

Technical Appendix 6.2: National Vegetation Classification & Habitats Survey Report



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Ravengill Energy Park

Ravengill Energy Park Limited

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Survey Report

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Acronyms and Abbreviations

AWI	Ancient Woodland Inventory
EIAR	Environmental Impact Assessment Report
GWDTE	Groundwater Dependent Terrestrial Ecosystems
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
SLC	South Lanarkshire Council
TN	Target Note

1.0 Introduction

MacArthur Green (now SLR Consulting Limited¹) was commissioned by 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, for the Proposed Development.

The aim of the NVC survey was to identify and map the vegetation communities present within the Site and associated survey area to identify those areas of greatest ecological interest (i.e., Annex I habitats²; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE); and Scottish Biodiversity List (SBL) priority habitats). The PCA survey aimed to provide additional information and context with regards to peatlands, and to identify and map the condition of peatland habitats within the Site. This information was used to inform the wind farm design process and the ecological assessment for the Proposed Development's Environmental Impact Assessment Report (EIAR).

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

2.0 The Site and Survey Area

2.1 Overview

The Site, covering an area of approximately 2,554.5 hectares (ha), is located 1 km north of Leadhills village, 1.5 km south of Abington village and west of the A74(M) motorway. The Site terrain is undulating with multiple hills, and the area is predominantly open moorland, mostly comprising of a mixture of wet and dry heath, acid grassland and blanket bog habitats. This landscape is typical of the wider location within the Southern Uplands. The Proposed Development is within the administrative boundary of South Lanarkshire Council (SLC). The Proposed Development is fully described within **Chapter 2: 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 5,597.6 ha, and including the entire Site. The survey area in many areas extends well beyond the application boundary; this reflects earlier and larger areas of interest which have been refined down during the iterative design process (see **Chapter 3: Design Evolution (EIAR Volume 2)**), and also to provide sufficient survey buffers to account for the possible presence of potential GWDTE. The survey area and its juxtaposition with the application boundary is shown in **Figure 6.3 (EIAR Volume 3a)**. The appropriate scale and 'study area' for the assessment of effects with regards habitat loss has been deemed to be the application boundary (as defined in **Chapter 6: Ecology (EIAR Volume 2)**).

2.2 Designated Sites

There is one statutory designated site containing habitat related, or botanical, qualifying features within 5 km of the Site, i.e. North Lowther Uplands Site of Special Scientific Interest (SSSI) which is located 3.2 km to the west. The details of, and relevant qualifying features

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'.



for, this designation relevant to this appendix is 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 application boundary

Designated Site	Distance from application boundary (km)	Qualifying feature	Last assessed condition & date
North Lowther Uplands SSSI	3.2 km	Upland habitat assemblage	Unfavourable Recovering 15/01/2019

There are no Local Nature Conservation Site (LNCS) within 5 km of the application boundary.

2.3 Ancient Woodland

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 Ancient Woodland Inventory (AWI)³ 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; and
- **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.

There is one area of ancient woodland (as present on the AWI) that overlaps partially with the application boundary; a very small strip in the far north along the Glengonnar Water (see **Figure 6.1 (EIAR Volume 3a)**). A second area of ancient woodland is present at Long Wood within the NVC survey area but is no longer within the Site following the iterative design process (see **Section 2.1**). Both of these areas are categorised as Long-Established (of planted origin). There are several more areas of ancient woodland within 5 km of the application boundary, the majority of which are categorised as Long-Established (of planted origin), with a few small patches of Ancient (of semi-natural origin) and Other (on Roy map).

³ Ancient Woodland Inventory (Scotland). Available at: <https://www.spatialdata.gov.scot/geonetwork/srv/api/records/A091F945-F744-4C8F-95B3-A09E6EF6AE33>. [Accessed March 2026]



2.4 Carbon and Peatland Map 2016

The Carbon and Peatland Map 2016⁴ was consulted to determine likely peatland classes present within the Site. 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 habitat⁵ as Class 1⁶ and Class 2⁷ peatlands.

Figure 6.2 (EIAR Volume 3a) indicates that, according to this predictive tool and map, there are several scattered areas of Class 1 peatland across the Site, most of which are relatively limited in size. These are primarily located in the western portion on Snar Law and Rake Law, as well as in the east around Peat Hill and Harryburn Brae. The majority of the Site is made up of Class 4⁸ soils, with smaller scattered areas of Class 3⁹, Class 5¹⁰ and Class 0 (mineral)¹¹ soils. No Class 2 peatland as per the Carbon and Peatland Map is present within the Site. Class -2 Non-soil areas are present in proximity to the Site, but outwith, and relate to waterbodies or the built-up area of Leadhills.

3.0 Methodology

3.1 National Vegetation Classification

The vegetation was surveyed by suitably qualified and experienced botanical surveyors using the NVC scheme¹² and in accordance with NVC survey guidelines¹³. 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 tables¹². Stands were classified to sub-community level where possible, although in many cases the vegetation was mapped to community level only.

⁴ 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>

⁵ Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

⁶ Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value. Indicative vegetation - Peatland.

⁷ 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.

⁸ 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.

⁹ 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.

¹⁰ Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded.

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

¹² Rodwell, J.S. (Ed), et al. (1991 - 2000). British Plant Communities (5 volumes). Cambridge University Press, Cambridge.

¹³ Rodwell, J.S. (2006). NVC Users' Handbook. ISBN 978 1 86107 574 1.



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-communities¹³. 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 patterns¹³.

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 could 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 classification¹⁴, 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)¹⁵ for vascular plants, Atherton *et al.* (2010)¹⁶ for bryophytes and Smith *et al.* (2009)¹⁷ for lichens.

4.0 Survey Details and Limitations

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

- 16 to 20 September 2024 inclusive;
- 30 September to 04 October 2024 inclusive;
- 29 October to 01 November 2024 inclusive; and
- 07 to 09 July 2025 inclusive.

The surveys were therefore generally carried out during the optimal or preferred season for habitat surveys. The weather conditions were generally 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 except for the built-up area of Leadhills village

¹⁴ Joint Nature Conservancy Council (JNCC). (2010). Handbook for phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.

¹⁵ Stace, C.A. (2019). New Flora of the British Isles. 4th Edition. Cambridge University Press.

¹⁶ Atherton, I., Bosanquet, S. & Lawley, M. (2010). Mosses and Liverworts of Britain and Ireland: a field guide. British Bryological Society.

¹⁷ 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.



(subsequently mapped as No Survey Access (NSA)) but which is outwith the application boundary.

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.*, 2000¹⁸; Averis *et al.*, 2004¹⁹; Mountford, 2011²⁰; and Averis and Averis, 2020²¹). 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 will not be present in the future. However, the results of these surveys are considered to be sufficient and robust to undertake the assessment.

5.0 Results

5.1 Summary of Habitat Types & NVC Communities

44 NVC communities, three intermediate communities, and 23 non-NVC communities were recorded within the survey area, and these corresponded to 39 Phase 1 habitat types. These communities and habitat types, and their respective Site-specific correlations are summarised in **Table 5-1**.

¹⁸ Rodwell, J., Dring, J.C., Averis, A.B.G., Proctor, M.C.F., Malloch, A.J.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.

¹⁹ 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.

²⁰ 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

²¹ 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 & Other Non-NVC Habitats/Features Recorded
A1.1.1 Broadleaved Semi-Natural Woodland	W4 <i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland W7 <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland W10 <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i> woodland W11 <i>Quercus petraea</i> – <i>Betula pubescens</i> – <i>Oxalis acetosella</i> woodland
A1.1.2 Broadleaved Plantation Woodland	BP Broadleaved Plantation (non-NVC type) YBP Young Broadleaved Plantation (non-NVC type) W10(p) ²² <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i> woodland
A1.2.2 Coniferous Plantation Woodland	CP Coniferous Plantation (non-NVC type) YCP Young Coniferous Plantation (non-NVC type)
A1.3.2 Mixed Plantation Woodland	W7(p) ²³ <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland Mosaics of A1.1.2 and A1.2.2 communities
A3.1 Scattered Broadleaved Trees	SBT Scattered Broadleaved Trees (non-NVC type)
A3.2 Scattered Conifer Trees	SCT Scattered Conifer Trees (non-NVC type)
A4.2 Recently Felled Coniferous Woodland	CF Clear-Felled Conifer Woodland (non-NVC type)
B1.1 Unimproved Acid Grassland	U2 <i>Avenella flexuosa</i> grassland U4 <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Galium saxatile</i> grassland U5 <i>Nardus stricta</i> – <i>Galium saxatile</i> grassland U6 <i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
B1.2 Semi-Improved Acid Grassland	U4b <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Galium saxatile</i> grassland <i>Holcus lanatus</i> – <i>Trifolium repens</i> sub-community U4b – MG9a intermediate community
B2.1 Unimproved Neutral Grassland	MG1 <i>Arrhenatherum elatius</i> grassland MG9 <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
B2.2 Semi-Improved Neutral Grassland	H1 <i>Holcus lanatus</i> dominated neutral grassland (non-NVC type)
B3.1 Unimproved Calcareous Grassland	CG10 <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Thymus polytrichus</i> grassland
B4 Improved Grassland	MG6 <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland

²² The suffix (p) where used 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.

²³ W7(p) has here been included within the A1.3.2 Mixed Plantation Woodland category as the canopy also contained a number of conifer species – see Section 5.2.4.



Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
B5 Marsh/Marshy Grassland	MG10 <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture (including MG10(Ja) <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture, <i>Juncus acutiflorus</i> dominant M23 <i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush-pasture M25 <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire M27 <i>Filipendula ulmaria</i> – <i>Angelica sylvestris</i> mire Mx <i>Carex</i> spp. neutral sedge mire (non-NVC type) Je <i>Juncus effusus</i> acid grassland community (non-NVC type) Ja <i>Juncus acutiflorus</i> acid grassland community (non-NVC type)
C1.1/C1.2 Bracken – Continuous & Scattered	U20 <i>Pteridium aquilinum</i> – <i>Galium saxatile</i> community
C3.1 Tall Herb & Fern: Tall Ruderal	OV25 <i>Urtica dioica</i> – <i>Cirsium arvense</i> community OV27 <i>Chamerion angustifolium</i> community W24 <i>Rubus fruticosus</i> – <i>Holcus lanatus</i> underscrub
C3.2 Tall Herb & Fern: Non-Ruderal	U16 <i>Luzula sylvatica</i> – <i>Vaccinium myrtillus</i> tall-herb community U19 <i>Oreopteris limbosperma</i> – <i>Blechnum spicant</i> community Bs <i>Blechnum spicant</i> dominant (non-NVC type) Daff <i>Dryopteris affinis</i> dominant (non-NVC type)
D1.1 Dry Dwarf Shrub Heath – Acid	H9 <i>Calluna vulgaris</i> – <i>Avenella flexuosa</i> heath H10 <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath H12 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> heath H18 <i>Vaccinium myrtillus</i> – <i>Avenella flexuosa</i> heath H21 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> – <i>Sphagnum capillifolium</i> heath H10 – H12 intermediate community
D1.2 Dry Dwarf Shrub Heath – Basic	H10d <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath, <i>Thymus polytrichus</i> – <i>Carex pulicaris</i> sub-community
D2 Wet Dwarf Shrub Heath	M15 <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
D4 Montane Heath/Dwarf Herb	U7 <i>Nardus stricta</i> – <i>Carex bigelowii</i> grass-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 <i>Sphagnum cuspidatum/fallax</i> bog pool community M3 <i>Eriophorum angustifolium</i> bog pool community M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire
E1.7 Wet Modified Bog	M15 ²⁴ <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath

²⁴ The carat '^' indicates the wet heath community appears on peat over 0.5 m in depth or has been derived from degraded bog, and is therefore more appropriately considered wet modified bog rather than wet heath.



Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
	M20 <i>Eriophorum vaginatum</i> blanket mire M25a ²⁵ <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire <i>Erica tetralix</i> sub-community ²⁵ M20b – M25a/M25a ²⁵ intermediate communities
E2.1 Acid/Neutral Flush/Spring	M4 <i>Carex rostrata</i> - <i>Sphagnum fallax</i> mire M5 <i>Carex rostrata</i> – <i>Sphagnum squarrosum</i> mire M6 <i>Carex echinata</i> - <i>Sphagnum fallax/denticulatum</i> mire M32 <i>Philonotis fontana</i> – <i>Saxifraga stellaris</i> spring M36 Lowland springs and streambanks of shaded situations
E2.2 Basic Flush/Spring	M10 <i>Carex dioica</i> - <i>Pinguicula vulgaris</i> mire
E4 Bare Peat	ExP Exposed Peat (non-NVC type)
F1 Swamp	S9 <i>Carex rostrata</i> swamp S19 <i>Eleocharis palustris</i> swamp S28 <i>Phalaris arundinacea</i> tall-herb fen
F2.2 Inundation Vegetation	MG11 <i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> grassland
G1 Open Water	SW Standing Water (non-NVC type)
G2 Running Water	RW Running Water (non-NVC type)
I1.2.1 Scree – Acid/Neutral	RK Rock (non-NVC type) Rlan <i>Racomitrium lanuginosum</i> dominant (non-NVC type)
I1.4.1 Other rock exposure - acid	RK Rock (non-NVC type)
I2.2 Spoil	BG associated with historical spoil heaps (non-NVC type)
J1.2 Amenity Grassland	PG Private Gardens & Lawns, Parks etc (non-NVC type)
J1.3 Ephemeral/ Short Perennial	Am <i>Alchemilla mollis</i> dominant (non-NVC type)
J3.6 Buildings	BD Buildings (non-NVC type)
J4 Bare Ground	BG - Bare Ground associated with tracks, hardstandings etc (non-NVC type)
J5 Other Habitat	MB Muirburn (non-NVC type)

²⁵ Areas of M25a²⁵ (i.e. with the caret symbol) 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., M25a²⁵, whereas marshy grassland M25 on shallow peaty soils or without characteristic bog species is identified as M25a (no caret).



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**, TN photographs are included within **Annex B**. Further photographs of a number of the typical habitat types found within the survey area are provided within **Annex C**.

5.2 Woodland & 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. They are most common in the west and north of the Site, with small, scattered stands along Glengonnar Water and Glencaple Burn.

The majority of woodland recorded in the survey area is W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum* woodland, however there are also small patches of W10 *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland, W11 *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* woodland and W4 *Betula pubescens* – *Molinia caerulea* woodland.

The canopy species within the patches of W7 woodland mostly include varying mixtures of *Alnus glutinosa*, *Salix cinerea*, *Salix caprea* and *Betula pubescens*. The ground layer includes species such as *Cirsium palustre*, *Juncus effusus*, *J. acutiflorus*, *Deschampsia cespitosa*, *Holcus lanatus*, *Filipendula ulmaria*, *Ranunculus repens*, *Geum rivale*, *Lotus pedunculatus*, *Holcus mollis*, *Rubus idaeus*, *Rumex acetosa*, *Urtica dioica*, *Arrhenatherum elatius* and the mosses *Calliergonella cuspidata*, *Brachythecium rutabulum*, *Kindbergia praelonga* and *Hylocomiadelphus triquetrus*. Much of this woodland was mapped at NVC community level, but some, such as examples with frequent *Juncus* species, was classed as the W7b *Carex remota*-*Cirsium palustre* sub-community.

The one area of W11 woodland recorded had a mixed canopy of *Betula pubescens* and some *Sorbus aucuparia*, *Alnus glutinosa* and *Salix cinerea*, and a grassy ground layer with species including *Agrostis capillaris*, *Holcus mollis*, *H. lanatus*, *Anthoxanthum odoratum*, *Avenella flexuosa*, *Potentilla erecta*, *Dryopteris filix-mas* and mosses such as *Hylocomium splendens* and *Thuidium tamariscinum*. It was found on well-drained slopes at low altitude. The species composition does not fit clearly into any of the four sub-communities, so it was classified to NVC community level. This community represents the small sliver of Ancient Woodland that crosses the application boundary in the far north (see **Section 2.3**).

