **Figure 6.7 (EIAR Volume 3a)**.

Any structures or trees recorded with potential suitability for roosting bats are shown in **Figure 6.7 (EIAR Volume 3a)** with the detailed results (target notes) listed in **Annex D**, **Table D-1, Table D-2 and Table D-3**.

Overall, there were 21 features recorded with potential suitability for roosting bats (13 trees and eight structures).

[9] Open Government Licence (OGL) https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

No features with moderate or high suitability for roosting bats were recorded within 200 m plus rotor radius of a proposed wind turbine location and as such no further surveys were required.

6.3 Automated Activity Surveys

In 2023, bat detectors were deployed at 13 locations within the Site from May to August over a total period of 43 days, collecting 544 complete recording nights of data, see **Table B-1** of **Annex B** and **Figure 6.7 (EIAR Volume 3a)**.

Bats were detected on 37 of the 43 nights. A total of five bat species and one genus were recorded at these locations. The total number of passes recorded for each species across all the detectors within the Site is shown in **Table 6-2**.

Table 6-2 Total number of bat passes for each species across all locations (2023)

Species / Species Group	No of Registrations	Percentage of total (%)
Common pipistrelle	1101	52.2
Soprano pipistrelle	740	35.1
Nyctalus spp.[10]	134	6.4
Daubenton's	110	5.2
Natterer's	8	0.4
Brown long-eared	15	0.7
Total	**2108**	**100**[11]

In 2024, bat detectors were deployed at five locations within the Site from April to September over a total period of 42 days and collecting 183 complete recording nights of data, see **Table B-2** of **Annex B** and **Figure 6.7 (EIAR Volume 3a)**.

Bats were detected on 10 of the 42 nights. A total of four bat species and one genus were recorded at these locations. The total number of passes recorded for each species across all the detectors within the Site is shown in **Table 6-3.**

Table 6-3 Total number of bat passes for each species across all locations (2024)

Species / Species Group	No of Registrations	Percentage of total (%)
Common pipistrelle	15	36.6
Soprano pipistrelle	20	48.8
Nyctalus spp.	3	7.3
Daubenton's	1	2.4
Natterer's	2	4.9
Total	**41**	**100**[11]

The survey results were processed using the Ecobat tool (Mammal Society, 2024) to gain a measure of relative bat activity at the Site, the full Ecobat Report is available upon request

[10] The Ecobat report only records to genus level for *Nyctalus* spp.

[11] The 'Total' percentage may not be exactly 100% due to rounding of the percentages per species.

from the Project Team[12], with the summarised results and analysis are presented in Steps 1 to 6 below.

6.3.1 Step 1: Bat Activity Levels

6.3.1.1 Average Annual Site Activity Levels

Table 6-4 and **Table 6-5** detail the average annual activity levels within the Site calculated using Ecobat for 2023 and 2024 respectively.

The median percentile represents the most frequent activity category and the 'typical' bat activity levels in the Site. The maximum percentile can be used to help interpret if there are unusually high levels or important peaks of bat activity. The reference range is the number of nights for each species that the data was compared to (a reference range of 200+ is recommended to be confident in the relative activity level).

Table 6-4 2023 Average annual activity levels within the Site (from Ecobat Analysis[13])

Species / Group	Median Percentile	Activity Level	95% CIs[14]	Max Percentile	Activity Level	Reference Range	Nights Recorded
Daubenton's	7	Low	7 – 7	57	Moderate	796	62
Natterer's bat	18	Low	18 – 18	18	Low	202	8
Nyctalus spp.	1	Low	4.5 – 4.5	52	Moderate	3835	44
Common pipistrelle	0	Low	4 – 4	15	Low	38,093	157
Soprano pipistrelle	0	Low	3 – 3	12	Low	40,805	124
Brown long-eared	52	Moderate	52 – 52	100	High	130	12

Table 6-5 2024 Average annual activity levels within the Site (from Ecobat Analysis[15])

Species / Group	Median Percentile	Activity Level	95% CIs[14]	Max Percentile	Activity Level	Reference Range	Nights Recorded
Daubenton's	1	Low	0	1	Low	687	1
Natterer's bat	28	Low – Moderate	0	28	Low – Moderate	196	1
Nyctalus spp.	1	Low	0	1	Low	3704	2
Common pipistrelle	0	Low	0 – 0	0	Low	37,585	7
Soprano pipistrelle	0	Low	0 – 0	0	Low	40,479	10

[12] Project Team contact details are provided in **Chapter 1: Introduction (EIAR Volume 2).**

[13] Taken from Ecobat analysis report created on the 28/02/2025 from static activity data of the Site in 2023

[14] CIs: confidence intervals.

