



Technical Appendix 6.1: National Vegetation Classification & Habitats Survey

Dalfad Wind Farm

Brockwell Energy Limited

The Eagle Building, Third Floor, 19 Rose Street, Edinburgh, EH2 2PR

Prepared by:

SLR Consulting Limited

93 South Woodside Road, Glasgow, G20 6NT

SLR Project No.: 413.057968.00001

24 August 2026

Revision: 2.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	7 July 2026	E. Beveridge	J. Mackay	B. Henry
2.0	24 August 2026	B. Henry	B. Henry	B. Henry

Basis of Report

This document has been prepared by SLR Consulting Ltd. SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Brockwell Energy Limited (the Applicant) as part or all of the services it has been appointed by the Applicant to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Applicant. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Applicant and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Applicant is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.



Table of Contents

1.0	Introduction	1
2.0	The Site and Survey Area	1
2.1	Overview	1
2.2	Designated Sites	2
2.3	Ancient Woodland	4
2.4	Carbon and Peatland Map 2016	5
3.0	Methodology	5
3.1	National Vegetation Classification (NVC)	6
3.2	Phase 1 Habitat Characterisation	6
4.0	Survey Details and Limitations	7
5.0	Results	7
5.1	Summary of Habitat Types & NVC Communities	7
5.2	Woodland & Scrub	10
5.3	Grasslands & Marsh	11
5.4	Tall Herb & Fern	14
5.5	Heathland	14
5.6	Mire	15
5.7	Swamp, Marginal & Inundation Habitats	17
5.8	Open Water	17
5.9	Rock Exposure & Waste	18
5.10	Miscellaneous	18
5.11	Invasive Non-Native Species	19
5.12	Notable Species	19
6.0	Evaluation of Botanical Interest	19
6.1	Overview	19
6.2	Groundwater Dependent Terrestrial Ecosystems (GWDTE)	19
6.3	Annex I Habitats	20
6.4	Scottish Biodiversity List Priority Habitats	22
6.5	Sensitivity Summary	23
7.0	Summary	25
8.0	References	26



Tables in Text

Table 2-1: Designated Sites with Botanical Qualifying Features within 5 km of the Site	2
Table 2-2: LNCS within 5 km of the Site.....	2
Table 5-1: Phase 1 Habitat Type Equivalents of NVC Communities and Other Habitats Recorded	7
Table 6-1: Communities within the Survey Area which may potentially be classified as GWDTE	19
Table 6-2: Annex I Habitats and Corresponding NVC Communities.....	21
Table 6-3: Summary of Survey Area Communities and Sensitivities	23
Table A-1: Survey Area Target Notes	A-1

Annexes

Annex A	NVC Target Notes
Annex B	Target Note Photographs
Annex C	General Community Photographs



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 at the proposed Dalfad Wind Farm (hereafter referred to as the 'Proposed Development').

The aim of the NVC survey was to identify and map the vegetation communities present within the Site 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). This information was used to inform the wind farm design process and the ecological assessment for the Proposed Development's Environmental Impact Assessment Report (EIA Report).

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

2.0 The Site and Survey Area

2.1 Overview

The Proposed Development is located approximately 4 km east of Cumnock and falls within the East Ayrshire Council (EAC) administrative area. The Site centre can be found at British National Grid reference NS 62781 21809, with the northern part of the Site located on the former Dalfad Opencast Mine and part of the former Duncanziemere Coal Mine, and the southern part of the Site consisting predominantly of agricultural land. The Dalfad Opencast Mine is a partially restored brownfield site in need of restoration betterment, with the Duncanziemere Opencast Mine in need of further restoration. Both of these former coal mines are EAC priority areas for restoration³.

The Site is situated in a predominantly rural environment, characterised by agricultural land, forestry and former coal mining sites with several remaining open mining voids in the local area, one of which is located within the Site. The coal within the former Dalfad and Duncanziemere Coal Mines was formerly mined using both opencast and underground methods. Most of the opencast areas have been backfilled, with limited ongoing surface restoration being undertaken by the current landowners.

The Site is described in **Chapter 1: Introduction** and the Proposed Development is fully described within **Chapter 2: Project Description**.

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 799.8 hectares (ha). The survey area in some areas extends beyond the Site boundary; this reflects earlier and larger areas of interest which have been refined down during the iterative design process (see **Chapter 3: Design Evolution and Alternatives** of the EIA Report), and also to provide sufficient survey buffers to account for the possible presence of potential GWDTE, where land access was permissible. The survey area and its juxtaposition with the Site is shown in **Figure 6.3**. The

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

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

³ East Ayrshire Council, 2013. "Opencast Mining in East Ayrshire –Steps to Recovery, Council". <https://www.east-ayrshire.gov.uk/CouncilAndGovernment/About-the-Council/MinutesAgendasAndReports/OpencastCoalUpdate.aspx>



appropriate scale and 'Study Area' for the assessment of effects with regards to habitat loss has been deemed to be the Site (as defined in **Chapter 6: Ecology** of the EIA Report).

2.2 Designated Sites

There are two statutory designated sites containing habitat related, or botanical, qualifying features within 5 km of the Site. One of these (Muirkirk Uplands Site of Special Scientific Interest (SSSI)) abuts the north-east of the Site. The details of, and only relevant qualifying features for, each designation relevant to this Technical Appendix are detailed in **Table 2-1**; see also **Figure 6.1**.

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

Designated Site	Distance from Site boundary & nearest new infrastructure (m)	Qualifying feature	Last assessed condition & date
Muirkirk Uplands SSSI	Abuts Site and 67 m from proposed new track associated with T1	Blanket bog	Unfavourable, No Change (06 October 2009)
		Upland assemblage	Favourable, maintained (02 June 2009)
Airds Moss Special Area of Conservation (SAC)	439 m from Site and 466 m from proposed existing track to be upgraded at the Site entrance	Blanket bog	Unfavourable, No Change (11 October 2018)

There are 18 non-statutory Local Nature Conservation Site (LNCS) within 5 km of the Site that are designated (wholly or partially) for habitat related, or botanical, interests. Two of these (i.e., Low Moss and Glenmuir Water: Lugar to Kyle Castle) partially overlap with the Site. The available details⁴ of these LNCS are presented in **Table 2-2**, see also **Figure 6.1**.