W10 woodland was recorded twice outwith the Site in the vicinity of Leadhills, the canopy primarily consisted of *Acer pseudoplatanus* over a more neutral grassland flora.

The small areas of W4 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*. These woodland patches were represented at community level and by the W4b *Juncus effusus* sub-community, where rushes were also abundant in the field layer.



5.2.2 A1.1.2 Broadleaved Plantation Woodland

Broadleaved plantation woodland was recorded in small patches in a number of locations, mostly in the far north of the survey area bordering the M74 motorway.

The majority of this habitat type was composed of the W10(p) community. The suffix (p) indicates that although the area has been attributed an NVC code and the vegetation is broadly referable to that community, the area is clearly of plantation origin and therefore not semi-natural. The canopy species of these woodland patches generally comprised species mixes including *Acer pseudoplatanus*, *Fraxinus excelsior*, *Fagus sylvatica*, *Betula pubescens*, *Quercus* spp., *Corylus avellana* and *Pinus sylvestris*, and the ground layer is species-poor and quite grassy, including *Holcus lanatus*, *Dactylis glomerata*, *Arrhenatherum elatius* and *Rubus idaeus*. These areas were recorded to community level only.

Two stands of mature *Fagus sylvatica* by the M74 motorway have an impoverished field layer with no defining characteristics to attribute an NVC code and have thus been classified as Broadleaved Plantation (BP). There is one area of young *Sorbus aucuparia* and *Betula* spp. saplings around Whiteside in the far south of the survey area. As this patch has only been recently planted, there are no defining characteristics to assign an NVC code, and it has therefore been classified as Young Broadleaved Plantation (YBP).

5.2.3 A1.2.2 Coniferous Plantation Woodland

Coniferous Plantation (CP) and Young Coniferous Plantation (YCP) woodland was recorded in a number of scattered locations across the survey area, with the most extensive areas consisting of commercial blocks along the B797 north of Leadhills village. Several of these stands are second-rotation forest, having been re-planted on previous clear-fell. Most of these areas consist of even-aged *Pinus sylvestris*, *Picea sitchensis*, *Larix decidua*, *Pinus contorta* and *Picea abies*. It is also found in a small number of other locations, often planted as shelter belts within fields or close to farmhouse buildings.

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 A1.3.2 Mixed Plantation Woodland

This habitat type covers mapped mosaics of A1.1.2 (Section 5.2.2) and A1.2.2 (Section 5.2.3) communities.

In addition, one small area of woodland closely referable to W7(p) in the far north of the survey area by the M74 was also included in this classification. This is due to the abundance of *Pinus sylvestris* within its canopy, alongside *Acer pseudoplatanus*, *Larix decidua* and *Fagus sylvatica*.

5.2.5 A3.1/A3.2 Scattered Broadleaved Trees & Scattered Coniferous Trees

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 commercial forestry blocks found adjacent to some parts of the survey area. The scattered broadleaved trees are mostly *Sorbus aucuparia* within steep gullies or crevices or *Salix* spp. along watercourses.



5.2.6 A4.2 Recently Felled Coniferous Woodland

Several areas along the slopes bordering the B797 north of Leadhills village were recorded as recently clear-felled (CF) conifer plantation. In a few areas there are signs of replanting and young self-seeded trees invading, as well as regenerating grasses.

5.3 Grasslands & Marsh

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

Unimproved acid grassland was found to be common and scattered widely throughout the survey area, as well as clusters of more semi-improved acid grassland, which were more localised to the upland margins and around Leadhills village. The acid grassland within the survey area is of the U2 *Avenella flexuosa* grassland community, U4 *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland community, U5 *Nardus stricta* – *Galium saxatile* grassland community and the U6 *Juncus squarrosus* – *Festuca ovina* grassland community.

U4 is the most commonplace and extensive of these communities within the survey area, followed by U5, and then several scattered patches of U2 and 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, heath and bog communities.

The U4 community often contained a variable mixed sward of *Festuca ovina*, *F. rubra*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Avenella flexuosa*, *Nardus stricta* and *Luzula multiflora* mixed with herbs such as *Potentilla erecta*, *Galium saxatile*, *Polygala serpyllifolia* and *Rumex acetosa*, and mosses including *Rhytidiadelphus squarrosus*, *Hylocomium splendens* and *Pleurozium schreberi*. Smaller quantiles of other vascular species are present in places, such as *Holcus lanatus*, *Nardus stricta*, *Cynosurus cristatus*, *Juncus squarrosus*, *Prunella vulgaris*, *Ranunculus repens*, *Cerastium fontanum*, *Achillea millefolium*, *Trifolium repens* and *Cirsium* spp. As well as community level U4, the U4a Typical sub-community, U4b *Holcus lanatus*-*Trifolium repens* sub-community and U4d *Luzula multiflora*-*Rhytidiadelphus loreus* 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, U5b *Agrostis canina*-*Polytrichum commune* sub-community and U5c *Carex panicea*-*Viola riviniana* sub-community were also recorded. The largest areas of U5 habitat are found on the high-altitude slopes of Lowther Hill and Green Lowther in the south of the survey area. Other species typically include *Festuca ovina*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Potentilla erecta*, *Galium saxatile*, *Luzula multiflora* and the mosses *Rhytidiadelphus squarrosus*, *Pleurozium schreberi* and *Hylocomium splendens*. The species-poor sub-community U5a is common on well-drained ground within the survey area. Some areas of U5 are similar but with mosses including *Polytrichum commune* and/or *Sphagnum* species. These belong in the *Agrostis canina*-*Polytrichum commune* sub-community U5b, the flora of which reflects slightly damper soils than those with U5a. Some other small and widely-scattered areas of U5, also on the damper side, have a flora including species indicative of at least mild base-enrichment: species such as *Briza media*, *Galium verum*, *G. uliginosum*, *Lotus corniculatus*, *Carex flacca*, *Plantago lanceolata*, *Euphrasia* agg., *Ranunculus acris*, *Filipendula ulmaria* and the moss *Climacium dendroides*. *Carex panicea* is dominant amongst the *Nardus* tussocks within some of these patches. These belong to the *Carex panicea*-*Viola riviniana* sub-community U5c: a relatively species-rich form of *Nardus* grassland.



The U6 community was recorded at community level and as the U6a *Sphagnum* sub-community, U6c *Vaccinium myrtillus* sub-community and U6d *Agrostis capillaris*-*Luzula multiflora* sub-community. The flora of most of the U6 within the survey area has much in common with that of the U4 and U5 acid grassland communities described above, with species including *Agrostis canina*, *Nardus stricta*, *Potentilla erecta*, *Galium saxatile*, *Cerastium fontanum*, *Poa pratensis* and the mosses *Rhytidiadelphus squarrosus*, *Hylocomium splendens* and *Polytrichum commune*, but contains a noticeable abundance of *Juncus squarrosus*. The community varied at times and appeared both as pure stands of U6 or within mosaics with other mire and grassland communities. These patches are mostly located in the south of the survey area at higher elevations. In a small number of these *Vaccinium myrtillus* is common, placing the vegetation in the U6c *Vaccinium myrtillus* sub-community U6c. In one location the lack of *V. myrtillus* and lack of a strong wetland element places it in the U6a *Sphagnum* sub-community.

The U2 *Avenella flexuosa* grassland community is fairly uncommon across the survey area, being limited to the south and outwith the Site where it is regenerating on areas where muirburn has been carried out historically and in more recently-burned patches. This habitat is dominated by the grass *Avenella flexuosa*, with common associates including *Agrostis capillaris*, *Potentilla erecta* and *Galium saxatile*. It is represented at the community level, and by the U2a *Festuca ovina*-*Agrostis capillaris* sub-community and U2b *Vaccinium myrtillus* sub-community where there is a stronger heathy element to the associate vegetation.

Areas of semi-improved acid grassland (B1.2) are characterised by the U4b *Holcus lanatus*-*Trifolium repens* sub-community. This sub-community is generally located at lower elevations around the village of Leadhills, where there has likely 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*. A single area of an U4b-MG9a intermediate vegetation community was also recorded as semi-improved acid grassland.

5.3.2 B2.1/B2.2 Unimproved & Semi-Improved Neutral Grassland

Unimproved neutral grassland is a habitat with a limited distribution throughout the survey area, mostly found along the margins of roads and embankments. These neutral grasslands are represented by MG1 *Arrhenatherum elatius* grassland, MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland and the semi-improved neutral grassland by the non-NVC type *Holcus lanatus* dominant neutral grassland.

MG1 is coarse neutral grassland in which *Arrhenatherum elatius* is abundant and *Dactylis glomerata* present in varying amounts. Other species include *Holcus lanatus*, *H. mollis*, *Anthoxanthum odoratum*, *Chamaenerion angustifolium*, *Urtica dioica*, *Cirsium arvense* and *Centaurea nigra*. This vegetation was found in several strips along the B797 in the centre of the survey area, on well-drained ground where grazing is evidently no more than light. Some patches were classified to NVC community level only, whilst others were assigned the MG1a *Festuca rubra* sub-community. MG1 is also frequent on the managed embankments of the M74 motorway.

Within MG9, *Deschampsia cespitosa* dominates with other associates such as *Juncus effusus*, *Juncus acutiflorus*, *Holcus lanatus*, *Agrostis capillaris*, *Rumex acetosa* and *Poa trivialis*. The largest of these areas is found in the far south of the survey area, with some patches often in association with U4 acid grassland and M23 neutral rush-pasture. Some areas were classified as the MG9a *Poa trivialis* sub-community but most were recorded to NVC community level.



Some small areas around the village of Leadhills were completely dominated by *Holcus lanatus* with very few other vascular species, indicating there has likely been some form of historical improvement or a long history of intensive grazing and/or nutrient enrichment. These areas do not fit an NVC community and so have been assigned the non-NVC type "H1".

5.3.3 B3.1 Unimproved Calcareous Grassland

Unimproved calcareous grassland is present in small very localised patches within the survey area. It is represented by CG10 *Festuca ovina*-*Agrostis capillaris*-*Thymus polytrichus* grassland at the community level, as the CG10a *Trifolium repens*-*Luzula campestris* sub-community and as the CG10b *Carex pulicaris*-*Carex panicea* sub-community. Two small patches of CG10 are present in the far north of the survey area on the steep slopes of White Hill, with a few others found more widely in mosaic with other grassland communities.

This is short grassland in which grazed swards of the grasses *Festuca ovina*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Cynosurus cristatus*, *Holcus lanatus*, *Nardus stricta*, *Danthonia decumbens* and *Briza media* are accompanied by low mats of *Thymus polytrichus* and herbs including *Plantago lanceolata*, *Potentilla erecta*, *Viola riviniana*, *V. lutea*, *Galium verum*, *Campanula rotundifolia*, *Ranunculus acris*, *Cerastium fontanum*, *Prunella vulgaris*, *Trifolium repens* and *Bellis perennis*, the sedges *Carex flacca* and *C. caryophylla*, and mosses such as *Rhytidiadelphus squarrosus*, *Pseudoscleropodium purum* and *Hylocomium splendens*. *Helianthemum nummularium* joins *Thymus* in the low sub-shrub component of the vegetation in some places. Vegetation as described above belongs to the CG10a *Trifolium repens*-*Luzula campestris* sub-community and occurs in the survey area as widely scattered patches, mostly small in extent and on well-drained slopes and some more level ground such as that among areas of riverside shingle. Some of this CG10a occurs in mosaics with its acid grassland counterpart U4a. Some CG10 is on damper, flushed ground and has a flora similar to that of CG10a but also including damp-preferring species such as *Carex panicea* and *C. pulicaris*. This belongs to the CG10b *Carex pulicaris*-*Carex panicea* sub-community and is found locally on some flushed slopes, in association with U4 and U5c grasslands and M23a and M25c rush and *Molinia* vegetation.

5.3.4 B4 Improved Grassland

This is species-poor agriculturally improved grassland in which *Lolium perenne* is abundant, accompanied by other species such as *Holcus lanatus*, *Cynosurus cristatus*, *Agrostis capillaris*, *Trifolium repens* and *Cerastium fontanum*. MG6 occupies much of the ground in low-lying fields within the Site.

Improved grasslands are found mostly around the South Shortcleugh and Glencaple Farm areas to the east and 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., *Holcus lanatus* and *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 one of the most common habitat types 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 expanse of the survey area and is very 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 & c), M27 (a & c) and MG10 (a, c and a *Juncus acutiflorus* variant denoted as MG10(Ja)) NVC communities are included within its limits along with the non-NVC communities 'Mx', 'Je', and '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, MG10c *Holcus lanatus* – *Juncus effusus* rush-pasture, *Iris pseudacorus* sub-community, MG10(Ja) *Juncus acutiflorus* neutral grassland, as well as the non-NVC types *Juncus effusus* acid grassland (Je) and *Juncus acutiflorus* acid grassland (Ja).

M23 vegetation is distinguished by an abundance or dominance of tall rushes accompanied by an assemblage of herbs and mosses typical of mesotrophic wetlands and grasslands. Both sub-communities are relatively common within the survey area, occupying wet ground on flushed slopes, in depressions and along watercourses. The M23a *Juncus acutiflorus* sub-community is the more common and can be species-rich in places and has swards of *Juncus acutiflorus* and an associated flora including species such as *Deschampsia cespitosa*, *Molinia caerulea*, *Holcus lanatus*, *Carex flacca*, *Filipendula ulmaria*, *Rumex acetosa*, *Cirsium palustre*, *Potentilla erecta*, *Epilobium palustre*, *Silene flos-cuculi*, *Galium uliginosum*, *Succisa pratensis*, *Lathyrus pratensis*, *Centaurea nigra*, *Ranunculus acris* and the mosses *Calliergonella cuspidata*, *Hylocomium splendens*, *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*. The M23b *Juncus effusus* sub-community is similar but with *Juncus effusus* as the main rush and with an associated flora typically a little less species-rich than that of M23a.

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*, *Holcus lanatus*, *Trifolium repens*, *Ranunculus repens*, *Rumex acetosa*, *Agrostis capillaris* and *A. stolonifera* in variable amounts. The MG10a Typical sub-community is the most common across the survey area, with patches found on damp, level to sloping ground, especially picking out damper areas among surrounding U4 or MG6 grasslands. One very small patch of the MG10c *Iris pseudacorus* sub-community, characterised by the abundance of the associate *Iris pseudacorus*, was found forming a mosaic with a wider area of acid grassland. The species composition indicates neutral soils, in contrast to its the more acidic counterpart Je, described below. The 'MG10(Ja)' 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.

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 *Agrostis 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.

Small patches of M27 *Filipendula ulmaria*-*Angelica sylvestris* mire, recorded at the community level and as the M27a *Valeriana officinalis*-*Rumex acetosa* sub-community and the M27c *Juncus effusus*-*Holcus lanatus* sub-community. It usually appears within a mosaic of unimproved neutral grassland communities and other marshy grassland types, many of them on damp slopes that face north or are close to watercourses. *Filipendula ulmaria* is very abundant in these patches with occasional *Epilobium palustre*, *Succisa pratensis*, *Rumex acetosa*, *Holcus lanatus*, *Phragmites australis*, *Deschampsia cespitosa*, *Galium aparine*, *Cirsium palustre*, *Lathyrus pratensis* and *Centaurea nigra*.

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. This habitat is very localised within the survey area, only found in a small number of patches in the east around Elvan Water and Hershaw Burn. The sedges present here are mainly *Carex echinata* and *C. nigra* and other vascular species include *Holcus lanatus*, *H. mollis*, *Agrostis canina*, *Festuca rubra*, *Nardus stricta*, *Molinia caerulea*, *Luzula multiflora*, *Cirsium palustre*, *Ranunculus acris*, *R. repens*, *Galium uliginosum*, *Epilobium palustre*, *Prunella vulgaris*, *Scorzonera autumnalis*, *Cardamine pratensis* and the mosses *Calliergonella*, *Brachythecium rivulare*, *Rhytidiadelphus squarrosus*, *Sphagnum teres*, *Climacium dendroides* and *Hylocomium splendens*.