[15] Taken from Ecobat analysis report created on the 17/02/2025 from static activity data of the Site in 2024

6.3.1.2 Monthly Location Specific Activity Levels

Data on the monthly activity levels per location is provided in **Table E-1** of **Annex E**.

6.3.2 Step 2, 3 and 4: Collision Risk, Population Relative Abundance and Potential Vulnerability

Table 6-6 details the collision risk, population relative abundance and potential vulnerability of the bat species recorded within the Site.

Table 6-6 Collision risk, population relative abundance and potential vulnerability

Bat Species	Collision Risk	Population Relative Abundance	Potential Vulnerability
Common pipistrelle	High	Common	Medium
Soprano pipistrelle	High	Common	Medium
Leisler's	High	Rarest	High
Noctule	High	Rarest	High
Daubenton's	Low	Rarer	Low
Natterer's	Low	Rarer	Low
Brown long-eared	Low	Rarer	Low

6.3.3 Step 5: Categorising Site Risk Level

The site risk level is determined by project size and habitat risk (see **Table 4-5**).

The Proposed Development would consist of 13 wind turbines with a maximum tip height of 240 m above ground level (agl), with a number of wind farms within the vicinity, and so falls within the 'Medium' project size, as shown in **Table 4-5** and **Table C-1** of **Annex C**.

In terms of habitat risk for bats, there are no buildings, structures, or trees with moderate and/or high bat roosting potential within 200 m plus the rotor radius of wind turbines.

Foraging habitat quality and connectivity within this buffer area from the turbines is low with a largely treeless environment and small open upland burns and a fairly homogenous area of open moorland habitat present. This results in a habitat risk classification of 'Low' as shown in **Table 4-5** and **Table C-1** of **Annex C**.

According to **Table 4-5** above, the 'Medium' project size combined with a 'Low' habitat risk level results in an overall site risk assessment of 'Low/Lowest' (2).

6.3.4 Step 6: Risk Assessment – High Collision Risk Species Only

The overall risk assessment is undertaken for high collision risk species which were identified within the Site. Low-risk species have a low risk of collision with a turbine blade, so the impact of the Proposed Development on these local bat populations (*Myotis* spp. and *Plecotus* spp.) would likely be negligible.

The overall risk assessment involves multiplying the site risk level (**Table 4-5**) with the median and the maximum Ecobat activity levels (**Table 4-1)** to calculate both the typical (median) site risk level, and the maximum site risk level.

Table 6-7 and **Table 6-8** combines the monthly data from 2023 and 2024 respectively and summarises the overall risk assessment score for high-risk species based on the median and maximum percentiles for the Site. The overall site risk scores for all high collision risk species in 2023 and 2024, based on the median percentile and maximum percentiles were

'Low' (2), other than for *Nyctalus* spp. which had a 'Medium' (6) score in 2023 based on maximum percentiles.

Table 6-7 Risk assessment scores based on median and maximum percentiles for high collision risk species 2023

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Max. Percentile
Common pipistrelle	Low (2)	Low (2)
Soprano pipistrelle	Low (2)	Low (2)
Nyctalus spp.	Low (2)	Medium (6)

Table 6-8 Risk assessment scores based on median and maximum percentiles for high collision risk species 2024

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Max. Percentile
Common pipistrelle	Low (2)	Low (2)
Soprano pipistrelle	Low (2)	Low (2)
Nyctalus spp.	Low (2)	Low (2)

Figures 6.8 to 6.13 (EIAR Volume 3a) illustrate the results of the median monthly risk assessment scores for high collision risk bat species recorded within the Site in 2023 and 2024 at each survey location, illustrating how bat activity and risk levels varies within the Site across the year and by species. This data is also presented in **Table E-1** of **Annex E** which includes both the median and maximum monthly risk assessment scores.