Table 2-2: LNCS within 5 km of the Site

LNCS	Distance from Site (m)	Description
Low Moss	0	Raised bog. This site comprises an area of upland habitats of raised bog and grassland. Surrounding land uses comprise of areas of agricultural fields, areas of scrub and woodland.
Glenmuir Water: Lugar to Kyle Castle	0	Woodland and scrub. A variety of woodland habitats including semi-natural gorge woodland, old plantation, dense scrub (birch/willow) and small patches of semi-improved pasture along Glenmuir Water.
Guelt	284	Grassland and scrub. This site is comprised of grassland and scrub, with a minor road running along the west and south boundary.

⁴ Sourced from a combination of East Ayrshire Council (2016) *State of the Environment Report – Chapter 3: Ecology and Nature Conservation (July 2016)* and Scottish Government (2026). Local Nature Conservation Sites – Scotland. Available at: <https://www.data.gov.uk/dataset/c3460656-74ab-435a-8f77-9a528e24beb1/local-nature-conservation-sites-scotland> [Accessed 23/02/2026].



LNCS	Distance from Site (m)	Description
Lugar Water: Holmhead to Braehead	1,020	Woodland and scrub. This site is comprised of woodland, scrub, scattered trees and large areas of grassland of various uses. Several man-made features are present within this site. A proportion of the Site overlaps with woodland listed on the Ancient Woodland Inventory (AWI).
Lugar Loch Wetlands	1,912	Woodland, scrub and wetlands. This site comprises a mosaic of grassland habitats, with a woodland in the south and four waterbodies of varying sizes in the centre. Waterbodies are connected by Craigston Burn. Open water, swamp, mire, semi-improved grassland and scrub habitats are present. This site overlaps with woodland listed on the AWI.
River Ayr: Mid Heilar to Chapelhouse	2,346	Woodland and scrub. This site predominantly comprises the River Ayr and surrounding natural broadleaf woodlands and neutral, marshy and improved grasslands. Many native and naturalised species of tree present throughout the woodlands, such as beech, silver birch, sycamore, oak, hawthorn, ash, willow, Scots pine, alder, holly, elm, hazel and rowan.
Crook Moss	2,654	Composite/blanket bog. Includes wet heath and acid grassland. Similar vegetation types to the adjacent Muirkirk Uplands SSSI, including a peat bog known as Crook Moss, wet heath known as Lammerlaugh Muir and acid grassland.
River Ayr Floodplain	3,248	Wetlands. This site comprises the River Ayr, a small section of Garpel Water which is a tributary of the River Ayr, and surrounding grasslands and woodlands. This site lies within a B-Line and a proportion of this site overlaps with woodland listed on the AWI.
Marchhouse Hill	3,353	Mires and heaths. This site includes two large areas of wet modified bog which grades through acid grassland to marshy grassland downhill and to the south of the Site. Short, well-grazed heather dominated the wet modified bog habitats, with wavy hair grass, tormentil, blaeberry, cross leaved heather, hairs tail cottongrass, deer grass, purple moor-grass and lichen also present within these bogs.
Darconner	3,425	Composite. Comprising grasslands and waterbodies. Associated with Shaw Hill LNCS, which is immediately north of this site.
Ryderston Belt	3,426	Grasslands. This site runs alongside Loganhill Road and a railway line and is 750 m from Glaisnock Glen / Velvetere Wood LNCS comprising a mixture of scrub and trees along the river. Surrounding land uses include agricultural farmland, Knockshinnoch Lagoons LNCS, rail lines, pockets of broadleaf woodland.
Shaw Hill	3,467	Composite/blanket bog. The Site is located immediately to the northwest and west of Airds Moss SAC, as well as immediately to the north of Darconner LNCS and in close proximity to River Ayr: Damhead to Nether Heilar LNCS.



LNCS	Distance from Site (m)	Description
Mansfield Burn	4,110	Woodland and scrub. The Site consists of a watercourse surrounded by scrub and woodland, which in turn is surrounded by grassland. Mansfield Burn flows through the Site, a tributary of the Nith River. A proportion of the Site overlaps with woodland listed on the AWI.
Glaisnock Glen / Velvetere Wood	4,393	Woodland and scrub. This site is comprised of natural and planted woodland and grasslands. A proportion of the Site overlaps with woodland listed on the AWI.
River Ayr: Damhead to Nether Heilar	4,690	Woodland and scrub. A large portion of the site overlaps woodland listed on the AWI. This site predominantly comprises the River Ayr and surrounding natural broadleaf woodlands. Beech was generally the most common species, with many other native and naturalised species present throughout the woodlands, such as silver birch, sycamore, oak, elm, ash, Sitka spruce, yew, hazel, lime and rowan.
New Cumnock Wetlands	4,720	Wetlands. This site comprises a mosaic of grassland habitats, with a woodland in the south and four waterbodies of varying sizes in the centre. These waterbodies are connected by the Craigston Burn. This site comprises a mosaic of largely open grassland habitats, with several open waterbodies. Seggy Burn flows down the site.
Horsecleugh Glen Woodland	4,818	Woodland and scrub. A semi-natural woodland along steep-sided glen dominated by ash/elm with oak with good structure and variety of plants and shrubs although marred by dumping and grazing. Also includes scrub and semi-improved meadow with marshy patches.
Shankston Wood	4,929	Woodland and scrub. A mature broadleaved woodland dominated by oak with a variety of other broadleaves including exotics, and dense scrub on a former tip. The woodland is grazed which has slightly impoverished the ground flora but there are good wet patches.

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 AWI holds information on the location and extent of ancient woodland within Scotland, and categorises each stand as follows:

- **Ancient Woodland (1a and 2a)** - Interpreted as semi-natural woodland from maps of 1750 (1a) or 1860 (2a) and continuously wooded to the present day. If planted with non-native species during the 20th century they are referred to as Plantations on Ancient Woodland Sites (PAWS);
- **Long-established woodlands of plantation origin (LEPO) (1b and 2b)** - Interpreted as plantation from maps of 1750 (1b) or 1860 (2b) and continuously wooded since. Many of these sites have developed semi-natural characteristics, especially the oldest stands, which may be as rich as ancient woodland; 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 are six areas of ancient woodland (as present on the AWI) within the Site; two stands in the far north, two in the west and two in the far south (see **Figure 6.1**). Five of these are classified as Long-Established (of plantation origin) and one as Ancient (of semi-natural origin); the one area classified as Ancient (of semi-natural origin) just overlaps marginally with the Site in the south. Of the stands in the west, one no longer exists and the other has been significantly reduced in size, having been removed as part of former mining operations.