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), M25b *Anthoxanthum odoratum* and M25c *Angelica sylvestris* 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), grassland species (M25b) or species indicative of more mesotrophic habitats (M25c). Other species recorded in M25a included lesser amounts of *Trichophorum germanicum*, *Erica tetralix*, *Calluna vulgaris*, *Narthecium ossifragum*, *Potentilla erecta*, *Galium saxatile*, *Juncus* spp. 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 and acid grassland communities, usually found on slightly drier (but still damp) ground. 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*, *Nardus stricta*, *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. The M25c is quite distinct because it includes species indicative of mesotrophic or slightly base-enriched habitats: typical among such species are *Cirsium palustre*, *Filipendula ulmaria*, *Galium uliginosum*, *Achillea ptarmica* and the moss *Breutelia chrysocoma*. M25c occurs as small, widely-scattered patches on sloping ground across the survey area.



5.4 Tall Herb & Fern

5.4.1 C1.1/C1.2 Bracken: Continuous & Scattered

Several areas of continuous (C1.1) and scattered (C1.2) bracken (*Pteridium aquilinum*) are found across the survey area, with the largest areas located in the north around Craig Dod and Pyatshaw Brae on well-drained ground at low to medium altitudes. Beneath the *Pteridium aquilinum* is a shorter layer that has much in common with U4 acid grassland, with species such as *Agrostis capillaris*, *Anthoxanthum odoratum*, *Holcus lanatus*, *Potentilla erecta* and *Galium saxatile*; this belongs in the U20a *Anthoxanthum odoratum* sub-community. In some of the places where patches of bracken occur in close association with heath communities, the associated flora includes some of *Calluna vulgaris*, *Erica cinerea* and *Vaccinium myrtillus*, giving a better fit with the U20b *Vaccinium myrtillus*-*Dicranum scoparium* sub-community. Not all patches of bracken matched these descriptions closely enough for sub-community classification and were therefore classified to NVC community level only.

5.4.2 C3.1 Tall Ruderal

Within the survey area, this habitat type is represented by the OV25 *Urtica dioica* – *Cirsium arvense* and OV27 *Chamerion angustifolium* open habitat communities and the W24 *Rubus fruticosus* – *Holcus lanatus* underscrub communities. The OV25 consists of patches of *Urtica dioica* and *Cirsium arvense*, usually on lower ground and often found in mosaic with acid grassland and improved grassland communities. OV27 is found across the survey area as small discrete patches and as a constituent in mosaics, usually on disturbed ground along roads and around the village of Leadhills. W24 is present as small patches of vegetation dominated by *Rubus idaeus*. This is very locally common among grassland in the northeast of the survey area.

5.4.3 C3.2 Non-Ruderal

This habitat type is represented by U16 *Luzula sylvatica* – *Vaccinium myrtillus* tall-herb community, U19 *Oreopteris limbosperma* - *Blechnum spicant* community, *Blechnum spicant* (Bs) dominant non-NVC type and *Dryopteris affinis* (Daff) dominant non-NVC type.

The U16 *Luzula sylvatica* – *Vaccinium myrtillus* tall-herb community is relatively uncommon within the survey area. It is largely restricted to the higher elevations along the southern portion, with the largest area found on the eastern slopes of Dun Law. It commonly forms mosaics with acid grassland communities. It was recorded at community level, but also as the U16b *Anthoxanthum odoratum*-*Festuca ovina* and U16c species-poor sub-communities. Generally, the species include *Luzula sylvatica* and *Vaccinium myrtillus* with wefts of mosses such as *Rhytidiadelphus loreus*, *R. squarrosus*, *Hypnum jutlandicum*, *Hylocomium splendens*, *Pleurozium schreberi* and *Pseudoscleropodium purum*.

Very small patches of the U19 *Oreopteris limbosperma* – *Blechnum spicant* community are present in the south and east of the survey area, usually found on steep slopes. This is vegetation containing abundant tussocks of the fern *Oreopteris limbosperma*. Other species present include *Dryopteris affinis*, *D. dilatata*, *Blechnum spicant*, *Calluna vulgaris*, *Avenella flexuosa*, *Agrostis capillaris*, *Luzula multiflora*, *Potentilla erecta*, *Galium saxatile*, *Digitalis purpurea*, *Oxalis acetosella*, *Polygala serpyllifolia*, *Cerastium fontanum* and the mosses *Hylocomium splendens*, *Pleurozium schreberi*, *Rhytidiadelphus loreus*, *Polytrichum commune*, *Dicranum scoparium* and *Sphagnum capillifolium*.

Small patches of vegetation dominated by the fern *Blechnum spicant* were found among acid grassland and heath communities on north-facing slopes in the glen of the Elvan Water. These have been assigned the non-NVC type 'Bs'. As well as *Blechnum spicant*, other

species present include *Calluna vulgaris*, *Vaccinium myrtillus*, *Potentilla erecta*, *Avenella flexuosa*, *Anthoxanthum odoratum*, *Nardus stricta*, *Molinia caerulea*, *Dryopteris dilatata*, *Galium saxatile* and the mosses *Hylocomium splendens*, *Pleurozium schreberi* and *Sphagnum russowii*.

Vegetation consisting of dense tussocks of the fern *Dryopteris affinis* were found growing among heath and scree in one location and among acid grassland and neutral rush mire in the north of the survey area. This vegetation has been assigned the non-NVC type 'Daff'.

5.5 Heathland

5.5.1 D1.1/D1.2 Dry Dwarf Shrub Heath – Acid/Basic

Acid dry dwarf shrub heath is the most widespread habitat within the survey area, and is commonly found on steep, well-drained slopes. It is represented in the survey area by H9 *Calluna vulgaris* - *Avenella flexuosa* heath, H10 *Calluna vulgaris* - *Erica cinerea* heath, H12 *Calluna vulgaris* - *Vaccinium myrtillus* heath, H18 *Vaccinium myrtillus* - *Avenella flexuosa* heath and H21 *Calluna vulgaris* - *Vaccinium myrtillus* - *Sphagnum capillifolium* heath communities, as well as a small area of a H10-H12 intermediate heath community. Many areas have been subjected to muirburn, with extensive evidence of muirburn over a long period resulting in a patchwork of dry heaths in various stages of recovery. Areas more recently subjected to muirburn and that could not be assigned a NVC community were recorded as 'MB' (see Section 5.10.5).

H9 *Calluna vulgaris* - *Avenella flexuosa* is a dry heath community whose canopy consists of *Calluna vulgaris* with very little or nothing in the way of other dwarf shrub species. The associated flora typically includes very sparse *Avenella flexuosa*, *Festuca ovina*, *Anthoxanthum odoratum*, *Galium saxatile*, *Potentilla erecta* and the mosses *Hypnum jutlandicum*, *Pleurozium schreberi*, *Hylocomium splendens* and *Dicranum scoparium*. Patches of H9 are scattered widely on well-drained level to sloping ground through the survey area. They were primarily classed to NVC community level but certain areas show affinities with the H9a *Hypnum cupressiforme* sub-community, H9b *Vaccinium myrtillus*-*Cladonia* spp. sub-community and the H9c species-poor sub-community.

The H10 *Calluna vulgaris* - *Erica cinerea* heath community has *Calluna vulgaris* as the main dwarf shrub but with *Erica cinerea* also frequent to abundant. There is generally at least a thin scattering of other vascular species including *Avenella flexuosa*, *Festuca ovina*, *Agrostis capillaris*, *A. vinealis*, *Carex binervis* and *Potentilla erecta*, and an abundance of mosses including *Hypnum jutlandicum*, *Pleurozium schreberi* and *Hylocomium splendens*. This form of heath, with a clear dominance of dwarf shrubs and other vascular species only sparse, is relatively common on south-facing slopes, and belongs in the H10a typical sub-community. Heath that is floristically quite similar but shorter and more grazed has the dwarf shrub cover reduced and the cover of grasses and small herbs correspondingly greater and belongs in the H10c *Festuca ovina*-*Anthoxanthum odoratum* sub-community. This is locally common in the north and east of the survey area but less extensive than H10a. The H10d *Thymus polytrichus* - *Carex pulicaris* sub-community is found in one location on a steep bank on Craggy Brae in the east of the survey area, where the heath resembled H10c but with much *Thymus polytrichus*, indicating that the soils are less acidic than those beneath the other sub-communities of H10. This area has thus been assigned the D1.2 Basic Dry Dwarf Shrub Heath Phase 1 code.

H12 *Calluna vulgaris* - *Vaccinium myrtillus* heath is the most common form of dry heath in the survey area. It resembles H10 described above but with *Vaccinium myrtillus* taking the place of *Erica cinerea*. It was described to the community level in places, as well as by its three constituent sub-communities; H12a *Calluna vulgaris* sub-community, H12b *Vaccinium*



vitis-idaea - *Cladonia impexa* sub-community and the H12c *Galium saxatile* - *Festuca ovina* sub-community. H12a and H12c are the less grazed and more grazed/grassy forms, and they are the counterparts of H10a and H10c in the H10 community. As in H10, the more heathy, less grazed form (H12a) is more common than the shorter and more grassy form (H12c). Very locally, heath intermediate between H10 and H12 was recorded. This is dominant *Calluna* accompanied by frequent *Erica cinerea* and *Vaccinium myrtillus*, with the last two species in roughly equal quantity. This heath is labelled as an H10-12 intermediate community. The H12b *Vaccinium vitis-idaea* - *Cladonia impexa* sub-community is also fairly common across the survey area and contains a higher proportion of *Vaccinium vitis-idaea* and *Empetrum nigrum*.

The H18 *Vaccinium myrtillus* - *Avenella flexuosa* heath is generally present within mosaics or formed from patches of previous muirburn or where grazing is quite high and *Vaccinium myrtillus* is very dominant. Common species include *Avenella flexuosa*, *Galium saxatile* and the mosses *Pleurozium schreberi*, *Dicranum scoparium*, *Hylocomium splendens* and *Hypnum jutlandicum*. It was recorded at the community level as well as the H18a *Hylocomium splendens* - *Rhytidiadelphus loreus* sub-community.

H21 *Calluna vulgaris* - *Vaccinium myrtillus* - *Sphagnum capillifolium* heath has a dense and fairly tall (30-50 cm) canopy of *Calluna vulgaris* and smaller amounts of *Vaccinium myrtillus*. It is similar to the H12 community described above and shares the scattering of other vascular plants such as *Avenella flexuosa* and *Potentilla erecta*, and the extensive carpets of mosses including *Hypnum jutlandicum*, *Pleurozium schreberi*, *Hylocomium splendens* and *Rhytidiadelphus loreus*. However, it differs from H12 in that the moss layer includes frequent patches of *Sphagnum capillifolium/rubellum*. It was recorded at the community level and as the H21a *Calluna vulgaris* - *Pteridium aquilinum* sub-community. It is locally common across the survey area on slopes of gentle to moderate gradient. In some areas it is found in mosaics with M19 bog. Some of this might therefore have been derived from previous M19 by burning, resulting in drying out of the habitat and a corresponding loss of *Eriophorum vaginatum*.

5.5.2 D2 Wet Dwarf Shrub Heath

Wet heath is very common across the entire survey area, with the most extensive tracts in the southern survey area where it covers large areas of Broad Law and Mine Hill. It all consists of the M15 *Trichophorum germanicum* - *Erica tetralix* wet heath community. In places the habitat mosaics and transitions with blanket bog and acid grassland. The majority of the wet heath present is of the M15b Typical sub-community. The M15d *Vaccinium myrtillus* sub-community is also well-represented, although there are only a small number of patches of the M15a *Carex panicea* sub-community and M15c *Cladonia* spp. sub-community recorded. Many of these areas are in a relatively degraded condition, with an apparent history of burning and drying.

The areas of M15b were generally dominated by *Calluna vulgaris*, with *Trichophorum germanicum* and *Molinia caerulea* becoming co-dominant in places. Also present in varying proportions are *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*. In some particularly dry patches, the *Trichophorum germanicum* is diluted by a number of grass species including *Avenella flexuosa* and *Anthoxanthum odoratum*. The small areas of M15c

present were relatively dry and contained a higher abundance of *Cladonia* spp. compared to the other sub-communities.

5.5.3 D4 Montane Heath/Dwarf Herb

Montane heath/dwarf herb is an uncommon habitat within the survey area and is solely represented by the U7 *Nardus stricta* - *Carex bigelowii* grass-heath community. It is restricted to the highest altitudes in the far south of the survey area around the summits of Green Lowther and Green Trough. This vegetation community is characteristic of areas where snow lies moderately late into spring.

Nardus stricta is strongly present within these areas along with abundant *Carex bigelowii*. *Avenella flexuosa* is also fairly abundant in areas, along with *Agrostis capillaris*, *Vaccinium myrtillus*, *Galium saxatile* and the mosses *Racomitrium lanuginosum* and *Pleurozium schreberi*. It is represented here at the community level and by the U7a *Empetrum nigrum* - *Cetraria islandica* sub-community where *Trichophorum germanicum* is present within the sward, as well as by the U7b typical sub-community.

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 centre and east of the survey area around Peat Hill, Harryburn Brae and Wool Law. Smaller scattered patches are also common throughout the south and west. 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 relatively drier M19 community is significantly more abundant within the survey area than the typically wetter M17 blanket mire community. The M2 *Sphagnum cuspidatum/fallax* bog pool community and M3 *Eriophorum angustifolium* bog pool community were also rarely recorded within these blanket bog areas (see Annex A).

Areas of M2 were recorded at community level only. These bog pools were mostly 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 - *Rhytidadelphus 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 M17c is generally much drier and dominated by graminoids. The M17b sub-community is the most common within the survey area and is differentiated by the greater presence of the moss *Racomitrium lanuginosum* and *Cladonia* spp. lichens.

M19 *Calluna vulgaris* – *Eriophorum vaginatum* is the most common blanket bog community across the survey area, generally occurring on peat-covered level to gently sloping ground. It is represented at community level and as the M19a *Erica tetralix* sub-community, the M19b *Empetrum nigrum* sub-community and the M19c *Vaccinium vitis-idaea* - *Hylocomium splendens* sub-community. The community is generally distinctive with the bulk of the vegetation consisting of a co-dominant mixture of *Calluna vulgaris* and *Eriophorum vaginatum*. There is commonly at least a little *Eriophorum angustifolium*, *Avenella flexuosa*, *Vaccinium myrtillus* and *Juncus squarrosus*, these species in distinctly smaller quantity than the two co-dominants. The mosses *Hylocomium splendens*, *Polytrichum commune*, *Pleurozium schreberi*, *Hypnum jutlandicum* and *Sphagnum capillifolium* are collectively very abundant, forming deep and extensive moss carpets. There can also be small amounts of *Sphagnum fallax*, *Sphagnum medium*, *Sphagnum papillosum* and *Polytrichum commune*. On the higher ground there is M19 as described above and also containing *Empetrum nigrum*; this belongs in the M19b *Empetrum nigrum* sub-community. Elsewhere, but less extensively, the M19 was found to have little or no *E. nigrum* and at least a scattering of *Erica tetralix* and/or *Trichophorum germanicum*, placing it in the M19a *Erica tetralix* sub-community. A very small number of patches were classified as the M19c *Vaccinium vitis-idaea* - *Hylocomium splendens* sub-community where *Vaccinium vitis-idaea*, *Vaccinium myrtillus* and *Empetrum nigrum* is more common and abundant *Cladonia* spp. are present.

The blanket bog within the survey area is generally 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 muirburn, livestock grazing, agricultural improvement, conifer encroachment and moor grip drainage, all of which acts to dry out the habitat and lower the water table. This degradation is evident in some of the relatively larger patches of bogs that exhibit some hagg and gully features, particularly in the area around Peat Hill in the east of the survey area.

Following completion of NVC surveys and the identification of priority peatland habitats on-site, according to NatureScot Guidance²⁶, further peatland condition surveys were undertaken for the Proposed Development – these are fully detailed and discussed within Annex D.