No high-risk assessment scores were recorded across the Site per month in 2023, with only low to medium scores recorded. To provide an indication of how activity varied across the survey period for high collision risk species, the percentage of locations where a medium risk assessment score was calculated from the median and maximum percentiles. **No high-risk** or medium-risk assessment scores were recorded across the Site per month in 2024, with only low scores recorded.

Table 6-9 shows the percentage of sample locations where a medium risk assessment score was recorded. Using this method, no high-risk species recorded a medium risk based on median percentiles.

The maximum percentile scores, which can be used to suggest peaks in bat activity, calculated a peak in activity during August 2023 for *Nyctalus* spp., as also summarised in **No high-risk** or medium-risk assessment scores were recorded across the Site per month in 2024, with only low scores recorded.

Table 6-9 below. NatureScot guidance (2021) notes there is evidence from southern Scotland that the 4-week period between mid-August to mid-September often corresponds with a substantial seasonal peak in bat activity.

No high-risk or medium-risk assessment scores were recorded across the Site per month in 2024, with only low scores recorded.

Table 6-9 The Percentage of Locations with Medium Risk Assessment Scores based on Monthly Median and Maximum Percentiles for High Collision Risk Species 2023

	Species	May	June	August
Median Percentile	Common pipistrelle	0%	0%	0%
	Soprano pipistrelle	0%	0%	0%
	Nyctalus spp.	0%	0%	0%
Maximum Percentile	Common pipistrelle	0%	0%	0%
	Soprano pipistrelle	0%	0%	0%
	Nyctalus spp.	0%	0%	7.69%

6.4 Proximity of Roost Sites Based on Activity Data

The Ecobat output includes an analysis of bat activity data at sample locations, referenced against the known roost emergence times for each high collision risk bat species (Russ, 2012). This indicates whether a roost site may be present in close proximity to a sample location.

In 2023, bat activity at Locations 1 and 9 (**Figure 6.7, EIAR Volume 3a**)) indicated the potential for nearby roost sites which recorded *Pipistrellus* spp., during their known emergence time ranges, as detailed in **Table 6-10**. These registrations were recorded in August which is out with the maternity roost season (15 June to 30 July). The maximum number of calls was one, so the risk is not considered high.

Table 6-10 Anabat locations potentially within proximity to a roost (2023)

Sample Locations	Bat Species	Date	Number of Bat Calls
Location 1	Common pipistrelle	25 – 28/08/2023	1
	Soprano pipistrelle	26 & 28/08/2023	1
Location 9	Common pipistrelle	17/08/2023	1
	Soprano pipistrelle	16/08/2023	1

In 2024, bat activity at Location 1 (**Figure 6.7, EIAR Volume 3a**) indicated the potential for nearby roost sites which recorded *Pipistrellus* spp., during their known emergence time ranges, as detailed in **Table 6-11.** These registrations were recorded in September which is out with the maternity roost season (15 June to 30 July). The maximum number of calls was four, so the risk is not considered high.

Table 6-11 Anabat locations potentially within proximity to a roost 2024

Sample Locations	Bat Species	Date	Number of Bat Calls
Location 1	Common pipistrelle	19 & 21/09/2024	4 & 1
	Soprano pipistrelle	16/09/2024	3

7.0 References

Andrews, H. (2018). *Bat Roosts in Trees: a guide for identification and assessment for tree-care and ecology professionals.* Pelagic Publishing, Exeter.

Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London.

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Reason, P.F. and Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Chartered Institute of Ecology and Environmental Management, Ampfield.

Russ, J. (2012). *British Bat Calls: A Guide to species Identification*. Pelagic Publishing.

ANNEX A Bats Legal Status

The information contained in this Annex is a summarised version of the legislation and should be read in conjunction with the appropriate legislation.

All bat species receive protection under the Conservation (Natural Habitats, &c.) Regulations 1994[16].

For any wild bat species, it is an offence to deliberately or recklessly:

- capture, injure or kill a bat;
- harass a bat or group of bats;
- disturb a bat in a roost (any structure or place it uses for shelter or protection);
- disturb a bat while it is rearing or otherwise caring for its young;
- obstruct access to a bat roost or otherwise deny an animal use of a roost;
- disturb a bat in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb a bat in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- disturb a bat while it is migrating or hibernating.