There are several more areas of ancient woodland within 5 km of the Site (see **Figure 6.1**), the majority of which are categorised as Long-Established (of planted origin) and Ancient (of semi-natural origin), with a few areas of Other (on Roy map).

2.4 Carbon and Peatland Map 2016

The Carbon and Peatland Map 2016⁵ 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 habitat⁶ as Class 1⁷ and Class 2⁸ peatlands.

Figure 6.2 indicates that, according to this predictive tool and map, there is only one area of Class 1 peatland that overlaps with the Site. This is in the west of the Site and covers the area of Low Moss, a raised bog which is discussed further in **Section 5.6.2**, and is concurrently a LNCS as noted in **Section 2.2**. No Class 2 peatland as per the Carbon and Peatland Map is present within the Site. The majority of the Site is made up of Class 0 (mineral)⁹ soils, with smaller areas of Class 5¹⁰ found in the centre and north-east.

3.0 Methodology

NVC level mapping has been used across the survey area as this survey method provides the highest resolution of habitat mapping and also provides the greatest level of detail with respect to vegetation composition and character, to allow a detailed and accurate baseline characterisation. It also provides the detailed NVC community data that is required by several statutory consultees and for various ecological and hydrological assessments and also helps

⁵ 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>

⁶ Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

⁷ Class 1 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value. Indicative vegetation – Peatland.

⁸ 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.

⁹ Mineral soil - Peatland habitats are not typically found on such soils (Class 0). Indicative vegetation - no peatland vegetation.

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



inform other elements of the Proposed Development (e.g. around future potential habitat management decisions).

The NVC data forms the baseline data, but for ease of interpretation of the broader baseline character and for presentation purposes the NVC data have also been correlated to the Phase 1 methodology (see **Section 3.2** for further details).

3.1 National Vegetation Classification (NVC)

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

Homogeneous stands and mosaics of vegetation were identified and mapped by eye and drawn as polygons on high resolution aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species present. The surveyors worked progressively across the survey area to ensure that no areas were missed, and that mapping was accurate. NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991-2000). Stands were classified to sub-community level where possible, although in many cases the vegetation was mapped to community level only because the vegetation was too species-poor or patches were too small to allow meaningful sub-community determination; or because some areas exhibited features or fine-scale patterns of two or more sub-communities.

Quadrat sampling was not used in this survey because experienced NVC surveyors do not need to record quadrats in order to reliably identify NVC communities and sub-communities (Rodwell, 2006). 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 (survey area) vegetation patterns (Rodwell, 2006).

Due to small scale vegetation and habitat variability and numerous zones of habitat transition or 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 classification (JNCC, 2010), 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) for vascular plants, Atherton *et al.* (2010) for bryophytes and Smith *et al.* (2009) for lichens.



4.0 Survey Details and Limitations

NVC and habitat surveys were undertaken within the NVC survey area between the 21 July 2025 and 24 July 2025 inclusive. Surveys were therefore carried out during the optimal season for habitat surveys. The weather conditions were amenable to survey; bright, with broken cloud and relatively light to moderate winds, and with infrequent light showers.

A section near the centre of the survey area was inaccessible and could not be surveyed in detail due to access and health & safety restrictions around an unrestored area of old opencast mine – this area has been mapped and presented on **Figure 6.3** as a Non-Surveyed Area (NSA). The access constraints are not considered to affect the validity of the survey results, or the robustness of any assessments made from these data, as detailed below.

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

Thirty three NVC communities and 23 non-NVC communities were recorded within the survey area, and these corresponded to 32 Phase 1 habitat types. These communities and habitat types, and their respective Site-specific correlations are summarised in **Table 5-1**, and presented in **Figures 6.3a-i**.

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
A1.1.2 Broadleaved Plantation Woodland	YBP Young Broadleaved Plantation (non-NVC type)



Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
	W10(p) ¹¹ <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	YMP Young Mixed Plantation (non-NVC type)
A2.1/A2.2 Scrub – Dense/Continuous & Scattered	W21 <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub
A3.1 Scattered Broadleaved Trees	SBT (non-NVC type)
A3.2 Scattered Conifer Trees	SCT (non-NVC type)
A4.2 Recently Felled Coniferous Woodland	CF Clear-Felled Woodland (non-NVC type) CF>MG10a (non-NVC type) CF>OV27 (non-NVC type)
B1.1 Unimproved Acid Grassland	U4 <i>Festuca ovina</i> – <i>Agrostis capillaris</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
B2.1 Unimproved Neutral Grassland	MG1 <i>Arrhenatherum elatius</i> grassland MG9 <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
B4 Improved Grassland	MG6 <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland
B5 Marsh/Marshy Grassland	MG10 <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture M23 <i>Juncus effusus/acuteiflorus</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 Epal <i>Equisetum palustre</i> dominant (non-NVC type) Je <i>Juncus effusus</i> acid grassland community (non-NVC type) Ja <i>Juncus acuteiflorus</i> acid grassland community (non-NVC type) MG10(Ja) <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture, <i>Juncus acuteiflorus</i> dominant (non-NVC type)
C1.1 Bracken – Continuous	U20 <i>Pteridium aquilinum</i> – <i>Galium saxatile</i> community
C3.1 Tall Herb & Fern: Tall Ruderal	OV24 <i>Urtica dioica</i> – <i>Galium aparine</i> community OV25 <i>Urtica dioica</i> – <i>Cirsium arvense</i> community OV27 <i>Chamerion angustifolium</i> community
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

¹¹ The suffix (p) indicates that although the area has been attributed a NVC code and the vegetation is broadly referable to that community, the area is clearly, or very likely, of plantation origin and therefore not semi-natural.



Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
D2 Wet Dwarf Shrub Heath	M15 <i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
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 M18 <i>Erica tetralix</i> – <i>Sphagnum papillosum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire
E1.6.2 Raised Bog	M17 <i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire
E1.7 Wet Modified Bog	M20 <i>Eriophorum vaginatum</i> blanket mire M25a^ <i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire <i>Erica tetralix</i> sub-community
E2.1 Acid/Neutral Flush/Spring	M4 <i>Carex rostrata</i> - <i>Sphagnum fallax</i> mire M6 <i>Carex echinata</i> - <i>Sphagnum fallax/auriculatum</i> mire
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 S10 <i>Equisetum fluviatile</i> swamp S12 <i>Typha latifolia</i> swamp
G1 Open Water	SW Standing Water (non-NVC type)
G2 Running Water	RW Running Water (non-NVC type)
I2.3 Mine	UM Unrestored Mine (non-NVC type)
J1.2 Amenity Grassland	PG Private Gardens & Lawns, Parks etc (non-NVC type)
J1.3 Ephemeral/Short Perennial	Tf <i>Tussilago farfara</i> dominant (non-NVC type) UM>M15b (non-NVC type) UM>U4 (non-NVC type)
J2.1.2/J2.2.2 Species-Poor Intact & Defunct/Gappy Hedge	W21 <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub
J3.6 Buildings	BD Buildings (non-NVC type)
J4 Bare Ground	BG Bare Ground, Tracks, Hardstandings etc (non-NVC type)

The following sections describe each of these Phase 1 habitat types and the communities underpinning these within the survey area. Habitats are described in the order they appear within the Phase 1 classification. The survey results are displayed in **Figures 6.3a-i** which combine 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 **Figures 6.3a-i** and detailed within **Annex A**, target note photographs are included within **Annex B**. Further photographs of several 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 uncommon within the survey area, with the largest and most continuous stands at Welltrees and Boghead Wood to the north and around Laigh Glenmuir Farm and Cubs Craig to the south-west of the survey area. A few smaller patches are also found scattered throughout the survey area.

The semi-natural broadleaved woodland recorded in the survey area is a mix of W4 *Betula pubescens* – *Molinia caerulea* woodland, W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum* woodland and W10 *Quercus robur* – *Pteridium aquilinum* - *Rubus fruticosus* woodland, all of which were recorded to community level only and occasionally form mosaics with each other. The most common woodland community present is W7, followed by W10 and then W4.

The areas of W4 generally consisted of *Betula* spp., *Sorbus aucuparia* and *Salix cinerea* over a field layer characterised by mire species such as *Molinia caerulea*, *Calluna vulgaris*, *Eriophorum vaginatum*, *Juncus effusus* and *Sphagnum fallax*.

The W7 recorded often comprised *Salix cinerea*, *Betula pendula* and *Alnus glutinosa* over a *Juncus* spp. dominated field layer with occasional *Deschampsia cespitosa*, *Filipendula ulmaria* and *Equisetum arvense*. A number of these woodland patches were recorded with the prefix 'y' (i.e. yW7) to indicate the canopy was comprised of young or immature trees.

Patches of W10 were usually dominated by a mix of *Fraxinus excelsior*, *Quercus* spp., *Fagus sylvatica*, *Betula* spp., *Alnus glutinosa*, *Corylus avellana*, *Sorbus aucuparia*, *Salix* spp., and *Crataegus monogyna*. The understorey and field flora were often species-poor and sparse, with vegetation characteristic of improved grassland with scattered *Urtica dioica* and *Rubus fruticosus*.

5.2.2 A1.1.2 Broadleaved Plantation Woodland

A few patches of young broadleaved plantation (YBP) were recorded in the central and western fringes of the survey area, with the largest of these found near Hawk Hill. The character of this plantation contains young *Alnus glutinosa*, *Betula pubescens*, *Salix cinerea*, *Sorbus aucuparia* and *Populus tremula*, and a relatively species-poor understorey. As these patches have only been recently planted, there are no defining characteristics to assign an NVC code.

Further planted stands were identified towards the eastern section of the survey area, as most closely referable to W10(p) *Quercus robur* – *Pteridium aquilinum* - *Rubus fruticosus* woodland. The suffix (p) indicates that although the area has been attributed a NVC code and the vegetation is broadly referable to that community (see **Section 5.2.1**), the area is clearly, or very likely, of plantation origin and therefore not semi-natural. These stands were mostly located in the south and west of the survey area and planted as shelter belts around field margins.

5.2.3 A1.2.2 Coniferous Plantation Woodland

The survey area includes several areas of planted commercial young and mature coniferous plantation woodland (YCP and CP), which were mainly located in the central and southern parts of the survey area. These plantation woodlands were mostly dominated by *Pinus sylvestris* or *Picea sitchensis*.

When mature, these types of typically dense plantation woodlands are of negligible botanical and ecological value due to over-shading and loss of the field flora; patchy or sparse and



impoverished vegetation is therefore generally all that persists here beneath the deep shade and the litter shed amongst the conifers.

5.2.4 A1.3.2 Mixed Plantation Woodland

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

5.2.5 A2.1/A2.2 Dense/Continuous & Scattered Scrub

Continuous (A2.1) and scattered (A2.2) scrub is sparse and of low cover within the survey area, being restricted to two small stands found in the south-west. Scrub was represented by dense patches of W21 *Crataegus monogyna* – *Hedera helix* scrub, characteristically dominated by *Crataegus monogyna*. W21 was more commonly recorded as J2.1.2 species-poor intact hedge and J2.2.2 species-poor defunct/gappy hedge within this survey (see **Section 5.10.3**).

5.2.6 A3.1/A3.2 Scattered Broadleaved & 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 young *Salix* spp. and *Betula* spp.

5.2.7 A4.2 Recently Felled Coniferous Woodland

An area within the survey area, towards the centre near Hawk Hill was recorded as recently felled conifer plantation. These areas have not yet been re-planted and are now re-establishing with secondary temporary/transitional semi-natural vegetation types through the remnant stumps and brash. These re-vegetating clear-fell areas are denoted by the '>' symbol (see **Figures 6.3a-i** and **Table 5-1**). The '>' indicates the closest-fit NVC community to which the clear-felled area now appears in transition to or is developing towards. The two habitats found to be recolonising were marshy grassland 'CF > MG10a' and tall ruderal 'CF>OV27'.