5.6.2 E1.7 Wet Modified Bog

Wet modified bog has a scattered distribution throughout the survey area, although the most continuous tracts are found in the west around Rake Law and Glen Kip. It is mostly represented by the M20 *Eriophorum vaginatum* blanket mire, as well as large areas of

M25a[^] *Molinia caerulea* – *Potentilla erecta* mire *Erica tetralix* sub-community and much more limited patches of M15b[^] *Trichophorum germanicum* - *Erica tetralix* wet heath, typical sub-community. M25a[^] and M15b[^] being classified as wet modified bog and not marshy grassland or wet dwarf shrub heath here due to generally appearing on peat of greater than 0.5 m in depth or with clear affinities to being a mire or having been derived from previous better quality mire (see also Sections 5.3.5 and 5.5.2). In these circumstances, the communities are denoted with a caret (i.e., M25a[^]). In a few areas the M20 communities appear to be transitioning to a more impoverished and lower quality vegetation more indicative of M25, classified here as M20-M25 intermediate, likely through the same processes of degradation described in Section 5.6.1 above.

M20 *Eriophorum vaginatum* blanket mire areas were recorded both at community level and as the M20a Species-poor sub-community and M20b *Calluna vulgaris* – *Cladonia* species sub-community. For M20a, this can be identified by *Eriophorum vaginatum* and *E. angustifolium*, with some *Avenella flexuosa*. The M20b species assemblage can be identified by the dominant tussocks of *Eriophorum vaginatum*, along with some *Calluna vulgaris*, *Trichophorum germanicum*, *Vaccinium myrtillus* and *Empetrum nigrum*. Grasses found include *Anthoxanthum odoratum*, *Agrostis capillaris*, *Nardus stricta* and *Avenella flexuosa*. The basal layer in these areas generally lacks abundant *Sphagna* although often some wetter patches contain *Sphagnum capillifolium* and *S. fallax*, however overall, the basal layer is dominated by *Polytrichum commune* and common and typical pleurocarpous and hypnoid mosses. Most patches of this community appear likely to have been derived from previous blanket bog communities (i.e. M17, M19) by grazing and burning, reducing dwarf shrub cover.

The M25a[^] areas were 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* and patches of *Sphagnum capillifolium*. The few scattered patches of M15b[^] were mostly found in areas of relatively recent muirburn where the regenerating vegetation was characteristic of the wet dwarf shrub heath form of M15 described above, despite clearly being located on deeper peat.

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 (see Section 5.3.5). The majority of this habitat is represented by M6 *Carex echinata* – *Sphagnum fallax/denticulatum* mire. The M4 *Carex rostrata* - *Sphagnum fallax* mire and M5 *Carex rostrata* - *Sphagnum squarrosum* mire communities were also recorded infrequently across the survey area. Additionally, M32 *Philonotis fontana* – *saxifraga stellaris* springs and one M36 Lowland springs and streambanks of shaded situations were recorded across the survey area, most of which were recorded as TNs (see Annex A).

The M6 *Carex echinata* – *Sphagnum fallax/denticulatum* mire in the survey area is predominately of the M6c *Juncus effusus* sub-community, however there are also frequent patches of the M6d *Juncus acutiflorus* sub-community. 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 *Viola palustris*, *Potentilla erecta*, *Carex echinata*, *Agrostis canina*, *Rumex acetosa*, *Molinia caerulea*,

²⁶ <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management> (accessed March 2025).



Myosotis secunda, *Ranunculus repens* and *Cirsium palustre*, and the mosses *Polytrichum commune*, *Aulacomnium palustre* and *Hylocomium splendens*.

The small, scattered, patches of M4 *Carex rostrata* - *Sphagnum fallax* mire are found on areas of roughly level, very wet ground and are characterised by a sward dominated by *Carex rostrata* with a basal layer composed of *Sphagnum fallax*, *Sphagnum palustre* and *Sphagnum capillifolium*. Other species found here include *Juncus effusus*, *Carex panicea*, *Carex echinata*, *Viola palustris*, *Potentilla erecta*, *Rumex acetosa*, *Luzula multiflora*, *Agrostis canina*, *Cirsium palustre* and *Holcus lanatus*.

Only one small patch of the M5 *Carex rostrata* - *Sphagnum squarrosum* mire was recorded, found in the northeast of the survey area in the upper part of the glen of Hershaw Burn. Like M4, this also contains a sedge sward with abundant *Carex rostrata*, however the associated flora is indicative of more neutral conditions. This includes *Carex panicea*, *Viola palustris*, *Cirsium palustre*, *Galium uliginosum*, *Agrostis canina*, *Festuca rubra*, *Holcus lanatus*, *Nardus stricta*, *Luzula multiflora*, *Potentilla erecta* and the mosses *Sphagnum teres*, *Rhytidiadelphus squarrosus* and *Thuidium tamariscinum*.

The M32 *Philonotis fontana* - *saxifraga stellaris* springs were recorded at the community level and as the M32a *Sphagnum denticulatum* sub-community. They were mostly found in seepage areas on moderate gradients, being most common in the south of the survey area on the slopes of Green Lowther and Dun Law. They contained typical vegetation for the community, including abundant *Philonotis fontana*, as well as *Juncus effusus*, *Carex panicea*, *Pinguicula vulgaris*, *Nardus stricta*, *Viola palustris*, *Saxifraga stellaris*, *Agrostis stolonifera* and *Deschampsia cespitosa*.

One instance of M36 Lowland springs and streambanks of shaded situations was found in the survey area, recorded as TN 67 (see **Annex A**). This was located in a steep-sided shaded gully between White Law and Great Hill in the south of the survey area. The vegetation community at this spring is ill-defined, with the spring emerging from rocks underneath a patch of *Urtica dioica*.

5.6.4 E2.2 Basic Flush/Spring

Two small areas of basic stony flush were found within the survey area, both of which are recorded as TNs (TN4 and TN35) (see **Annex A** and **Figure 6.4 (EIAR Volume 3a)**). These flushes are represented by the M10 *Carex dioica* - *Pinguicula vulgaris* mire community. They were recorded to the east of the survey area on the southern slope of Harryburn Brae, as well as in the north on Ravengill Dod.

The M10 vegetation present was recorded at the community level only, and has a sward consisting mainly of sedges including *Carex flacca*, *C. hostiana*, *C. pulicaris*, *C. dioica*, *C. panicea* and *C. nigra*. Other species present include the rush *Juncus articulatus* and mosses including *Campylium stellatum*, *Scorpidium revolvens*, *Palustriella commutata*, *Philonotis calcarea* and *Ctenidium molluscum*. Herbs occur too, typical species here include *Succisa pratensis*, *Cirsium palustre* and *Taraxacum* agg., and there can also be a thin scattering of grasses such as *Briza media* and *Molinia caerulea*.

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 haggling or peat pans, or peatland areas devoid of vegetation through erosion. The patches of bare peat are limited in size and predominantly found in mosaic with the more degraded areas of blanket bog in the centre and east of the survey area, particularly around Peat Hill.



5.7 Swamp, Marginal & Inundation Habitats

5.7.1 F1 Swamp

One small patch of S9 *Carex rostrata* swamp was recorded at the edge of an old small mining settlement pool near Glengonnar Halt in the south of the survey area. This comprised pure stands of *Carex rostrata* in shallow standing water. A stand of S19 *Eleocharis palustris* swamp was recorded in a small pond within woodland in the north near Glengonnar Water. This vegetation consists of a species-poor sward of *Eleocharis palustris* growing in shallow water. An area of S28 *Phalaris arundinacea* tall-herb fen, consisting of a tall, species-poor sward of *Phalaris arundinacea*, was also found in a small pond within the same woodland in the far north of the survey area.

5.7.2 F2.2 Inundation Vegetation

One very small patch of MG11 *Festuca rubra* - *Agrostis stolonifera* - *Potentilla anserina* grassland was recorded only once in the survey area to the north near Glencaple Farm, in a mosaic with marshy grassland communities. It is defined by the abundance of *Potentilla anserina* among an otherwise undistinguished mix of *Holcus mollis*, *Ranunculus repens*, *Urtica dioica* and *Cirsium arvense*.

5.8 Open Water

5.8.1 G1 Standing Water

There are two very small standing waterbodies (SW) within the survey area, one being an old mining settlement pool and the other an inundated patch within an area of blanket bog.

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 are Glengonnar Water and Elvan Water.

5.9 Rock Exposure & Waste

5.9.1 I1.2.1 - Scree - Acid/Neutral

Small areas of scree are scattered widely throughout the survey area. These patches are mostly found on steep-sided glens and gullies, with their surfaces largely devoid of vegetation. One small area in the south of the survey area near Glengonnar Halt was noted as being dominated by the moss *Racomitrium lanuginosum* on stony thin soil and was also included in this classification. It was assigned the non-NVC type 'Rlan'.

5.9.2 I1.4.1 - Other Rock Exposure - Acid

Several small areas of exposed or bare rock (RK) were recorded throughout the survey area, mostly in the form of river shingle along the banks of watercourses. There were also a small number of rock exposures and areas of exposed gravel that were assigned this classification. These surfaces generally almost entirely lack vegetation.

5.9.3 I2.2 Spoil

A small number of bare ground (BG) areas were comprised of historical spoil heaps, and as such assigned the I2.2 Phase 1 code.



5.10 Miscellaneous

5.10.1 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. This code was also used to indicate playing fields and a golf course within the survey area near Leadhills village.

5.10.2 J1.3 Cultivated/Disturbed Land – Ephemeral/Short Perennial

One small patch in an area of old mining spoil just north of the village of Leadhills was found to be dominated by regenerating *Alchemilla mollis*, with very little else growing. It has been indicated by the non-NVC type 'Am'.

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, hardstandings and public roads. Any areas that were devoid of vegetation and that could not be classified as any other habitat are also included here.

5.10.5 J5 Other Habitat

Other habitat is a non-NVC community used here where there is muirburn (MB) within the survey area, where the burning was very recent or of a degree that the parent or likely habitat type could not be easily determined.

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:

- SEPA guidance on Groundwater Dependent Terrestrial Ecosystems (GWDTEs);
- Habitats Directive (92/43/EEC) Annex I habitats; and

- Scottish Biodiversity List (SBL) priority habitats.

6.2 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater²⁷. 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 this assessment (see **Chapter 8: Hydrology, Hydrogeology and Geology (EIAR Volume 2)**).

Using SEPA's guidance²⁷, **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	<i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland
W7	<i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemorum</i> woodland
M4	<i>Carex rostrata</i> – <i>Sphagnum fallax</i> mire
M5	<i>Carex rostrata</i> – <i>Sphagnum squarrosum</i> mire
M6	<i>Carex echinata</i> – <i>Sphagnum fallax/denticulatum</i> mire
M10	<i>Carex dioica</i> – <i>Pinguicula vulgaris</i> mire
M15	<i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
M23	<i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush pasture
M27	<i>Filipendula ulmaria</i> – <i>Angelica sylvestris</i> mire
M32	<i>Philonotis fontana</i> – <i>Saxifraga stellaris</i> spring
M36	Lowland springs and streambanks of shaded situations
MG9	<i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
MG10	<i>Holcus lanatus</i> – <i>Juncus effusus</i> rush pasture
MG11	<i>Festuca rubra</i> – <i>Agrostis stolonifera</i> – <i>Potentilla anserina</i> grassland
CG10	<i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Thymus polytrichus</i> grassland
U5c	<i>Nardus stricta</i> - <i>Galium saxatile</i> grassland <i>Carex panicea</i> - <i>Viola palustris</i> sub-community
U6	<i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
U16	<i>Luzula sylvatica</i> – <i>Vaccinium myrtillus</i> tall-herb community

²⁷ SEPA (2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems. Available at: <https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>. [Accessed February 2026]



NVC Code	NVC Community Name
Je/Ja ²⁸	<i>Juncus effusus</i> acid grassland / <i>Juncus acutiflorus</i> acid grassland
Mx ²⁹	<i>Carex</i> spp. neutral sedge mire

The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see **Figure 6.4 (EIAR Volume 3a)**.

Within **Figure 6.4 (EIAR Volume 3a)** the potential GWDTE classification of each polygon is classified on a three-tier approach 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
- 'Non' – no GWDTE(s) within the polygon.

GWDTE potential has been assigned solely on the SEPA listings²⁷. 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 and Geology (EIAR Volume 2)**).

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. Its Annex I status can depend on various factors such as quality, extent, species assemblages, geographical setting and substrates.

Using Joint Nature Conservation Committee (JNCC) Annex I habitat listings and descriptions³⁰, which have then been compared with survey results and field observations, the following NVC communities within the survey area which could be considered to constitute Annex I habitat 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 <i>Erica tetralix</i>	M15 <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
4030 European dry heaths	H9 <i>Calluna vulgaris</i> – <i>Avenella flexuosa</i> heath

²⁸ In light of the SEPA classification on potential GWDTEs the non NVC types 'Je' and '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.

³⁰ JNCC (n.d.) Habitats list. Available at: <https://jncc.gov.uk/habitats/>. [Accessed March 2026].



Annex 1 Habitat	Corresponding NVC Communities & Other Non-NVC Habitats/Features Recorded
	H10 <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath H12 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> heath H18 <i>Vaccinium myrtillus</i> – <i>Avenella flexuosa</i> heath H21 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> – <i>Sphagnum capillifolium</i> heath H10-H12 intermediate heath
6150 Siliceous alpine and boreal grasslands	U7 <i>Nardus stricta</i> – <i>Carex bigelowii</i> grass-heath
6230 Species-rich <i>Nardus</i> grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe)	U5c <i>Nardus stricta</i> – <i>Galium saxatile</i> grassland <i>Carex panicea</i> – <i>Viola riviniana</i> sub-community CG10 <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Thymus polytrichus</i> grassland
7130 Blanket bog	M2 <i>Sphagnum cuspidatum/fallax</i> bog pool community M3 <i>Eriophorum angustifolium</i> bog pool community M15 ^A <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire M20 <i>Eriophorum vaginatum</i> blanket mire M25 ^A <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire
7140 Transition mires and quaking bogs	M4 <i>Carex rostrata</i> – <i>Sphagnum fallax</i> mire M5 <i>Carex rostrata</i> – <i>Sphagnum squarrosum</i> mire
7230 Alkaline fens	M10 <i>Carex dioica</i> – <i>Pinguicula vulgaris</i> 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 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-M3) where these occur within blanket mires such as M17-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, M15 wet heath and 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 M15b[^] and M25a[^] - see **Sections 5.5.2 and 5.6.2**) have also been classified as potential Annex I blanket bog, to represent a worst-case scenario.

6.3.3 7140 Transition mires and quaking bogs

All examples of M4 *Carex rostrata* - *Sphagnum fallax* mire and M5 *Carex rostrata* - *Sphagnum squarrosum* 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. Examples of M10 mire in the survey area fall within this Annex I habitat type.

M10 can be included within the 7240 Alpine pioneer formations of the Caricion bicoloris-atrofuscae Annex I type, where the community occurs at high altitude and includes many arctic-alpine species; however, that was not the case within the survey area and the M10 is therefore assigned to 7230 alkaline fens.

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 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 most common dwarf shrub is *Calluna vulgaris*.

The dry heath communities recorded – H9, H10, H12, H18, H21, H10-H12 intermediate – all 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. These communities within the survey area are lower altitudinal examples so they all fall under the 4030 European dry heaths Annex I type.

The most common forms of dry heath in the survey area, as noted in the community descriptions above, are species-poor, relatively botanically impoverished forms of *Calluna* dominated heath.