It's also an offence to:

- damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly); and
- keep, transport, sell or exchange, or offer for sale or exchange any wild bat (or any part or derivative of one) obtained after 10 June 1994[17].

[16] Sections 39(1) – (3).

[17] Available online: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/protected-species-z-guide/protected-species-bats

Table A-1 Legal and Conservation Status of all UK Bats[16]

Species	Legislation / Convention													
	Bern Convention Appendix II	Bonn Convention Appendix II	WCA	Habitats Directive Annex IV	Habitats Directive Annex II	Habs Regs 1994 (as amended) *Scotland*	Conservation of Habs & Species Regs 2010	Conservation Regs (N Ireland) 1995	CROW Act 2000	NERC Act 2006	Wild Mammals Protection Act	UK BAP Priority species	IUCN Red List*	EUROBATS Agreement
Greater horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Lesser horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Daubenton's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Natterer's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Whiskered bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brandt's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Bechstein's bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Alcathoe bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		DD	✓
Noctule	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Leisler's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Serotine	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Common pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Soprano pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Nathusius' pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brown long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Grey long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Barbastelle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Greater mouse-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓

*IUCN categories: LC is Least Concern, NT is Near Threatened, DD is Data deficient; see www.iucnredlist.org for more details.

[16] Source: Bat Conservation Trust. Available online: http://www.bats.org.uk/pages/bats_and_the_law.html

ANNEX B Survey Timings and Anabat Locations

Table B-1 Description of Anabat locations and summary of temporal survey effort (2023)

					Total Number of Complete Recording Nights		
Location	**Easting**	**Northing**	**Bearing**	**Habitat**	**Visit 1 10/05/2023 – 24/05/2023**	**Visit 2 13/06/2023 – 28/06/2023**	**Visit 3 16/08/2023 – 30/08/2023**
1	295698	607714	123	Within 90 m of plantation	14	15	14
2	294734	607101	154	Open moorland	14	15	14**
3	295215	607098	140	Open moorland	14	15	14**
4	294204	606529	40	Within 182 m of watercourse	14	0*	14
5	295215	606523	65	Open moorland	14	15	14
6	294159	605911	25	Within 25 m of watercourse	14	15	14
7	295588	605795	172	Within 185 m of watercourse	14	15	14
8	294435	605226	221	Open moorland	14	15	14
9	295825	605101	118	Within 87 m of watercourse	14	15	14
10	294599	604726	190	Within 116 m of watercourse	14	15	14
11	296582	604521	35	Within 31 m of burn	14	15	14
12	296644	604097	161	Within 68 m of watercourse	14	15	14
13	296185	603348	223	Within 7 m of watercourse	14	15	14
Total					**544**		

**Location 4 failed to record during deployment in June 2023 / **Location 2 and 3 fallen at some point during deployment in August 2023.*

Table B-2 Description of Anabat locations and summary of temporal survey effort (2024)

					Total Number of Complete Recording Nights		
Location	**Easting**	**Northing**	**Bearing**	**Habitat**	**Visit 1 25/04/2024 – 09/05/2024**	**Visit 2 04/06/2024 – 18/06/2024**	**Visit 3 10/09/2023 – 24/09/20234**
1	294029	608360	345	Within 187m of clearfell	14	14	14**
2	294219	608016	300	Open moorland	14	14**	2*
3	294427	607756	40	Open moorland	14	14	14
4	294806	607632	115	Open moorland	14	0*	0*
5	295208	608066	280	Open moorland	14	14	13
Total					**183**		

**Location 2 and 4 failed to record during deployment (Location 2 after 2 nights) / **Location 2 (June) and Location 1 (September) fallen at some point during deployment.*

ANNEX C Initial Site Risk Assessment

Table C-1 Initial Site Risk Assessment[17].

Site Risk Level (1-5) 18	Project Size			
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Key: Green (1-2) – low/lowest site risk; Amber (3) – medium site risk; Red (4-5) – high/highest site risk				

Habitat Risk	Description
Low	Small number of potential roost features, of low quality. Low-quality foraging habitats that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and or an important flyway. Close to key roost and /or swarming.
Project Size	**Description**
Small	Small scale development (<10 turbines). No other wind energy developments within 10 km. Comprising turbines <50 m in height.
Medium	Larger developments (between 10 and 40). May have some other wind development within 5 km. Comprising turbines 50 – 100 m in height.
Large	Largest developments (>40 turbines) with other wind energy developments within 5 km. Comprising turbines >100 m in height.