5.3 Grasslands & Marsh

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

Patches of unimproved acid grassland (B1.1) were fairly uncommon and restricted to the north of the survey area. Semi-improved acid grassland (B1.2) was found to be more common, particularly in the west of the survey area around marginal farmland and areas of old opencast mine that have been recolonised. The acid grassland within the survey area is almost exclusively of the U4 *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland community, with one small patch of the U6 *Juncus squarrosus* – *Festuca ovina* grassland community. These grassland communities were recorded as homogenous stands and also within mosaics and transitional zones with several other communities.

The U4 community contained the typical sward of *Agrostis capillaris*, *Festuca ovina* and *Anthoxanthum odoratum*. The herbs *Potentilla erecta* and *Galium saxatile* are common, and in some stands there can also be smaller quantities of other vascular species such as *Holcus lanatus*, *Nardus stricta*, *Avenella flexuosa*, *Cynosurus cristatus*, *Juncus squarrosus*, *Prunella vulgaris*, *Ranunculus repens*, *Cerastium fontanum*, *Achillea millefolium*, *Trifolium repens* and *Cirsium* spp. Mosses are frequent, especially *Pleurozium schreberi* and *Rhytidiadelphus squarrosus*.



The one patch of U6 was recorded at community level as part of a small mosaic with wet modified bog in the south-east of the survey area. The flora has much in common with that of the U4 acid grassland community described above, but with *Juncus squarrosus* obviously dominant.

Areas of semi-improved acid grassland are characterised by the U4b *Holcus lanatus*-*Trifolium repens* sub-community only. This sub-community is most common in areas in which there has been some form of historical improvement or a long history of intensive grazing and/or nutrient enrichment. The sward tends to be dominated by a semi-improved assemblage which includes typical species such as *Holcus lanatus*, *Agrostis* spp., *Cynosurus cristatus*, *Lolium perenne*, *Trifolium repens* and *Ranunculus repens*.

5.3.2 B2.1 Unimproved Neutral Grassland

Unimproved neutral grassland is uncommon within the survey area and of low coverage, being mainly found along the edges of watercourses or track/road verges. These unimproved neutral grasslands were comprised of small patches of the MG1 *Arrhenatherum elatius* grassland community and MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland community.

The MG1 community was recorded at community level and as the MG1c *Filipendula ulmaria* sub-community. This community was often distinctive by its taller and coarse sward, the vegetation here contains a mix of *Arrhenatherum elatius*, *Dactylis glomerata*, *Holcus lanatus*, *Urtica dioica*, *Alopecurus pratensis*, *Filipendula ulmaria*, *Ranunculus repens* and *R. acris*.

Within MG9, *Deschampsia cespitosa* dominates with other associates such as *Holcus lanatus*. This community was often found within mosaics with other marshy and wet grassland communities. Species diversity was predominantly limited to *Filipendula ulmaria*, *Urtica dioica* and *Cirsium palustre*. These areas were found to be generally species poor.

5.3.3 B4 Improved Grassland

Improved grassland is the single most extensive habitat type within the survey area, dominating much of the southern half, comprising many of the enclosed and improved fields used for livestock grazing. These areas are characterised by the MG6 *Lolium perenne* – *Cynosurus cristatus* grassland community.

These fields and communities were all dominated by *Lolium perenne*. Where other species appear scattered through the *Lolium perenne* sward these include *Cynosurus cristatus*, *Holcus lanatus*, *Poa annua*, *Bellis perennis*, *Ranunculus repens*, *Trifolium repens*, *Plantago lanceolata* and *Cerastium fontanum*.

5.3.4 B5 Marsh/Marshy Grassland

Marshy grassland 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 common throughout the survey area and comprises the second most extensive habitat type present, with the most extensive tracts found in the north.

Within the survey area, the M23 *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture, M25 *Molinia caerulea* – *Potentilla erecta* mire, MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture and M27 *Filipendula ulmaria* – *Angelica sylvestris* mire NVC communities are included within its limits along with the non-NVC communities 'Epal', 'Je', 'Ja', 'MG10(Ja)'. These communities also commonly form mosaics and transitional areas with each other, in particular the rush dominated areas, as well as with adjoining grassland and mire communities.

The most common and extensive community present within the survey area is MG10. This community is dominated by *Juncus effusus*, with often a damp field layer containing *Deschampsia cespitosa* and *Holcus lanatus* in variable amounts, as well as some scattered



Rumex acetosa and *Ranunculus repens*. It is represented solely by the MG10a typical sub-community. The 'MG10(Ja)' non-NVC damp neutral grassland community is essentially similar to the MG10 community but *Juncus acutiflorus* replaces *Juncus effusus* as the dominant rush species.

The M23 community is often species-poor with *Juncus* spp. being the dominant species, and it regularly grades in and out of MG10, Ja or Je. It is represented by the M23a *Juncus acutiflorus* sub-community and the M23b *Juncus effusus* sub-community. Generally, areas of M23 are dominated by mixtures of *Juncus acutiflorus* and/or *Juncus effusus* with patches of a low diversity of grasses such as *Holcus lanatus*, *Anthoxanthum odoratum*, *Molinia caerulea* and *Agrostis* spp. Within the sward, a variety of other graminoids and herbs are more occasional to rare and included *Cirsium palustre*, *Rumex acetosa*, *Ranunculus repens*, *Potentilla erecta* and *Carex* spp. Wefts of mosses are also common through M23 between these species including *Calliergonella cuspidata*, *Kindbergia praelonga*, and *Rhytidiadelphus squarrosus*.

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

Several small patches of M27 *Filipendula ulmaria* – *Angelica sylvestris* mire were recorded, and as is typical for the community, formed a relatively homogenous stand of *Filipendula ulmaria*.

Two small patches in the north of the survey area were dominated by *Equisteum palustre* and assigned the non-NVC code 'Epal'. These were found on wet areas of old opencast mine where *Equisteum palustre* was recolonising along with an assemblage of neutral herbs characteristic of M23 rush mire and scattered *Juncus effusus*, *Juncus acutiflorus*, *Tussilago farfara* and *Typha latifolia*.

The 'Ja' and 'Je' non-NVC grassland communities were 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*. 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.