6.3.7 6150 Siliceous alpine and boreal grasslands

Siliceous alpine and boreal grasslands are one of the few predominantly near-natural habitats remaining in the UK. The habitat is the most extensive type of vegetation in the high mountain zone, above an altitude of about 750 m. It often forms large continuous tracts, covering summit plateaux and the tops of the higher summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by contrasting extremes of exposure and snow-lie. Late-lie snow-bed communities dominated by

bryophytes and dwarf-herbs are also included within the definition of the habitat. U10 moss-heath occurs on windswept ground blown clear of snow during winter, and is the most extensive sub-type of the habitat across most of the UK. Where snow-lie builds up, such moss-heath gives way initially to U7 *Nardus* – *Carex* grass-heath. The habitat is vulnerable to nutrient inputs and physical damage such as occur due to dunging and urination by grazing animals, acid deposition, human and animal trampling, and use of all-terrain vehicles.

The small stands of U7 within the survey area are all located at approximately 700 m altitude around the summit of Green Lowther and are considered to fall within this Annex I type.

6.3.8 6230 Species-rich *Nardus* grassland, on siliceous 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. There are 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. More species-rich sub-types of U4 *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland and U5 *Nardus stricta* – *Galium saxatile* grassland are also included within the habitat definition; this especially applies to the U5c *Carex panicea* – *Viola riviniana* sub-community.

This Annex I type is of very low and restricted cover within the survey area and is accounted for by some small areas of CG10 (see **Section 5.3.3**). Some small and widely-scattered areas of the U5c *Carex panicea* - *Viola riviniana* sub-community present within the survey area have also been included in this Annex I type. This sub-community contains a flora including species indicative of at least mild base-enrichment and are a relatively species-rich form of *Nardus* grassland (see **Section 5.3.1**).

6.3.9 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.

Sparse areas of W11 were recorded within the survey area, but they were not deemed to be of Annex I status/quality because they are fragments of birchwoods with no *Quercus* spp. and they generally lack any characteristics such as a rich bryophyte assemblage which would refer to them as 'old sessile oak woods'.

6.4 Scottish Biodiversity List Priority Habitats

The SBL is a list of species and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was first published in 2005 with updates in 2007, 2012, and most latterly revised in December 2025 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004³¹. The most

³¹ 2004 asp 6 (Acts of the Scottish Parliament) Nature Conservation (Scotland) Act 2004.
<https://www.legislation.gov.uk/asp/2004/6/contents>



recent SBL revision has been developed from scratch, and it is shorter and more targeted; reduced from more than 2,000 species and habitats on the previous list to less than 500 on the current revised list.

The SBL identifies habitats which are important to furthering the conservation of biodiversity in Scotland: these are termed 'priority habitats'. The names of many priority habitat types have changed from the previous list, and it appears many of the underpinning habitat or community types that comprise these priority types are also likely to have been revised, changed or reduced. Whilst the previous iteration of the SBL provided associated priority habitat definition documents outlining the habitat type, where it occurs, its characteristics, and the associated correlations with Phase 1, NVC and UK BAP habitat types, the most recent revision has not provided such supporting information (at the time of preparation of this technical appendix). Therefore, at the current time and until such information is made available, it is not possible to definitively or accurately correlate the results of this survey, and the habitat types present within the Site or survey area to the revised SBL priority habitat types.

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
Mires & Wet Heath		
M2	n/a	7130 Blanket bogs (examples associated with M17-M20)
M3	n/a	7130 Blanket bogs (examples associated with M17-M20)
M4	Yes	7140 Transition mires and quaking bogs
M5	Yes	7140 Transition mires and quaking bogs
M6a, M6b, M6c, M6d	Yes	n/a
M10	Yes	7230 Alkaline fens
M15, M15a, M15b, M15b [^] , M15c, M15d	Yes	4010 Northern Atlantic wet heaths with <i>Erica tetralix</i> ; 7130 Blanket bogs where peat depth >0.5 m (i.e. M15b [^])
M17, M17a, M17b, M17c	n/a	7130 Blanket bogs
M19, M19a, M19b, M19c	n/a	7130 Blanket bogs
M20, M20a, M20b, M20-M25a/a [^] intermediate	n/a	7130 Blanket bogs
M23, M23a, M23b	Yes	n/a
M25, M25a, M25b, M25c, M25 [^] , M25a [^]	n/a	7130 Blanket bogs (where peat depth >0.5 m)
M27, M27a, M27c	Yes	n/a
M32, M32a	Yes	n/a



NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat
M36	Yes	n/a
Dry Heaths		
H9, H9a, H9b, H9c	n/a	4030 European dry heaths
H10, H10a, H10c, H10d	n/a	4030 European dry heaths
H12, H12a, H12b, H12c	n/a	4030 European dry heaths
H18, H18a	n/a	4030 European dry heaths
H21, H21a	n/a	4030 European dry heaths
H10-H12 intermediate	n/a	4030 European dry heaths
Calcifugous Grasslands & Ferns		
U2, U2a, U2b	n/a	n/a
U4, U4a, U4b, U4d	n/a	n/a
U4b-MG9a intermediate	n/a	n/a
U5, U5a, U5b, U5c	n/a	6230 Species-rich <i>Nardus</i> grassland, on siliceous substrates in mountain areas (applies to U5c only)
U6, U6a, U6c, U6d	Yes	n/a
U7, U7a, U7b	n/a	6150 Siliceous alpine and boreal grasslands
U16, U16b, U16c	Yes	n/a
U19	n/a	n/a
U20, U20a, U20b	n/a	n/a
Mesotrophic Grasslands		
MG1, MG1a	n/a	n/a
MG6	n/a	n/a
MG9, MG9a	Yes	n/a
MG10a, MG10c, MG10(Ja)	Yes	n/a
MG11	Yes	n/a
Calcicolous Grasslands		
CG10, CG10a, CG10b	Yes	6230 Species-rich <i>Nardus</i> grassland, on siliceous substrates in mountain areas
Woodland & Scrub		
W4, W4b	Yes	n/a
W7, W7b, W7(p)	Yes	n/a
W10, W10(p)	n/a	n/a
W11	n/a	n/a
W24	n/a	n/a
Swamps & Tall-Herb Fens		



NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat
S9	n/a	n/a
S19	n/a	n/a
S28	n/a	n/a
Vegetation of Open Habitats		
OV25	n/a	n/a
OV27	n/a	n/a
Non-NVC Types		
Am	n/a	n/a
BD	n/a	n/a
BG	n/a	n/a
BP	n/a	n/a
Bs	n/a	n/a
CF	n/a	n/a
CP	n/a	n/a
Daff	n/a	n/a
ExP	n/a	n/a
HI	n/a	n/a
Ja	Yes	n/a
Je	Yes	n/a
MB	n/a	n/a
Mx	Yes	n/a
PG	n/a	n/a
RK	n/a	n/a
Rlan	n/a	n/a
RW	n/a	n/a
SBT	n/a	n/a
SCT	n/a	n/a
SW	n/a	n/a
YBP	n/a	n/a
YCP	n/a	n/a

7.0 Summary

MacArthur Green (now SLR¹) carried out NVC and habitat surveys within the survey area from 16 to 20 September 2024 inclusive, 30 September to 04 October 2024 inclusive, 29

October to 01 November 2024 inclusive and 07 to 09 July 2025 inclusive in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 44 NVC communities and three intermediate communities were recorded within the respective survey area along with various associated sub-communities; 23 non-NVC habitat types are also present. A relatively small number of communities or habitat types account for the majority of the survey area.

The survey area is mainly open upland habitats, the most common and widespread making up the bulk of the landscape is acid dry dwarf shrub heath, followed by acid grassland, marshy grassland and wet dwarf shrub heath. Breaking up these expanses are patches and pockets of other habitat types such as blanket bog, calcareous grassland, flushes and woodland.

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 and potential GWDTE habitats, as summarised in **Table 6-3**.



ANNEX A NVC Target Notes

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

Table A-1 Survey Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
1	281145	618161	M32	M32 spring.	Photo B-1
2	281991	617408	n/a	Several mature <i>Sorbus aucuparia</i> on steep banks of watercourse.	Photo B-2
3	292029	619516	M32	M32 spring.	
4	292246	619796	M10	M10 flush, around 1x4 m in area	Photo B-3
5	290027	620644	n/a	Three mature <i>Sorbus aucuparia</i> along riverbank.	
6	267047	618920	n/a	Large, mature <i>Acer pseudoplatanus</i> .	Photo D-4
7	267088	618888	n/a	Large, mature <i>Acer pseudoplatanus</i> .	
8	268794	618135	n/a	Large, mature <i>Acer pseudoplatanus</i> .	
9	288450	617425	M32	Long narrow strip of M32 vegetation down hillside.	
10	290729	614016	M32	Small M32 spring leading into M6c flush.	
11	291132	613771	M32	M32 spring leading into M6c flush.	
12	291935	616154	M32	Thin strip of M32 vegetation around 20 m long.	
13	291268	613618	M32	M32 spring. Around 1x7 m in area.	
14	291809	613960	M32	Two adjacent M32 springs.	
15	292612	615310	n/a	Single mature <i>Sorbus aucuparia</i> in gully	
16	293064	615907	M32	Spring leads into M23b flush.	
17	292632	622284	W7	<i>Neofila ovata</i> (eight plants seen) in woodland.	
18	292763	622112	U4b	<i>Cirsium heterophyllum</i> in grassland.	
19	292768	622084	U4b	<i>Viola lutea</i> in grassland.	



Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
20	292161	621693	U4b-MG9	<i>Cirsium heterophyllum</i> locally frequent in grassland.	
21	292394	621399	CG10	Species here include <i>Helianthemum nummularium</i> , <i>Briza media</i> and <i>Danthonia decumbens</i>	
22	292672	621626	U4	<i>Viola lutea</i> in grassland.	
23	292511	621507	U4	<i>Viola lutea</i> in grassland.	
24	292498	621473	U4	<i>Viola lutea</i> in grassland.	
25	292611	621169	U4	<i>Viola lutea</i> in grassland.	
26	292352	620962	M25c	Species in herb-rich <i>Molinia</i> vegetation include <i>Galium uliginosum</i> and the moss <i>Breutelia chrysocoma</i> .	
27	293286	619385	M23 + Mx	Species in M23 and Mx mires include <i>Briza media</i> , <i>Carex pulicaris</i> , <i>Galium uliginosum</i> and the moss <i>Sphagnum teres</i> .	
28	293373	619186	M4 + M5	Species in sedge mires here include <i>Carex rostrata</i> , <i>Galium uliginosum</i> and moss <i>Sphagnum teres</i> .	
29	293185	618955	M19a	Species include moss <i>Sphagnum medium</i> .	
30	293158	618951	M20	Species include moss <i>Sphagnum medium</i> .	
31	292585	618798	Mx	Species in sedge mire include <i>Galium uliginosum</i> and <i>Carex pulicaris</i> .	
32	292766	617794	M23a	Species in rush mire include <i>Briza media</i> , <i>Galium uliginosum</i> , <i>G. verum</i> and <i>Carex hostiana</i> .	
33	293219	617521	U5c	Species in grassland include <i>Briza media</i> , <i>Galium uliginosum</i> , <i>G. verum</i> and <i>Alopecurus filiculmis</i> .	
34	292658	618450	M17/M19	Artificial drains in blanket bog around here.	
35	292989	618028	M10/M23a	Species in mires here include <i>Carex dioica</i> , <i>C. hostiana</i> , <i>Briza media</i> , <i>Parnassia palustris</i> and mosses <i>Hemitelia verrucosus</i> and <i>Philonotis calcarea</i> .	
36	292960	617991	CG10	Species here include <i>Briza media</i> , <i>Galium verum</i> , <i>Viola lutea</i> and <i>Alopecurus filiculmis</i> .	
37	293887	619997	n/a	Large <i>Quercus</i> sp.	
38	293906	620044	n/a	Large <i>Quercus</i> sp. with <i>Sorbus aucuparia</i> growing out of trunk.	
39	290753	620314	n/a	Three <i>Sorbus aucuparia</i> trees	
40	290575	617036	n/a	Surrounding bog is drained by small moor grips.	



Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
41	280364	616083	n/a	Mature <i>Sorbus aucuparia</i> tree.	
42	280304	617350	n/a	Example of eroded drainage gullies across the survey area with the underlying substrate exposed.	Photo B-5
43	288983	617336	M32a	M32a spring with <i>Philonotus fontana</i> .	
44	288669	616996	M32a	M32a with <i>Philonotus fontana</i> , <i>Viola palustris</i> , <i>Nardus stricta</i> , <i>Agrostis stolonifera</i> , <i>Saxifraga stellans</i> , and <i>Deschampsia cespitosa</i> .	
45	288655	616966	U5c	U5c - Found within small gully containing <i>Nardus stricta</i> , <i>Juncus effusus</i> , <i>Lotus corniculatus</i> , <i>Plantago lanceolata</i> , <i>Ranunculus acris</i> , <i>Filipendula ulmaria</i> , and <i>Cirsium palustre</i> .	Photo B-6
46	288692	615217	n/a	Mature <i>Pinus sylvestris</i> .	
47	288692	615195	n/a	Mature <i>Pinus sylvestris</i> .	
48	288672	615193	n/a	Mature <i>Pinus sylvestris</i> .	
49	288745	615207	n/a	Mature <i>Fagus sylvatica</i> trees.	
50	288655	615614	M32a	M32a spring with <i>Philonotus fontana</i> .	
51	288069	611676	M32a	M32a - <i>Philonotus fontana</i> appears across the surface with a seepage area continuing down the slope.	Photo B-7
52	288879	611821	n/a	Isolated area where peat hagsgs appear.	
53	288015	611892	M32a	M32a spring seepage area weaves through area of rush and <i>Molinia caerulea</i> .	
54	291112	615186	n/a	Peat erosion developing in this area with peat hagggs.	
55	280551	612791	M32a	M32a spring.	
56	280558	612798	M32a	M32a spring.	
57	280203	612253	M32a	M32a spring.	
58	288836	611781	M32	M32 spring.	
59	288667	612040	M32	M32 spring.	
60	288603	612247	M32	M32 spring.	
61	288553	612566	M32	M32 spring.	
62	288626	612502	M32	M32 spring.	



Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
63	280111	613230	n/a	Peat erosion evident within a localised area.	
64	288233	612701	n/a	Peat erosion in immediate area.	Photo B-8
65	282828	614325	M32	Small M32 spring leading into M23b flush.	
66	282815	614366	M32	M32 spring with <i>Philonotus fontana</i> .	
67	282758	614390	M36	Spring (marked on OS map) with no distinct vegetation, emerges from rock underneath patch of <i>Urtica dioica</i> .	Photo D-9
68	282762	614419	M32	M32 spring leading into M23 flush.	
69	283394	615307	n/a	Signs of peat erosion in wider area although peat seems to be very shallow locally.	
70	282661	613389	M2	Example of small bog pools within this area too small to map and at times were dried out at the time of survey.	Photo B-10
71	282715	613411	M3	Dominated by <i>Eriophorum angustifolium</i> .	
72	282718	613416	n/a	Peat erosion appears in the form of peat haggging within this area across the more bog dominated high ground along the ridge line.	
73	282361	613576	M32a	Spring found on steep slope dominated by <i>Philonotus fontana</i> along with <i>Carex echinata</i> and <i>C. panicea</i> .	
74	281914	614068	n/a	Peat erosion in the form of peat haggging.	



ANNEX B Target Note Photographs

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

Photo B-1 Target Note 1 – M32 Spring



Photo B-2 Target Note 2 – Mature *Sorbus aucuparia*



Photo B-3 Target Note 4 – M10 Flush



Photo B-4 Target Note 7 – Mature *Acer pseudoplatanus*



Photo B-5 Target Note 42 – Example of Eroded Drainage Gully



Photo B-6 Target Note 45 – U5c Acid Grassland



Photo B-7 Target Note 51 – M32a Spring



Photo B-8 Target Note 64 – Example of Peat Erosion



Photo B-9 Target Note 67 – M36 Spring



Photo B-10 Target Note 70 – Dried M2 Bog Pools



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 Typical Site setting



Photo C-2 M19 *Calluna vulgaris*-*Eriophorum vaginatum* blanket mire – more intact but with some self-seeded conifers present



Photo C-3 Micro-erosion, small peat hags, and bare peat patches



Photo C-4 Peat hagg erosion



Photo C-5 Hagg and gully erosion



Photo C-6 Self-seeded conifers within blanket bog



Photo C-7 Example of deep drainage ditch partially occluded with bank erosion



Photo C-8 Example of very deep erosion gully within the Site around Glen Kip



Photo C-9 M20 mire with occasional scattered patches of other *Calluna* dominated communities.