[17] Sourced from: NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2021). Bats and Onshore Wind Turbines: Survey Assessment and Mitigation.

ANNEX D Preliminary Bat Roost Assessment

Table D-1 Preliminary bat roost assessment target notes (2023)

PRF_ID	Feature	Notes	Roosting Suitability	Grid Reference
PS014	Tree	Single rowan with bark cracks and split on an old dead tree near watercourse.	Moderate	NS 95257 04818
PS015	Tree	Single rowan with bark cracks and split on a tree near watercourse.	Low	NS 95140 04682
PS025	Tree	Two ash by Daer Water. Two rot holes 2 m from ground that do not penetrate very deeply.	Low	NS 96440 02975
PS026	Structure	Uninhabited farm building with old slate roof. Many gaps within and around the loose slates 3 m from ground offering good roosting potential.	High	NS 96377 03016
PS028	Tree	Mature willow by bridge over the Howe Cleuch with area of loose bark 2 m from ground of low potential (likely too exposed for roosting).	Low	NS 96372 04405
PS066	Structure	Old building with multiple gaps in corrugated roof, 3 m from ground.	Moderate	NS 96353 05453
PS067	Structure	Disused house and barn. Some gaps in house roof tiles at corners. Gaps in corrugated barn roof, although this is bare inside and not watertight.	Moderate	NS 96353 05453

Table D-2 Preliminary bat roost assessment target notes (2024)

PRF_ID	Feature	Notes	Roosting Suitability	Grid Reference
PS089	Tree	Live single oak. PRF formed through disease (knot hole). 2 m from ground on limb. Tree could not be inspected closely as young lambs in adjacent field and occupied house on other side. Could see a rot hole of probably PRF-I value.	FAR.[18]	NS 95804 12744
PS090	Structure	Farmhouse with old slate roof. Many loose slates and gaps around gable end of building of high roosting potential, 4 m from ground. Photo not obtained as house occupied and lots of activity around it.	High	NS 95854 12770

[18] Further assessment required to establish if PRFs are present in tree.

PRF_ID	Feature	Notes	Roosting Suitability	Grid Reference
PS091	Structure	Farmhouse with old slate roof. Occupied so could not approach too closely but appears to be several loose slates and gaps around gable end of high potential, 4 m from ground. Photo not obtained as lots of activity around property.	High	NS 96491 10115
PS092	Structure	Ruined drystone building with a few cracks within and around chimney potentially offering roost potential, between 2 and 4 m from ground. Likely too windy and exposed.	Low	NS 95879 10645
PS101	Structure	Stone sheep shelter with corrugated metal roof, 2 m from ground. Low potential roosting opportunities around roof but likely too exposed.	Low	NS 95929 09792
PS102	Structure	Ruined drystone building with several cracks and gaps around chimney potentially offering roost potential, between 2 and 4 m from ground. Likely too exposed.	Low	NS 96220 09981

Table D-3 Preliminary bat roost assessment target notes (2025)

PRF_ID	Feature	Notes	Roosting Suitability	Grid Reference
PS104	Tree	Single, dead Sitka spruce with damage at around 5 m height consisting of at least four woodpecker holes around standing deadwood. Likely too exposed for significant / maternity roost.	PRF-I	NS 94257 10442
PS109	Tree	Standing dead Sitka trunk with several small cracks at the top (around 5 m height). Exposed - surrounded by immature conifer regrowth / plantation.	PRF-I	NS 94292 10697
PS110	Tree	Standing dead Sitka trunk with at least five woodpecker holes that could be used by bats at around 3 m height. Very exposed - surrounded by clearfell.	PRF-I	NS 94449 10714
PS111	Tree	Standing dead Sitka trunk with two small cracks near the top at around 5 m height. Exposed - surrounded by immature conifer regrowth / plantation.	PRF-I	NS 94547 10989
PS112	Tree	Standing dead Sitka trunk with one woodpecker hole near the top at around 5 m height. Exposed - surrounded by immature conifer regrowth / plantation.	PRF-I	NS 94403 10925
PS113	Tree	Standing dead Sitka trunk with vertical cracks near the top (around 4 m). Exposed - open area of immature regrowth.	PRF-I	NS 94220 10850