5.4 Tall Herb & Fern

5.4.1 C1.1 Bracken: Continuous

Areas of bracken are relatively uncommon within the survey area, with the largest areas being found on the upper reaches of the Bellow Water in the north. The habitat was recorded as the U20 *Pteridium aquilinum* – *Galium saxatile* community, to the community level only. *Pteridium aquilinum* dominates entirely in these patches with few other species being present.

5.4.2 C3.1 Tall Ruderal

This habitat type within the survey area is of low total coverage, with the main locus being found south of Gasswater. The habitat is predominantly made up of the OV25 *Urtica dioica* – *Cirsium arvense* community, with smaller patches of the OV24 *Urtica dioica* – *Galium aparine* and OV27 *Chamerion angustifolium* communities. OV24 and OV25 are usually associated with patches of waste or neglected ground or as part of trackside verges or within mosaics with improved grassland. Both communities comprised of their characteristic community dominants. OV27 was usually associated on damp, fertile, disturbed soils in woodlands, heaths and road verges.

5.5 Heathland

5.5.1 D1.1 Dry Dwarf Shrub Heath – Acid

Acid dry dwarf shrub heath is very scarce within the survey area, restricted to a few small patches mostly in the north of the survey area. These areas are generally species-poor, relatively botanically impoverished forms of *Calluna* dominated heath that are in the process of recolonising previously disturbed land associated with mining operations. The habitat is represented by the H9 *Calluna vulgaris* - *Avenella flexuosa* heath, H10 *Calluna vulgaris* - *Erica cinerea* heath and H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath communities, all of which were recorded to community level only.

Two small areas contained H9 *Calluna vulgaris* - *Avenella flexuosa* heath, which were entirely dominated by *Calluna vulgaris*, with occasional *Avenella flexuosa*. H10 *Calluna vulgaris* - *Erica cinerea* heath was only recorded once within the survey area, and was characterised by *Calluna vulgaris* and *Erica cinerea* recolonising an area of previously disturbed ground. H12 was recorded once within a mosaic with wet dwarf shrub heath along an old raised mining embankment, where *Calluna vulgaris* and scattered *Vaccinium myrtillus* were recolonising.

5.5.2 D2 Wet Dwarf Shrub Heath

Wet heath is relatively uncommon within the survey area and was only recorded within the northern half of the survey area. The habitat was all recorded as M15b *Trichophorum germanicum* – *Erica tetralix* wet heath, typical sub-community.

The wet heath present was mostly found to be recolonising previously disturbed ground associated with mining operations. The vegetation generally consisted of co-dominant mixtures of *Calluna vulgaris*, *Erica tetralix* and *Molinia caerulea*, with abundant *Polytrichum commune*. Scattered *Equisetum arvense*, *Eriophorum vaginatum*, *Sphagnum capillifolium* and *Cladonia* spp. were also found in some of the patches.



5.6 Mire

5.6.1 E1.6.1 Blanket Bog

Blanket bog is found in scattered and often isolated and fragmented patches across the survey area, with the larger patches located in the north-east and around Hillhead Moss. The habitat is mostly represented by M18 *Erica tetralix* – *Sphagnum papillosum* blanket mire and M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire, together with smaller areas of M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire. There was also one example of the M2 *Sphagnum cuspidatum/fallax* bog pool community recorded within an area of blanket bog and two instances of the M3 *Eriophorum angustifolium* bog pool community.

M18 was recorded in two patches; at Hillhead Moss and as part of a mosaic with M19 by an opencast mining pit in the centre of the survey area. Both of these were recorded at the community level only. The vegetation consists of an assemblage of characteristic species for the community. The sward contains *Calluna vulgaris*, *Erica tetralix*, *Eriophorum vaginatum*, *E. angustifolium*, *Trichophorum germanicum*, variable amounts of *Narthecium ossifragum*, *Vaccinium myrtillus*, *Juncus squarrosus*, *Molinia caerulea*, *Potentilla erecta*, *Galium saxatile*, *Empetrum nigrum*, *Avenella flexuosa*, *Drosera rotundifolia*, *Dactylorhiza maculata* and abundant trailing shoots of the preferential *Vaccinium oxycoccos*. Lawns of *Sphagnum* are present in some patches and includes the preferential *Sphagnum medium*, as well as *S. papillosum*, *S. cuspidatum* and *S. capillifolium*. Other lower plants present in variable abundances include *Cladonia* spp. (lichens) and mosses including *Hylocomium splendens*, *Rhytidiadelphus loreus* and *Racomitrium lanuginosum*.

The M19 community is generally distinctive with the bulk of the vegetation consisting of a co-dominant mixture of *Calluna vulgaris* and *Eriophorum vaginatum*. It was mostly recorded at community level, but also as the M19b *Empetrum nigrum* sub-community in one patch. There is commonly at least frequent to occasional *Erica tetralix*, *Eriophorum angustifolium*, *Narthecium ossifragum*, *Trichophorum germanicum*, *Vaccinium myrtillus*, *Potentilla erecta* and *Avenella flexuosa*. The mosses *Hylocomium splendens*, *Aulacomnium palustre*, *Polytrichum commune*, *Pleurozium schreberi*, *Hypnum jutlandicum*, *Sphagnum fallax* and *S. capillifolium* are collectively abundant, with *S. papillosum* and *S. palustre* occasional. *Cladonia* spp. (lichens) are also present. *Empetrum nigrum* was found to be particularly abundant in one area of M19, which was assigned the M19b *Empetrum nigrum* 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*, *Molinia caerulea* and *Calluna vulgaris*. The basal layer includes *Sphagnum papillosum*, *S. palustre*, and *S. capillifolium* as well as typical *pleurocarpous* mosses. M17 was recorded at the community level but also as the M17a *Drosera rotundifolia* – *Sphagnum* spp. sub-community where it is wetter and more diverse.

One small area of M2 was found as a minor component within more extensive blanket bog, which was present in a small, occluded hollow. This community is represented by the abundance of *Sphagnum fallax* and *S. cuspidatum*. The community was also found within raised bog (see **Section 5.6.2**). M3 was rarely recorded, being characterised by small patches where *Eriophorum angustifolium* dominated.