Photo C-10 M25a *Molinia caerulea*-*Potentilla erecta* mire, *Erica tetralix* sub-community



Photo C-11 M20 *Eriophorum vaginatum* mire regeneration on former muirburn



Photo C-12 Dry heath



Photo C-13 Example of regeneration over muirburn, with H12 *Calluna vulgaris*-*Vaccinium myrtillus* heath in the background



Photo C-14 Mosaic of H12 *Calluna vulgaris*-*Vaccinium myrtillus* heath and U4 *Festuca ovina*-*Agrostis capillaris*-*Galium saxatile* grassland



Photo C-15 M15b *Trichophorum germanicum*-*Erica tetralix* wet heath, typical sub-community



Photo C-16 Mosaic of M6d *Carex echinata* - *Sphagnum fallax/denticulatum* mire, *Juncus acutiflorus* sub-community and 'Ja' *J. acutiflorus* dominant acid grassland



Photo C-17 M17 *Trichophorum germanicum*-*Eriophorum vaginatum* blanket mire



Photo C-18 H18 *Vaccinium myrtillus* - *Avenella flexuosa* heath



Photo C-19 M6c *Carex echinata*-*Sphagnum fallax/denticulatum* mire, *Juncus effusus* sub-community



Photo C-20 Acid grassland within the Site



Photo C-21 U20 *Pteridium aquilinum*-*Galium saxatile* community



Photo C-22 Example of bare ground in steep cleughs on-Site



ANNEX D Peatland Condition Assessment

Introduction

Following completion of NVC surveys and the identification of priority peatland communities on-site, according to NatureScot Guidance³², further peatland condition assessment (PCA) surveys were undertaken for the Proposed Development.

Survey Area

The PCA survey area focussed on areas around proposed infrastructure and tracks, potential Outline Biodiversity Enhancement Management Plan (OBEMP) peatland restoration search areas, and areas mapped during the habitat surveys and symbolised using the Phase 1 symbology as containing priority peatland communities (i.e. codes D2 wet dwarf shrub heath, E1.6.1 blanket bog, E1.7 wet modified bog, E4 bare peat, and mosaics thereof); see **Figure 6.5 (EIAR Volume 3a)** for the area surveyed.

Sampling Strategy

Sampling and survey locations were distributed as follows:

- a sample at each turbine location, borrow pit, BESS, or other construction or substation compounds regardless of prevailing habitat type;
- a sample every 200 m along proposed new tracks within the PCA survey area, with additional samples at 50 m perpendicular offsets (one each side of track); and
- on a 150 m grid across the potential peatland restoration areas.

This resulted in the generation of a total of 325 PCA sample locations, as shown on **Figures 6.5.1-6.5.5 (EIAR Volume 3a)**.

Survey Methodology

MacArthur Green (now SLR¹) 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 peatlands³², Peatland Action condition criteria and guidance³³, JNCC guidelines on the selection of biological SSSIs³⁴, and other likely relevant variables from professional judgement and experience.

At each sample location the following data was collected:

- 1 The most applicable or best-fit category of the ten Peatland Action Peatland Condition Categories³³;
- 2 In a 30 m sample area around the survey location the following data was collected:
 - a) Presence/absence of artificial drains, if present then:

³² NatureScot (2023) Advising on carbon-rich soils, deep peat and priority peatland habitat in development management. Available at: <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>. [Accessed January 2026].

³³ NatureScot (2021) Peatland ACTION: peat depth and peat condition survey guidance and recording form guidance. Available at: <https://www.nature.scot/doc/peatland-action-peat-depth-and-peat-condition-survey-guidance-and-recording-form-guidance> [Accessed January 2026].

³⁴ 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>



- 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. DAFOR³⁵ 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 m² (0, 0-0.5, 0.5-2, or >2);
 - m) Presence/absence of peat hags 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.
- 4 Notes – any further notes or sample location specific information relevant to peatland condition.

Survey Dates

PCA surveys were undertaken between the 19 and 22 January 2026 inclusive.

³⁵ DAFOR = Dominant, Abundant, Frequent, Occasional, Rare.



Results & Discussion

Peatland Action Peatland Condition

Table D-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 **Figures 6.5.1-6.5.5 (EIAR Volume 3a)**.

Table D-1 Peatland Action Condition Category

Peatland Action Condition Category	Number of Samples	% of Samples
Actively Eroding: Hagg/Gully	27	8.3
Drained: Artificial	67	20.6
Drained: Hagg/Gully	2	0.6
Modified	217	66.8
N/A (not peatland)	12	3.7
TOTAL	325	100

As can be seen from **Table D-1**, the single most common peatland condition category within the survey area is 'Modified'. However, collectively the drained and actively eroding categories account for a notable number of peatland samples (n = 96) indicating a widespread level of degradation and frequent peatland damage/erosion features. Overall, these results indicate much of the peatland within the survey area is degraded or actively eroding (e.g. see example photographs in **Annex B (Photos B-5 and B-8)** and **Annex C** above). No 'Near-natural' peatland was recorded, and areas not impacted by drainage/damage/erosion features are subsequently of no greater than modified quality/condition. Further information on the nature of the peatland present and its condition is presented below.

Peatland Condition Variables

Of the 325 survey locations sampled in the PCA survey, 12 were not regarded as being present on peatland, often due to the presence of extensive peatland/non-peatland habitat mosaics. Therefore, the samples that did not fall on peatland were excluded from the following analyses (these excluded samples tended to fall within areas of dry heath or acid grassland). Of the 313 peatland samples the following summary information has been gathered from the data:

- Artificial drains were recorded at 68 sample locations and were widely scattered throughout the survey area, indicating systematic intensive historic moor grip drainage in places. In some areas there were several drains, or 'double-drains', within the survey plot. Of these drained survey points, 48 were considered open and 20 were occluded. Seventeen of the open drain survey points had drains deeply cut through to the underlying substrates.
- There is no evidence of peat cutting within the survey area.



- Only one sample was considered to have a natural surface pattern (as per JNCC, (1994)³⁶).
- Twenty-nine sample locations showed evidence of woodland and scrub invasion. These were mostly around Glen Kip in the west of the survey area and Peat Hill in the east (see **Figure 6.6 (EIAR Volume 3a)**) and largely consisted of young *Picea sitchensis* encroaching into the survey plots.
- Sphagna-rich ridges were considered present at 122 of the 313 peatland samples. However, when present they were usually not abundant nor extensive, but were often comprised of small patches of a single common species (see further analysis below regarding *Sphagnum* spp.). 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 – 4 samples;
 - Frequent – 17 samples;
 - Occasional – 30 samples; and
 - Rare – 71 samples.
- None of the following were recorded at sample locations or incidentally throughout the survey area - *Sphagnum-Betula nana* ridges, *Sphagnum fuscum* / *S. austrii* hummocks, peat mounds, or *Rhynchospora fusca*.
- Bog pools were recorded at 13 of the 313 peatland sample locations. As noted in **Section 5.6.1** above, some isolated M2 and M3 bog pools were recorded during the NVC surveys.
- There was evidence of recent muirburn at 11 of the sample locations (eight samples were classified as "low" impact, two samples of "medium" and one sample of "high").
- Bare peat was recorded at 41 sample locations (22 samples of 0-0.5 m², 15 samples 0.5-2 m² and four samples >2 m²).
- Peat hags and/or gully was recorded at 35 sample locations (eight samples are deeply cut through to underlying mineral substrate). Most of these samples were clustered in the actively eroding and deeper peatland in the west around Glen Kip and in the east around Peat Hill and Wellgrain Dod; see **Figure 6.5 (EIAR Volume 3a)**.
- No peat pans were recorded in the respective survey plots although areas of flat bare and eroding peat have been previously noted in the area around Wellgrain Dod in particular.
- Evidence of grazing, trampling or poaching by large herbivores (i.e., deer, cattle and sheep) was present throughout the survey area, with this impact recorded at 260 of the 313 peatland sample locations. Where *Calluna vulgaris* or other dwarf shrubs were present at a sample location an assessment was made as to the level of browsing impact (using several criteria contained within MacDonald *et al.* (1998)³⁷).

³⁶ 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-2fe795fb48ca>.

³⁷ 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.



The results indicated that grazing impact was **High** at 0 samples, **Moderate** at 32 samples and **Low** at 224 samples (N.B. grazing impacts were 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, distribution, height and character of the dwarf shrubs present it is likely the survey area does not have a recent history of intensive upland grazing, although this may have been higher in the past.

Peat Forming Vegetation & Indicator Species

Table D-2 below presents the data on certain species abundance and cover as per part 3a of the survey methodology described above; **Table D-3** summarises the data collected as part of 3b, **Table D-4** presents the information gathered as part of 3c, and **Table D-5** summarises the data collected as part of 3d of the above 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 D-2**. *Calluna vulgaris* is generally of high abundance and cover within the survey area. It was recorded at 234 of 313 quadrats, with 90 of these having 50 % cover or more recorded. These areas generally correlated with currently less grazed areas of M15, M17 and M19 communities. *Eriophorum vaginatum* was recorded at 267 of 313 quadrats, again cover was often relatively high, with 160 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 71 of 313 quadrats but was generally of low abundance with only eight quadrats recorded 30 % cover or more; this species was commonly present in both bog and wet heath communities. *Molinia caerulea* was recorded at 157 of 313 quadrats, with 51 quadrats with an estimated cover of 30 % or more. Other typical mire species such as *Eriophorum angustifolium* and *Vaccinium myrtillus* were generally frequently present but in low cover (**Table D-2**).

As per **Table D-3**, *Betula nana* and *Drosera* spp. were not recorded in the survey area. *Vaccinium oxycoccos* was only recorded at two quadrats (0.6% of peatland samples), with *Rubus chamaemorus* and *Vaccinium vitis-idaea* only recorded at four and five quadrats (1.3 % and 1.6 % of peatland samples, respectively). *Empetrum nigrum* was slightly more frequent across the survey area, being present in 54 quadrats (17.3 % of peatland samples), whilst *Erica tetralix* was fairly common, being found at 146 quadrats (46.6 % of peatland samples).

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)³⁸ and they also help to create the characteristically acidic environment of mires (Clymo, 1963)³⁹. 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)⁴⁰. Sphagna are adapted to various ecological niches,

³⁸ Lindsay, R. (1995) Bogs: The Ecology, Classification and Conservation of Ombrotrophic Mires. SNH, Battleby, Perth.

³⁹ Clymo, R.S. (1963). Ion exchange in Sphagnum and its relation to bog ecology. *Annals of Botany, New Series*, 27, 309-324.

⁴⁰ Wheeler, B.D., and Shaw, S.C. (1995) Restoration of Damaged Peatlands. Department of the Environment. HMSO, London.



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)⁴¹. *Sphagnum papillosum* is the least resistant to desiccation and generally requires a persistently wet mire surface (Clymo, 1997)⁴². The presence and abundance of *Sphagnum fallax* in blanket bog can also indicate the effects of disturbance. Sphagna were recorded at 220 (70.3 %) of peatland sample locations, with the most common and abundant species being *S. capillifolium*, recorded at 194 (62.0 %) of samples (Table D-5). *S. fallax* was found to be present at 32 (10.2 %) of samples. The good mire indicator and important peat-forming species *S. papillosum* was only recorded at 44 (14.1 %) 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 D-5). Sphagna abundance was generally low, with just 101 quadrats (32.3 %) with a 20 % or more basal coverage of Sphagna. The general distribution and abundance of Sphagna as recorded in this PCA survey is shown in Figure 6.7 (EIAR Volume 3a).

Polytrichum commune was common across the survey area, being recorded at 218 (70.0 %) peatland sample locations, and occasionally in relatively high cover (21 samples with 30 % or more cover of *P. commune*; Table D-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 survey area (Table D-4), indicating the relatively dry surface nature of much of the mire present.

Summary

PCA surveys undertaken for the Proposed Development have shown the peatland within the survey 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 near-natural or of national interest, as per NatureScot's template for assessment of peatland provided in the respective guidance²⁶. Whilst there are variable amounts of peatland with peat forming species present, there are various indicators of negative impact as well, for instance the presence of an extensive moor grip drainage network with active drains (often incised to the underlying substrates), the levels of peat haggling/gulling present and active erosion, 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 at 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)).

⁴¹ 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.

⁴² 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.



Table D-2 Foliar Cover %

Sample ID ⁴³	Sample Type ⁴⁴	C. vulgaris	E. vaginatum	E. angustifolium	T. germanicum	M. caerulea	V. myrtilus	Juncus spp.	Grasses
001	Infrastructure	0	2	4	0	80	0	2	2
002	Track	3	2	0	0	60	0	5	2
003	Track	0	0	0	0	95	0	0	3
004	Track	0	40	0	0	20	0	0	2
005	Track	0	5	0	0	80	0	0	5
006	Infrastructure	0	15	0	0	55	5	10	5
007	Track	0	0	0	0	95	0	0	5
008	Track	0	25	5	0	1	0	2	2
009	Infrastructure	0	50	0	0	30	0	20	0
010	Track	0	45	0	0	3	2	1	2
011	Infrastructure	3	10	5	0	20	2	2	2
012	Track	1	20	0	0	30	3	0	5
013	Infrastructure	0	30	0	0	10	0	0	0
014	Track	0	20	15	0	7	1	1	2
015	Track	0	30	0	1	10	0	1	0
016	Track	0	10	8	0	1	0	0	0
017	Turbine	70	5	0	0	0	10	5	0
019	Track	15	50	0	0	0	5	0	0
020	Turbine	30	0	5	0	35	0	2	30
021	Track	30	60	0	0	0	0	0	0

⁴³ Sample ID can be cross-referenced to Figure 6.5 (EIAR Volume 3a) for location. Only peatland samples (n=313) contained within table data.

⁴⁴ The sample type refers to whether the survey location was a grid/general survey area sample or specific to an infrastructure location, such as turbine, track, or other ancillary infrastructure.