PRF_ID	Feature	Notes	Roosting Suitability	Grid Reference
PS114	Tree	Standing dead Sitka trunk with at least one woodpecker hole near the top (around 10 m height). Exposed - surrounded by immature conifer regrowth / plantation.	PRF-I	NS 94256 10793
PS115	Tree	Standing dead Sitka trunk with at least seven woodpecker holes at between 7 and 12 m height. Exposed - surrounded by immature conifer regrowth / plantation.	PRF-I	NS 94273 10785

ANNEX E Monthly Location Specific Data

Table E-1 2023 Monthly Location Specific Data for High Collision Risk Species

Location ID	Species	Month	Median Percentile	Median Activity Category [19]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [20]	Overall Median Site Risk Score [21]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I1	*Nyctalus* spp.	Jun	4	Low	4	Low	2	2	Low	2	Low
I1	*Nyctalus* spp.	Aug	5	Low	5	Low	2	2	Low	2	Low
I1	Common pipistrelle	May	0	Low	1	Low	2	2	Low	2	Low
I1	Common pipistrelle	Jun	0	Low	1	Low	2	2	Low	2	Low
I1	Common pipistrelle	Aug	1	Low	3	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	Jun	0	Low	1	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	Aug	1	Low	5	Low	2	2	Low	2	Low
I10	*Nyctalus* spp.	Jun	1	Low	1	Low	2	2	Low	2	Low
I10	*Nyctalus* spp.	Aug	5	Low	8	Low	2	2	Low	2	Low
I10	Common pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I10	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I10	Common pipistrelle	Aug	1	Low	3	Low	2	2	Low	2	Low
I10	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I10	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low

[19] Taken from Table 4-1
[20] Taken from Table 4-5
[21] Taken from Table 4-6

Location ID	Species	Month	Median Percentile	Median Activity Category [19]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [20]	Overall Median Site Risk Score [21]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I10	Soprano pipistrelle	Aug	1	Low	3	Low	2	2	Low	2	Low
I11	*Nyctalus* spp.	Jun	1	Low	3	Low	2	2	Low	2	Low
I11	*Nyctalus* spp.	Aug	3	Low	6	Low	2	2	Low	2	Low
I11	Common pipistrelle	May	0	Low	1	Low	2	2	Low	2	Low
I11	Common pipistrelle	Jun	0	Low	1	Low	2	2	Low	2	Low
I11	Common pipistrelle	Aug	0	Low	4	Low	2	2	Low	2	Low
I11	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I11	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I11	Soprano pipistrelle	Aug	1	Low	6	Low	2	2	Low	2	Low
I12	*Nyctalus* spp.	Jun	3	Low	3	Low	2	2	Low	2	Low
I12	*Nyctalus* spp.	Aug	1	Low	15	Low	2	2	Low	2	Low
I12	Common pipistrelle	May	0	Low	1	Low	2	2	Low	2	Low
I12	Common pipistrelle	Jun	0	Low	1	Low	2	2	Low	2	Low
I12	Common pipistrelle	Aug	1	Low	6	Low	2	2	Low	2	Low
I12	Soprano pipistrelle	May	0	Low	1	Low	2	2	Low	2	Low
I12	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I12	Soprano pipistrelle	Aug	1	Low	11	Low	2	2	Low	2	Low
I13	*Nyctalus* spp.	Jun	3	Low	3	Low	2	2	Low	2	Low
I13	*Nyctalus* spp.	Aug	1	Low	3	Low	2	2	Low	2	Low
I13	Common pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I13	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low