The patches of remaining blanket bog in the survey area are in a moderate condition. It is likely this habitat was more extensive prior to the mining operations in the area, and that the associated disturbance has contributed to a degree of degradation. The impact of grazing appears to be variable, with some of the more northern patches experiencing moderate grazing pressure, whilst the areas around Hillhead Moss remain wet and relatively species-rich, although bog pool communities are scarce. There were a few areas with self-seeded non-



native conifer trees that have spread from the adjacent commercial forestry blocks which has impact on blanket bog (as well as wet modified bog) within the survey area. Further information of surveys relating to peat depth and further information on peat condition is provided in **Chapter 8: Geology, Hydrology, Hydrogeology and Peat** and associated Technical Appendices.

5.6.2 E1.6.2 Raised Bog

Low Moss is located to the west of the survey area and represents the only example of raised bog within the survey area. This area is represented by M17a *Trichophorum germanicum* – *Eriophorum vaginatum* mire, *Drosera rotundifolia* – *Sphagnum* spp. sub-community. A minor road bisects the bog, splitting it into south-western and north-eastern portions. Both of these areas are species-rich, containing a diverse sward of *Trichophorum germanicum*, *Eriophorum vaginatum*, *Erica tetralix*, *Eriophorum angustifolium*, *Molinia caerulea*, *Calluna vulgaris*, *Narthecium ossifragum*, *Vaccinium myrtillus*, *Juncus squarrosus*, *Potentilla erecta*, *Galium saxatile*, *Drosera rotundifolia* and scattered *Vaccinium oxycoccos*. The lichen *Cladonia* spp. is common in places, as are the mosses *Sphagnum capillifolium*, *S. fallax*, *S. squarrosus* and *S. palustre*. The north-eastern section is generally wetter with a greater abundance of M2 bog pools, some of which contain abundant *Rhynchospora alba* (e.g., see TN5, **Annex A**). Some scattered *Salix cinerea* is also present within this section of the raised bog.

A small number of M3 *Eriophorum angustifolium* bog pools were also present. These are generally species-poor and characterised by dominant *Eriophorum angustifolium* in wet depressions or pools.

The raised bog is in relatively good condition with abundant bog pools in places. The area has been historically drained and appears to have since been subject to peatland restoration works involving the use of peat dams.

5.6.3 E1.7 Wet Modified Bog

Wet modified bog is scattered throughout the northern and central parts of the survey area in relatively isolated and fragmented patches. The majority is represented by the M25a[^] *Molinia caerulea* – *Potentilla erecta* mire *Erica tetralix* sub-community, with smaller areas of M20 *Eriophorum vaginatum* blanket mire. M25a being classified as wet modified bog and not marshy grassland here due to generally appearing on peat of greater than 0.5 m in depth (c.f. **Section 5.3.4**) or containing a notable abundance of characteristic bog species, in particular *Eriophorum vaginatum*. In these circumstances, the M25a is denoted with a caret (i.e., M25a[^]).

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*, *Erica tetralix*, *Vaccinium myrtillus*, *Eriophorum vaginatum*, *Trichophorum germanicum*, *Narthecium ossifragum* and occasional patches of *Sphagna*. One area in the east of the survey area was found to contain *Vaccinium oxycoccos* scattered throughout and may be derived from degradation of a previous M18 assemblage (see **Section 5.6.1**).

M20 *Eriophorum vaginatum* blanket mire areas were recorded at the community level only. The species assemblage can be identified by the dominant tussocks of *Eriophorum vaginatum*, along with some *Erica tetralix*, *Eriophorum angustifolium* and *Juncus effusus*. The basal layer in these areas is mostly dominated by pleurocarpous and hypnoid mosses, although some wetter patches contain *Sphagnum capillifolium* and *S. fallax*.

5.6.4 E2.1 Acid/Neutral Flush/Spring

Acid/neutral flushes appear in several areas across the survey area. They are often relatively small patches of habitat and usually follow the route of watercourses, although larger



continuous tracts are present in the north near Welltrees and in the east next to the commercial forestry blocks abutting the survey area. The majority of this habitat is represented by M6 *Carex echinata* – *Sphagnum fallax/auriculatum* mire. The M6 on-site is predominately of the M6c *Juncus effusus* sub-community, with smaller extents of the M6d *Juncus acutiflorus* sub-community. A single patch of the M4 *Carex rostrata* - *Sphagnum fallax* mire community was also recorded in the west of the survey area.

The M6c and M6d communities are rush mires on wet ground, often following the lines of watercourses. A tall sward of *Juncus 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 relatively low cover, and included species such as *Rumex acetosa*, *Molinia caerulea*, *Menyanthes trifoliata*, *Ranunculus repens*, *Cirsium palustre* and *Carex* spp.

The one small patch of M4 was found in a mosaic with a swamp community and was characterised by dominant *Carex rostrata* with a basal layer composed of *Sphagnum fallax*.

5.6.5 E2.2 Basic Flush/Spring

One basic stony flush was found along the bank of Bellow Water in the north of the survey area (see TN1, **Annex A**). This flush was represented by the M10 *Carex dioica* – *Pinguicula vulgaris* mire community. The vegetation present was a species-poor example of M10 and consisted of abundant *Pinguicula vulgaris* and *Carex* spp. along with the community characteristic ‘brown mosses’.

5.6.6 E4 Bare Peat

Bare exposed peat (ExP) is a non-NVC community within the survey area, found in a small number of patches within blanket bog and wet modified bog habitats; these areas are mostly devoid of vegetation through erosion.

5.7 Swamp, Marginal & Inundation Habitats

5.7.1 F1 Swamp

Several small patches of swamp were recorded scattered throughout the survey area, many of them consisting of vegetation that has established in small pools within the areas of old opencast mining. S9 *Carex rostrata* swamp and S12 *Typha latifolia* swamp communities were the most common, with a smaller number of areas of S10 *Equisetum fluviatile* swamp.

The S9 swamp community was recorded at the community level only and was dominated by a sward of *Carex rostrata* over a saturated ground layer. *Equisetum* spp. was found to be abundant throughout the *C. rostrata* sward in a small number of these patches. The S10 and S12 swamp communities contain the dominant species of *Equisetum fluviatile* and *Typha latifolia* respectively, and are both generally species-poor.

5.8 Open Water

5.8.1 G1 Standing Water

Standing waterbodies (SW) within the survey area mostly comprise settlement pools related to the historical mining operations in the area.