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
022	Track	0	0	0	5	80	0	0	10
023	Track	2	30	0	0	0	1	0	0
024	Track	15	30	0	0	0	1	0	0
025	Track	50	0	0	0	30	0	5	30
026	Track	70	10	0	0	20	0	5	0
027	Track	0	0	0	0	70	0	25	5
028	Track	0	0	0	0	80	0	0	5
029	Track	0	0	0	0	80	0	10	10
030	Track	10	65	0	0	3	3	10	0
031	Track	1	35	1	0	0	0	0	0
032	Track	5	15	2	2	0	0	5	0
033	Track	0	2	60	0	0	0	1	0
034	Track	0	15	0	0	80	0	5	0
035	Track	85	5	10	0	0	1	0	0
036	Track	60	70	0	0	0	1	0	0
037	Track	60	0	5	0	45	0	1	5
038	Track	55	50	0	0	1	2	0	0
039	Track	0	25	0	0	70	0	0	0
040	Track	85	0	50	0	0	0	0	0
041	Track	60	35	1	0	0	2	0	0
042	Track	65	70	0	0	0	1	0	0
043	Track	40	55	0	0	0	0	0	0
044	Track	0	80	1	0	3	5	0	0
045	Track	30	50	0	0	0	1	0	0
046	Track	65	55	5	0	0	0	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
048	Track	75	30	2	0	0	1	0	0
050	Track	5	60	2	0	3	10	0	0
051	Turbine	70	40	0	0	0	1	0	1
052	Track	65	0	0	0	35	3	0	0
053	Track	5	65	0	0	0	10	1	0
054	Track	0	0	0	0	45	0	40	5
055	Track	0	50	5	0	0	0	20	0
056	Grid/General Study Area	5	7	25	3	15	2	0	1
057	Grid/General Study Area	2	60	5	0	0	5	1	3
058	Grid/General Study Area	60	65	0	0	0	0	0	0
059	Track	0	70	0	0	5	0	10	0
060	Track	0	55	0	0	0	0	0	0
061	Track	0	70	0	0	0	0	0	0
062	Track	10	75	0	0	0	1	0	0
063	Track	40	25	30	0	0	1	0	0
064	Grid/General Study Area	20	30	2	1	2	3	0	1
065	Grid/General Study Area	0	60	0	0	3	2	0	0
066	Grid/General Study Area	45	50	0	0	0	15	0	0
067	Grid/General Study Area	65	45	5	0	2	0	0	0
068	Grid/General Study Area	30	70	0	0	0	0	1	0
069	Track	70	30	5	0	0	5	0	0
070	Track	0	35	0	5	15	0	35	0
071	Track	0	60	2	0	0	3	0	0
073	Track	0	60	0	0	0	1	15	0
075	Turbine	10	5	25	0	0	5	0	2



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
076	Track	15	3	0	15	15	0	0	2
077	Turbine	85	5	50	0	0	1	0	0
078	Grid/General Study Area	2	25	0	3	10	2	3	0
079	Grid/General Study Area	70	10	20	10	1	5	0	0
080	Grid/General Study Area	30	0	5	0	2	10	0	5
081	Grid/General Study Area	3	70	1	0	0	3	0	0
082	Grid/General Study Area	0	75	0	0	0	5	0	0
083	Grid/General Study Area	1	70	1	1	0	0	1	1
084	Grid/General Study Area	15	65	0	0	0	0	0	0
085	Grid/General Study Area	45	45	1	0	0	2	0	0
086	Grid/General Study Area	15	70	0	0	0	10	0	0
087	Infrastructure	0	0	0	0	95	1	2	5
088	Track	2	1	20	0	70	1	1	2
089	Track	0	0	0	80	3	0	0	1
090	Track	70	15	0	0	30	2	1	1
091	Track	2	0	0	70	3	0	2	2
092	Track	0	2	0	0	75	0	0	10
093	Turbine	45	0	0	10	0	0	10	10
094	Track	75	5	0	1	2	5	0	0
095	Track	5	5	0	60	2	0	1	2
096	Track	10	5	0	0	60	5	0	3
097	Track	0	60	0	0	15	3	0	0
098	Grid/General Study Area	0	0	0	30	70	0	1	5
099	Grid/General Study Area	50	60	0	3	2	0	0	0
100	Grid/General Study Area	65	10	2	0	2	5	0	1



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
101	Grid/General Study Area	2	80	0	0	0	0	0	0
102	Grid/General Study Area	10	50	3	0	0	5	0	0
103	Grid/General Study Area	70	15	0	5	0	0	0	1
104	Grid/General Study Area	20	55	0	0	0	10	0	0
105	Grid/General Study Area	80	70	0	1	0	1	0	0
107	Track	55	10	2	0	20	3	0	0
108	Track	0	0	0	50	10	0	0	20
109	Track	80	10	0	0	0	1	0	0
111	Track	7	40	0	0	1	5	0	0
112	Track	5	50	0	0	0	5	0	0
113	Track	60	0	40	0	5	0	0	2
114	Track	0	80	0	0	0	0	5	0
115	Turbine	0	35	1	5	0	0	0	40
116	Grid/General Study Area	20	60	0	0	2	0	0	0
117	Grid/General Study Area	65	40	1	0	1	0	0	0
118	Grid/General Study Area	60	5	15	10	2	0	0	0
119	Grid/General Study Area	40	40	30	0	0	1	0	0
120	Grid/General Study Area	75	60	0	0	1	1	0	0
121	Grid/General Study Area	2	80	0	0	0	1	0	0
122	Grid/General Study Area	15	60	0	0	0	0	0	0
123	Grid/General Study Area	25	35	1	10	0	1	0	0
124	Grid/General Study Area	2	80	0	0	2	1	0	0
125	Grid/General Study Area	55	35	1	1	0	2	0	0
126	Track	10	3	20	0	10	0	0	5
127	Track	75	70	0	0	20	0	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
128	Track	10	0	15	0	60	0	1	2
129	Track	25	2	0	0	70	0	0	0
130	Track	10	0	20	5	2	0	2	0
131	Track	5	20	15	10	5	0	3	1
132	Track	15	55	2	2	1	0	0	0
133	Track	40	2	10	0	35	5	2	5
134	Track	10	3	0	0	10	0	1	2
135	Track	0	20	0	0	20	1	0	5
136	Track	5	0	0	70	2	0	2	2
137	Grid/General Study Area	30	0	20	7	13	0	0	1
138	Grid/General Study Area	70	10	2	0	5	0	0	0
139	Grid/General Study Area	75	30	3	0	5	0	0	0
140	Grid/General Study Area	75	30	3	0	0	0	0	0
141	Grid/General Study Area	60	35	2	0	0	1	1	0
143	Grid/General Study Area	2	5	2	0	15	0	0	1
144	Grid/General Study Area	5	65	0	1	0	0	0	0
145	Grid/General Study Area	5	75	0	0	1	5	0	0
146	Track	8	0	0	0	80	0	0	0
147	Track	15	65	0	0	0	1	0	0
148	Track	8	35	1	0	0	3	0	0
149	Track	0	65	0	0	0	0	0	0
150	Track	0	60	1	0	3	0	15	0
151	Turbine	55	30	0	0	0	1	1	0
152	Track	30	0	0	0	85	0	1	3
153	Track	0	30	5	0	10	1	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
154	Track	15	5	0	20	1	0	15	2
155	Track	15	80	1	10	0	0	0	1
156	Turbine	0	0	0	0	85	0	0	10
157	Track	0	25	0	0	30	2	1	10
158	Track	60	3	5	0	0	0	2	2
159	Turbine	25	10	10	0	0	0	0	1
160	Track	0	45	0	0	0	3	0	0
161	Track	10	2	1	0	0	0	10	2
162	Grid/General Study Area	5	2	1	0	40	0	0	1
163	Grid/General Study Area	45	20	10	10	0	0	0	0
164	Grid/General Study Area	80	35	0	2	3	0	0	0
165	Grid/General Study Area	60	50	2	0	0	0	0	0
166	Grid/General Study Area	75	40	2	0	0	1	0	0
167	Grid/General Study Area	70	25	3	0	2	10	0	0
168	Grid/General Study Area	10	20	1	2	5	10	0	0
169	Track	0	60	0	0	0	2	0	0
170	Track	5	20	1	0	0	0	1	1
171	Track	3	2	1	0	15	1	2	1
172	Track	1	50	0	0	0	4	0	2
173	Track	0	30	0	0	0	5	0	2
174	Track	15	20	5	2	2	0	0	1
175	Track	10	75	2	0	0	0	0	0
176	Track	30	0	70	0	0	0	0	2
177	Track	35	55	0	0	0	2	0	0
178	Track	0	65	0	0	3	1	10	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
179	Track	0	65	0	0	2	0	10	0
180	Track	1	40	0	0	0	2	0	2
181	Track	0	0	0	25	60	0	5	10
182	Track	30	15	10	0	0	0	0	1
183	Track	17	0	40	0	3	1	2	0
184	Track	10	15	2	5	15	0	0	1
185	Track	40	80	0	0	0	5	0	0
186	Track	0	45	0	0	0	1	1	5
187	Track	8	10	60	0	0	0	0	0
188	Grid/General Study Area	20	60	0	0	5	0	0	0
189	Grid/General Study Area	20	5	15	5	10	0	0	0
190	Grid/General Study Area	20	15	5	10	0	0	1	2
191	Grid/General Study Area	60	15	1	0	0	0	2	2
192	Grid/General Study Area	25	5	10	15	0	0	0	2
193	Grid/General Study Area	60	20	2	1	1	0	1	1
194	Grid/General Study Area	10	5	0	15	65	8	1	2
195	Track	0	5	0	0	70	1	0	0
196	Track	65	5	0	15	0	0	0	0
197	Track	40	30	0	0	0	1	0	1
198	Track	50	20	2	0	1	1	0	0
199	Track	50	0	30	5	0	0	0	0
200	Turbine	10	10	1	0	15	0	0	1
201	Track	0	70	0	0	0	1	0	10
202	Turbine	30	10	1	0	0	6	0	1
203	Track	2	10	0	0	65	3	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
204	Track	10	60	0	0	2	0	0	0
205	Track	70	20	1	1	0	0	1	2
206	Track	35	25	1	5	0	1	0	0
209	Track	70	5	0	10	15	0	0	0
210	Track	10	25	2	2	0	0	0	1
211	Track	0	65	10	0	1	1	3	0
212	Track	0	0	0	30	0	0	30	45
213	Track	0	30	5	10	0	2	0	0
214	Track	0	35	2	0	0	5	1	2
215	Infrastructure	20	0	0	10	0	1	20	35
216	Grid/General Study Area	50	35	0	0	0	0	0	0
217	Grid/General Study Area	85	30	0	0	0	0	0	0
218	Grid/General Study Area	0	10	2	5	5	0	5	2
219	Grid/General Study Area	2	25	2	0	0	1	0	2
220	Grid/General Study Area	2	1	4	0	60	6	0	2
221	Grid/General Study Area	0	30	0	0	0	3	1	0
222	Grid/General Study Area	0	45	2	0	0	10	5	3
223	Grid/General Study Area	65	15	0	5	10	2	0	0
224	Track	18	75	8	0	2	0	0	0
225	Turbine	0	50	0	0	0	3	0	5
226	Track	20	75	5	0	0	0	0	0
227	Track	70	18	0	0	5	0	0	0
228	Track	60	0	60	0	0	0	0	5
229	Track	35	45	0	2	0	0	35	0
230	Grid/General Study Area	40	40	20	0	0	2	3	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
231	Grid/General Study Area	80	3	0	0	0	1	0	0
232	Grid/General Study Area	35	20	10	0	2	0	1	0
233	Grid/General Study Area	60	25	20	1	0	1	1	0
234	Track	70	50	3	0	0	0	0	0
235	Track	35	50	2	2	0	1	20	0
236	Track	15	25	0	2	5	1	0	35
238	Track	75	60	0	0	3	0	0	0
239	Track	65	30	25	5	2	0	0	0
240	Track	80	10	35	0	0	0	0	0
241	Track	5	0	0	0	95	10	0	5
242	Track	65	0	2	0	35	15	0	3
243	Track	70	3	0	0	50	0	0	15
244	Track	70	0	0	0	50	0	0	0
245	Track	85	0	10	0	45	0	0	0
246	Track	80	0	0	0	15	0	0	3
247	Track	0	8	0	0	25	0	15	30
248	Track	80	0	0	0	30	2	0	0
249	Track	10	15	30	5	3	25	0	0
250	Grid/General Study Area	0	50	0	0	20	5	0	0
251	Grid/General Study Area	70	10	0	0	0	2	0	1
252	Track	55	15	0	0	15	2	0	5
253	Track	0	7	0	0	60	18	0	15
254	Track	80	0	0	0	40	0	0	0
255	Track	30	0	3	0	20	0	0	10
256	Track	80	0	0	0	45	1	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
257	Track	65	60	0	0	0	0	0	0
258	Turbine	20	0	0	0	0	0	25	35
259	Turbine	30	0	0	30	5	0	30	0
260	Track	70	15	0	0	0	5	0	1
261	Grid/General Study Area	30	50	1	0	0	5	0	0
262	Grid/General Study Area	0	65	0	0	0	0	25	0
263	Grid/General Study Area	40	50	0	0	3	5	0	0
264	Grid/General Study Area	5	40	0	0	25	3	0	0
265	Track	85	10	0	0	3	3	0	0
266	Track	75	20	1	0	0	0	0	0
267	Track	85	40	0	0	0	5	0	0
268	Turbine	15	70	0	0	0	2	0	0
269	Track	80	15	0	0	0	0	0	0
270	Track	0	50	0	0	0	20	0	0
271	Grid/General Study Area	0	10	0	0	50	0	10	5
272	Grid/General Study Area	40	60	0	0	0	1	0	0
273	Grid/General Study Area	2	65	0	0	0	15	0	0
274	Grid/General Study Area	7	70	0	0	3	5	0	0
275	Grid/General Study Area	0	80	0	0	0	5	0	1
276	Grid/General Study Area	5	2	0	20	0	10	0	5
277	Track	40	65	3	0	0	0	0	0
279	Track	0	70	0	0	0	0	0	0
280	Track	3	0	0	5	3	0	60	20
281	Track	60	35	0	0	0	1	0	0
282	Track	5	70	1	0	0	5	0	0



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
283	Track	60	55	0	0	0	2	0	0
284	Track	3	70	0	0	0	15	0	0
285	Turbine	0	70	0	0	1	2	0	0
286	Track	5	70	0	0	0	20	0	0
287	Track	1	80	0	0	0	0	0	0
288	Track	5	60	0	0	0	2	0	0
289	Track	0	65	0	0	0	10	0	0
290	Track	3	80	0	0	0	2	0	0
291	Grid/General Study Area	0	55	0	0	3	0	0	0
292	Grid/General Study Area	15	80	0	0	0	1	0	0
293	Grid/General Study Area	0	70	2	3	2	0	0	5
294	Grid/General Study Area	65	25	0	0	0	5	0	0
295	Grid/General Study Area	1	75	0	3	3	5	0	0
296	Track	90	3	0	0	0	0	0	0
297	Track	70	60	3	0	0	0	0	0
298	Track	0	5	0	0	0	5	0	0
299	Track	80	15	0	0	0	2	0	0
300	Track	1	60	4	0	0	1	0	0
301	Track	0	40	0	10	5	2	0	1
302	Track	40	25	5	0	0	5	0	0
303	Track	65	75	0	0	0	5	0	0
304	Track	50	35	1	0	2	3	0	0
305	Track	35	30	15	0	0	0	0	0
306	Track	60	20	1	0	1	3	0	1
307	Grid/General Study Area	25	30	0	0	10	0	0	5



Sample ID ⁴³	Sample Type ⁴⁴	<i>C. vulgaris</i>	<i>E. vaginatum</i>	<i>E. angustifolium</i>	<i>T. germanicum</i>	<i>M. caerulea</i>	<i>V. myrtillus</i>	<i>Juncus</i> spp.	Grasses
308	Grid/General Study Area	0	55	0	0	3	0	0	0
309	Grid/General Study Area	30	50	0	0	0	2	0	0
310	Grid/General Study Area	20	50	1	2	5	2	0	1
311	Grid/General Study Area	60	6	10	0	0	1	0	0
312	Track	0	40	3	0	3	0	0	0
313	Track	65	50	0	0	2	2	0	0
314	Track	15	30	0	0	0	1	0	0
315	Track	3	60	0	0	5	5	0	0
316	Track	3	45	5	0	0	1	0	0
317	Grid/General Study Area	20	60	0	20	2	0	0	0
318	Grid/General Study Area	70	20	0	0	1	0	0	0
319	Grid/General Study Area	55	20	0	0	0	0	0	0
320	Turbine	0	65	0	0	10	1	0	0
321	Grid/General Study Area	5	45	0	0	0	25	0	0
322	Track	65	30	0	0	2	2	1	0
323	Track	60	15	5	1	0	3	1	3
324	Track	75	0	0	1	0	3	2	10
325	Turbine	85	2	3	1	0	1	1	0

Table D-3 Other Peatland Species Presence/Absence⁴⁵

Species	No. Samples Present	No. Samples Absent
<i>Erica tetralix</i>	148	167
<i>Empetrum nigrum</i>	54	259

⁴⁵ Only peatland samples included (n = 313).