Location ID	Species	Month	Median Percentile	Median Activity Category [19]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [20]	Overall Median Site Risk Score [21]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I13	Common pipistrelle	Aug	0	Low	4	Low	2	2	Low	2	Low
I13	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I13	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I13	Soprano pipistrelle	Aug	0	Low	2	Low	2	2	Low	2	Low
I2	*Nyctalus* spp.	Aug	3	Low	3	Low	2	2	Low	2	Low
I2	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I2	Common pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I2	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I2	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I2	Soprano pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I3	*Nyctalus* spp.	Aug	19	Low	19	Low	2	2	Low	2	Low
I3	Common pipistrelle	May	3	Low	4	Low	2	2	Low	2	Low
I3	Common pipistrelle	Jun	2	Low	3	Low	2	2	Low	2	Low
I3	Common pipistrelle	Aug	0	Low	2	Low	2	2	Low	2	Low
I3	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I3	Soprano pipistrelle	Jun	0	Low	2	Low	2	2	Low	2	Low
I3	Soprano pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I4	*Nyctalus* spp.	Aug	1	Low	1	Low	2	2	Low	2	Low
I4	Common pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I4	Soprano pipistrelle	Aug	0	Low	2	Low	2	2	Low	2	Low
I5	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low

Location ID	Species	Month	Median Percentile	Median Activity Category [19]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [20]	Overall Median Site Risk Score [21]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I5	Common pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I5	Soprano pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I6	*Nyctalus* spp.	Jun	1	Low	1	Low	2	2	Low	2	Low
I6	*Nyctalus* spp.	Aug	3	Low	6	Low	2	2	Low	2	Low
I6	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I6	Common pipistrelle	Aug	0	Low	6	Low	2	2	Low	2	Low
I6	Soprano pipistrelle	Aug	0	Low	3	Low	2	2	Low	2	Low
I7	*Nyctalus* spp.	Jun	1	Low	1	Low	2	2	Low	2	Low
I7	*Nyctalus* spp.	Aug	3	Low	3	Low	2	2	Low	2	Low
I7	Common pipistrelle	Aug	0	Low	1	Low	2	2	Low	2	Low
I7	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I7	Soprano pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I8	*Nyctalus* spp.	Jun	1	Low	1	Low	2	2	Low	2	Low
I8	*Nyctalus* spp.	Aug	1	Low	1	Low	2	2	Low	2	Low
I8	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I8	Common pipistrelle	Aug	0	Low	1	Low	2	2	Low	2	Low
I8	Soprano pipistrelle	Aug	0	Low	0	Low	2	2	Low	2	Low
I9	*Nyctalus* spp.	Jun	1	Low	5	Low	2	2	Low	2	Low
I9	*Nyctalus* spp.	Aug	15	Low	52	Moderate	2	2	Low	6	Medium
I9	Common pipistrelle	May	4	Low	11	Low	2	2	Low	2	Low
I9	Common pipistrelle	Jun	1	Low	11	Low	2	2	Low	2	Low

Location ID	Species	Month	Median Percentile	Median Activity Category [19]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [20]	Overall Median Site Risk Score [21]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I9	Common pipistrelle	Aug	7	Low	15	Low	2	2	Low	2	Low
I9	Soprano pipistrelle	May	0	Low	7	Low	2	2	Low	2	Low
I9	Soprano pipistrelle	Jun	0	Low	3	Low	2	2	Low	2	Low
I9	Soprano pipistrelle	Aug	6	Low	12	Low	2	2	Low	2	Low

Table E-2 2024 Monthly Location Specific Data for High Collision Risk Species

Location ID	Species	Month	Median Percentile	Median Activity Category [22]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [23]	Overall Median Site Risk Score [24]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
I1	*Nyctalus* spp.	May	1	Low	1	Low	2	2	Low	2	Low
I1	Common pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I1	Common pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
I1	Soprano pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low
I2	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low
I3	Common pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low
I3	Soprano pipistrelle	May	0	Low	0	Low	2	2	Low	2	Low

[22] Taken from Table 4-1
[23] Taken from Table 4-5
[24] Taken from Table 4-6

Location ID	Species	Month	Median Percentile	Median Activity Category [22]	Maximum Percentile	Maximum Activity Category [19]	Site Risk [23]	Overall Median Site Risk Score [24]	Overall Median Category Score	Overall Maximum Category Score [21]	Overall Maximum Category Score
l3	Soprano pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low
l4	Soprano pipistrelle	Jun	0	Low	0	Low	2	2	Low	2	Low
l5	*Nyctalus* spp.	May	0	Low	0	Low	2	2	Low	2	Low
l5	Common pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low
l5	Soprano pipistrelle	Sep	0	Low	0	Low	2	2	Low	2	Low