Species	No. Samples Present	No. Samples Absent
<i>Vaccinium vitis-idaea</i>	5	308
<i>Vaccinium oxycoccos</i>	2	311
<i>Drosera</i> spp.	0	313
<i>Rubus chamaemorus</i>	4	309
<i>Betula nana</i>	0	313

Table D-4 Basal Cover %⁴⁵

Sample ID ⁴⁵	Sample Type	Bare ground /peat	Sphagna	<i>Cladonia</i> spp. lichens	<i>Racomitrium</i> <i>lanuginosum</i>	<i>Polytrichum</i> <i>commune</i>	Other Non- <i>Sphagnum</i> mosses
001	Infrastructure	0	0	0	0	0	70
002	Track	0	3	0	0	2	15
003	Track	0	0	0	0	2	70
004	Track	0	20	0	0	10	20
005	Track	0	35	0	0	4	20
006	Infrastructure	0	25	0	0	10	40
007	Track	0	0	0	0	0	45
008	Track	0	0	0	0	50	15
009	Infrastructure	0	1	0	0	60	35
010	Track	0	25	0	0	5	10
011	Infrastructure	0	1	0	0	6	75
012	Track	0	0	0	0	3	90
013	Infrastructure	0	5	0	0	50	10
014	Track	0	5	0	0	40	10
015	Track	0	0	0	0	15	40
016	Track	0	0	0	0	30	6



Sample ID ⁴⁵	Sample Type	Bare ground /peat	Sphagna	<i>Cladonia</i> spp. lichens	<i>Racomitrium</i> <i>lanuginosum</i>	<i>Polytrichum</i> <i>commune</i>	Other Non- <i>Sphagnum</i> mosses
017	Turbine	0	7	0	0	0	65
019	Track	0	60	0	0	5	20
020	Turbine	0	0	0	0	30	65
021	Track	0	5	0	0	10	90
022	Track	0	0	0	0	15	60
023	Track	0	10	0	0	25	10
024	Track	0	40	1	0	3	5
025	Track	0	0	0	0	0	90
026	Track	0	5	0	0	10	80
027	Track	0	0	0	0	1	90
028	Track	0	30	0	0	20	35
029	Track	0	5	0	0	2	75
030	Track	0	15	1	0	0	50
031	Track	0	10	0	0	5	60
032	Track	0	40	0	0	5	40
033	Track	1	3	0	0	3	10
034	Track	0	2	0	0	3	95
035	Track	0	30	0	0	20	60
036	Track	0	20	15	0	0	70
037	Track	0	0	0	0	2	90
038	Track	0	60	0	0	15	35
039	Track	0	30	0	0	40	30
040	Track	0	0	0	0	0	90
041	Track	0	0	0	0	20	75



Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
042	Track	0	1	0	0	0	90
043	Track	0	25	0	0	10	70
044	Track	0	35	0	0	5	55
045	Track	0	15	0	0	2	80
046	Track	0	65	0	0	0	35
048	Track	0	30	0	0	5	70
050	Track	0	0	0	0	40	55
051	Turbine	0	0	0	0	2	90
052	Track	0	0	0	0	20	75
053	Track	0	20	0	0	35	50
054	Track	0	15	0	0	15	65
055	Track	0	20	0	0	15	55
056	Grid/General Study Area	0	15	0	0	5	30
057	Grid/General Study Area	0	1	0	0	5	90
058	Grid/General Study Area	0	15	5	0	2	75
059	Track	0	25	0	0	10	60
060	Track	0	0	0	0	30	45
061	Track	0	0	0	0	10	85
062	Track	0	20	0	0	10	60
063	Track	2	10	0	0	40	50
064	Grid/General Study Area	0	7	0	0	5	40
065	Grid/General Study Area	0	25	0	0	30	50
068	Grid/General Study Area	0	20	0	0	3	80
067	Grid/General Study Area	0	20	1	0	1	80



Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
068	Grid/General Study Area	0	30	0	0	25	50
069	Track	0	30	0	0	0	70
070	Track	0	0	0	0	10	85
071	Track	0	2	0	0	15	70
073	Track	0	5	0	0	20	70
075	Turbine	0	3	0	0	20	60
076	Track	0	7	0	0	30	70
077	Turbine	0	0	0	0	0	70
078	Grid/General Study Area	5	10	0	0	5	15
079	Grid/General Study Area	0	2	0	0	0	40
080	Grid/General Study Area	0	1	0	0	20	80
081	Grid/General Study Area	0	5	0	0	20	60
082	Grid/General Study Area	0	5	0	0	0	90
083	Grid/General Study Area	0	3	0	0	15	80
084	Grid/General Study Area	0	5	0	0	5	75
085	Grid/General Study Area	0	5	0	0	0	90
086	Grid/General Study Area	0	5	0	0	0	90
087	Infrastructure	0	0	0	0	0	50
088	Track	0	3	0	0	1	50
089	Track	0	30	0	0	0	10
090	Track	0	0	0	0	5	80
091	Track	0	0	0	0	1	80
092	Track	0	0	0	0	0	60
093	Turbine	5	0	0	0	2	10



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
094	Track	0	0	0	0	5	95
095	Track	0	25	0	0	5	10
096	Track	0	1	0	0	3	45
097	Track	0	35	0	0	20	45
098	Grid/General Study Area	0	0	0	0	2	10
099	Grid/General Study Area	0	10	0	0	0	15
100	Grid/General Study Area	0	0	0	0	5	90
101	Grid/General Study Area	0	10	0	0	5	75
102	Grid/General Study Area	0	10	0	0	0	95
103	Grid/General Study Area	0	5	0	0	0	65
104	Grid/General Study Area	0	0	0	0	0	95
105	Grid/General Study Area	0	1	1	0	0	90
107	Track	0	0	0	0	5	50
108	Track	0	35	0	0	0	20
109	Track	0	0	0	0	1	99
111	Track	0	10	0	0	12	20
112	Track	0	20	0	0	2	50
113	Track	0	0	0	0	10	20
114	Track	0	40	0	0	15	40
115	Turbine	0	0	0	0	0	90
116	Grid/General Study Area	0	15	0	0	5	30
117	Grid/General Study Area	0	30	2	0	0	25
118	Grid/General Study Area	0	25	5	0	0	40
119	Grid/General Study Area	0	10	0	0	0	80



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
120	Grid/General Study Area	0	0	0	0	5	85
121	Grid/General Study Area	0	3	0	0	1	90
122	Grid/General Study Area	1	10	0	0	5	55
123	Grid/General Study Area	0	25	0	0	1	50
124	Grid/General Study Area	1	5	0	0	2	75
125	Grid/General Study Area	0	10	0	0	0	75
126	Track	0	20	0	0	15	10
127	Track	0	5	0	0	2	60
128	Track	0	0	0	0	5	80
129	Track	0	15	0	0	10	30
130	Track	0	60	1	0	2	15
131	Track	0	10	0	0	10	60
132	Track	0	2	0	0	5	90
133	Track	0	5	0	0	5	80
134	Track	0	10	0	0	2	5
135	Track	0	0	0	0	15	60
136	Track	2	5	0	0	0	30
137	Grid/General Study Area	0	5	0	0	0	60
138	Grid/General Study Area	0	55	1	0	0	45
139	Grid/General Study Area	0	35	3	0	0	55
140	Grid/General Study Area	0	45	25	0	0	45
141	Grid/General Study Area	0	10	1	0	1	75
143	Grid/General Study Area	0	0	0	0	10	70
144	Grid/General Study Area	0	3	0	0	0	80



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
145	Grid/General Study Area	0	5	0	0	1	85
146	Track	0	10	0	0	5	30
147	Track	0	30	0	0	2	4
148	Track	0	4	0	6	0	70
149	Track	0	70	0	0	10	0
150	Track	0	15	0	0	5	70
151	Turbine	0	5	0	0	0	70
152	Track	0	10	0	0	0	50
153	Track	0	8	0	0	15	10
154	Track	0	18	0	0	0	40
155	Track	0	75	0	0	3	5
156	Turbine	0	0	0	0	0	50
157	Track	0	0	0	0	1	70
158	Track	0	65	0	0	0	20
159	Turbine	0	0	0	0	0	90
160	Track	0	70	0	0	5	3
161	Track	0	35	0	0	0	30
162	Grid/General Study Area	0	60	0	0	5	15
163	Grid/General Study Area	0	0	80	5	0	20
164	Grid/General Study Area	0	20	3	0	0	65
165	Grid/General Study Area	0	50	2	0	3	50
166	Grid/General Study Area	0	40	5	0	0	60
167	Grid/General Study Area	0	3	0	0	5	80
168	Grid/General Study Area	0	0	1	0	5	80



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
169	Track	0	55	0	0	4	17
170	Track	0	20	0	0	25	40
171	Track	0	0	0	0	1	95
172	Track	0	0	0	0	7	90
173	Track	0	0	0	0	5	90
174	Track	0	0	0	0	15	70
175	Track	0	50	0	0	0	50
176	Track	0	0	0	0	4	60
177	Track	0	20	0	0	0	30
178	Track	0	3	0	0	5	90
179	Track	0	60	0	0	15	20
180	Track	0	0	0	0	1	85
181	Track	0	0	0	0	5	50
182	Track	0	25	0	0	10	50
183	Track	0	15	0	0	0	65
184	Track	0	5	0	0	0	75
185	Track	0	0	5	0	0	30
186	Track	0	2	0	0	10	70
187	Track	60	5	2	0	0	3
188	Grid/General Study Area	0	70	7	0	0	5
189	Grid/General Study Area	0	25	0	0	10	50
190	Grid/General Study Area	0	80	3	0	0	5
191	Grid/General Study Area	0	20	0	0	2	60
192	Grid/General Study Area	0	30	2	0	15	50



Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
193	Grid/General Study Area	0	0	1	0	2	60
194	Grid/General Study Area	0	10	0	0	5	60
195	Track	0	0	0	0	5	60
196	Track	0	50	5	0	0	30
197	Track	0	5	5	0	10	70
198	Track	0	40	0	0	5	25
199	Track	5	0	0	0	0	10
200	Turbine	0	75	0	0	15	5
201	Track	0	0	0	0	10	60
202	Turbine	0	2	2	0	10	60
203	Track	0	0	0	0	40	50
204	Track	0	60	2	0	0	5
205	Track	0	35	2	0	0	50
206	Track	0	35	0	0	5	50
209	Track	0	0	0	0	5	50
210	Track	0	40	5	0	2	35
211	Track	0	5	0	0	15	75
212	Track	0	3	0	0	5	90
213	Track	0	60	0	0	25	10
214	Track	0	25	0	0	10	60
215	Infrastructure	0	5	0	0	10	75
216	Grid/General Study Area	0	40	1	0	0	15
217	Grid/General Study Area	0	0	0	0	0	95
218	Grid/General Study Area	0	90	0	0	2	5



Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
219	Grid/General Study Area	0	70	0	0	5	15
220	Grid/General Study Area	0	0	0	0	20	60
221	Grid/General Study Area	0	35	0	0	30	20
222	Grid/General Study Area	0	30	0	0	20	40
223	Grid/General Study Area	0	20	0	0	20	10
224	Track	0	40	3	0	0	5
225	Turbine	0	15	0	0	3	60
226	Track	0	85	0	0	0	5
227	Track	0	0	2	0	2	30
228	Track	0	0	0	0	5	90
229	Track	0	2	0	0	0	90
230	Grid/General Study Area	0	20	3	0	5	70
231	Grid/General Study Area	0	2	2	0	0	65
232	Grid/General Study Area	0	10	0	0	0	40
233	Grid/General Study Area	0	0	1	0	0	95
234	Track	0	15	0	0	0	70
235	Track	0	10	0	0	3	75
236	Track	0	10	0	0	15	70
238	Track	0	25	0	0	20	50
239	Track	0	20	0	0	10	55
240	Track	0	10	0	0	5	75
241	Track	0	5	0	0	0	65
242	Track	0	0	0	0	0	65
243	Track	0	0	0	0	20	60



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
244	Track	0	35	0	0	0	60
245	Track	0	3	0	0	5	55
246	Track	0	0	0	0	0	55
247	Track	0	0	0	0	40	40
248	Track	0	0	0	0	0	40
249	Track	0	15	0	0	3	75
250	Grid/General Study Area	0	0	0	0	15	75
251	Grid/General Study Area	0	10	0	0	0	70
252	Track	0	0	0	0	0	50
253	Track	0	0	0	0	1	65
254	Track	0	0	0	0	5	70
255	Track	0	0	0	0	3	70
256	Track	0	5	0	0	5	65
257	Track	0	20	0	0	0	70
258	Turbine	5	0	0	0	35	30
259	Turbine	0	20	0	0	0	65
260	Track	0	50	0	0	15	35
261	Grid/General Study Area	0	0	1	0	5	85
262	Grid/General Study Area	0	55	0	0	2	35
263	Grid/General Study Area	0	10	0	0	0	95
264	Grid/General Study Area	0	5	0	0	2	85
265	Track	0	25	0	0	2	65
266	Track	0	1	0	0	3	85
267	Track	0	0	0	0	0	90



Sample ID ¹⁰	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
268	Turbine	0	0	0	0	0	95
269	Track	0	0	0	0	0	75
270	Track	0	15	0	0	0	95
271	Grid/General Study Area	0	0	0	0	0	90
272	Grid/General Study Area	0	15	0	0	3	90
273	Grid/General Study Area	0	3	0	0	2	90
274	Grid/General Study Area	0	0	0	0	10	70
275	Grid/General Study Area	0	2	0	0	5	70
276	Grid/General Study Area	0	3	0	0	0	90
277	Track	0	0	0	0	15	80
279	Track	0	65	0	0	15	20
280	Track	0	10	0	0	10	30
281	Track	0	3	0	0	0	75
282	Track	0	0	0	0	0	90
283	Track	0	10	0	0	1	65
284	Track	0	2	0	0	0	95
285	Turbine	0	25	0	0	5	70
286	Track	0	10	0	0	2	90
287	Track	0	15	0	0	20	60
288	Track	0	20	0	0	30	50
289	Track	0	0	0	0	20	90
290	Track	0	3	0	0	10	60
291	Grid/General Study Area	0	0	0	0	0	90
292	Grid/General Study Area	0	3	0	0	5	90



Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
293	Grid/General Study Area	0	0	0	0	90	5
294	Grid/General Study Area	0	10	0	0	2	75
295	Grid/General Study Area	0	5	0	0	1	90
296	Track	0	2	0	0	1	95
297	Track	0	30	0	0	10	50
298	Track	0	5	0	0	0	95
299	Track	0	3	0	0	1	90
300	Track	0	60	0	0	30	10
301	Track	2	0	0	0	3	75
302	Track	0	30	0	0	0	20
303	Track	0	5	0	0	1	75
304	Track	0	5	0	0	2	85
305	Track	0	45	0	0	2	50
306	Track	0	10	0	0	5	70
307	Grid/General Study Area	0	0	0	0	5	90
308	Grid/General Study Area	0	3	0	0	20	75
309	Grid/General Study Area	0	0	1	0	15	80
310	Grid/General Study Area	0	0	0	0	25	55
311	Grid/General Study Area	0	60	0	0	2	5
312	Track	0	0	0	0	50	35
313	Track	0	15	0	0	0	75
314	Track	0	65	0	0	7	20
315	Track	0	30	0	0	5	80
316	Track	0	40	0	0	0	55

Sample ID ¹³	Sample Type	Bare ground /peat	Sphagna	Cladonia spp. lichens	Racomitrium lanuginosum	Polytrichum commune	Other Non- Sphagnum mosses
317	Grid/General Study Area	0	65	0	0	2	30
318	Grid/General Study Area	0	5	0	0	0	70
319	Grid/General Study Area	0	70	0	0	1	5
320	Turbine	0	0	0	0	5	70
321	Grid/General Study Area	0	40	0	0	5	60
322	Track	0	0	0	0	0	75
323	Track	0	5	0	0	10	65
324	Track	0	0	0	0	0	65
325	Turbine	0	0	0	0	0	80

Table D-5 Sphagnum Species

Sphagnum species	No. Samples Present (out of 313)	Percentage Total (%)
<i>Sphagnum capillifolium</i>	194	62.0
<i>Sphagnum fallax</i>	32	10.2
<i>Sphagnum palustre</i>	8	2.6
<i>Sphagnum papillosum</i>	44	14.1
<i>Sphagnum tenellum</i>	2	0.6
<i>Sphagnum subnitens</i>	1	0.3



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