5.8.2 G2 Running Water

Several watercourses (RW) are present within the within the survey area and surrounding area, including several named burns.

5.9 Rock Exposure & Waste

5.9.1 I2.3 Mine

Unrestored mine (UM) is a code used here to characterise areas of former surface mine that have been historically abandoned and unrestored within the survey area. In these areas, patches of bare or disturbed ground, spoil, mining voids and evidence of historical disturbance remain (at the time of survey). Due to the time since abandonment sporadic ephemeral/short vegetation has established throughout some of these areas, but revegetation colonisation has been poor or minimal due to poor soil quality and exposure, and the recolonising communities are sparse. 'Hydroseeding' treatment was ongoing beside the large opencast pit in the centre of the Site at the time of survey, which will likely accelerate the recolonisation rate in this area over the coming years.

A few patches of these unrestored mine areas have slightly more vegetation and are slowly colonising with very poor and impoverished examples of NVC communities, although much bare ground remains in these areas. Where this has been noted the areas have been included in the J1.3 Ephemeral/Short Perennial classification (see **Section 5.10.2**).

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.

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

As described in **Section 5.9.1**, sporadic ephemeral/short vegetation has established throughout some of the areas of former surface mine and associated spoil. Where this vegetation is more established, *Tussilago farfara* is the most abundant species and such areas have been mapped as the non-NVC type 'Tf'. Very poor examples of the NVC communities U4 and M15b are also represented colonising these areas, denoted with the codes 'UM>M15b' and 'UM>U4'.

5.10.3 J2.1.2/J2.2.2 Species-Poor Intact & Defunct/Gappy Hedge

Species-poor intact (J2.1.2) and defunct/gappy (J2.2.2) hedges were generally found along field margins in the south of the survey area. These hedges were primarily formed from the W21 *Crataegus monogyna* – *Hedera helix* community. W21 was also present and recorded as dense/continuous scrub, see **Section 5.2.5**.

5.10.4 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.



5.10.5 J4 Bare Ground

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

5.11 Invasive Non-Native Species

No 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 botanical 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 groundwater (SEPA, 2024). 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 habitat's 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 also **Chapter 8: Geology, Hydrology, Hydrogeology and Peat**).

Using SEPA's (2024) guidance, **Table 6-1** shows which communities recorded within the survey area may be considered a potential GWDTE. The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see **Figures 6.4a-i**.

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



NVC Code	NVC Community Name
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
MG9	<i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
MG10	<i>Holcus lanatus</i> – <i>Juncus effusus</i> rush pasture
U6	<i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
Je/Ja ¹²	<i>Juncus effusus/Juncus acutiflorus</i> acid grassland
Epal ¹³	<i>Equisetum palustre</i> neutral mire

Within **Figures 6.4a-i** 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 potential GWDTE(s) within the polygon.

GWDTE potential has been assigned solely on the SEPA listings (SEPA, 2024). 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: Geology, Hydrology, Hydrogeology and Peat**).

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 descriptions¹⁴, which have then been compared with survey results and field observations, the

¹² In light of the SEPA classification on potential GWDTEs the non NVC types ‘Je’ and ‘Ja’ should also qualify for potential GWDTE status. The classification is keeping in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

¹³ In light of the SEPA classification on potential GWDTEs the non NVC type ‘Epal’ should also qualify for potential GWDTE status. The classification is keeping in line with the species description in **Section 5.3.4** above, which shows its similarity to M23 rush-pasture.

¹⁴ <https://sac.jncc.gov.uk/habitat/>.



following NVC communities within the survey area which may constitute terrestrial Annex I habitat are shown in **Table 6-2**.

Table 6-2: Annex I Habitats and Corresponding NVC Communities

Annex I 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>Deschampsia flexuosa</i> heath H10 <i>Calluna vulgaris</i> - <i>Erica cinerea</i> heath H12 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> heath
7130 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 M18 <i>Erica tetralix</i> – <i>Sphagnum papillosum</i> blanket mire M19 <i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire M20 <i>Eriophorum vaginatum</i> blanket mire M25a^ <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
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 several NVC communities within the survey area such as the M17, M18, 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, M18, M19 and M20 mire.

As noted above, M25 mire can also fall within the blanket bog Annex I type, usually where the underlying peat depth is greater than 0.5 m and the habitat is wet and contains peat forming species. These areas (denoted here as M25a^ - see **Section 5.6.3**) 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

The one example of M4 *Carex rostrata* - *Sphagnum fallax* mire within the survey area was 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. The one example of M10 mire in the survey area falls within this Annex I habitat type.

6.3.5 4010 Northern Atlantic wet heaths with *Erica tetralix*

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures *Erica tetralix*, *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses. Examples of M15 wet heath are 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 and H12 – 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 that are in the process of recolonising bare ground that has been previously disturbed as part of historical mining activities.

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 2004¹⁵. The most 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

¹⁵ 2004 asp 6 (Acts of the Scottish Parliament) Nature Conservation (Scotland) Act 2004.
<https://www.legislation.gov.uk/asp/2004/6/contents>



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 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		
M2	-	7130 Blanket bogs (examples associated with M17-M20)
M3	-	7130 Blanket bogs (examples associated with M17-M20)
M4	Yes	7140 Transition mires and quaking bogs
M6c, M6d	Yes	-
M10	Yes	7230 Alkaline fens
M15b	Yes	4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>
M17, M17a	-	7130 Blanket bogs
M18	-	7130 Blanket bogs
M19, M19b	-	7130 Blanket bogs
M20	-	7130 Blanket bogs
M23a, M23b	Yes	-
M25a, M25b, M25a^	-	7130 Blanket bogs (where peat depth >0.5 m)
M27	Yes	-
Dry Heaths		
H9	-	4030 European dry heaths
H10	-	4030 European dry heaths
H12	-	4030 European dry heaths
Calcifugous Grasslands & Ferns		
U4, U4b	-	-
U6	Yes	-
U20	-	-



NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat
Mesotrophic Grasslands		
MG1, MG1c	-	-
MG6	-	-
MG9	Yes	-
MG10a	Yes	-
Woodland & Scrub		
W4	Yes	
W7, yW7	Yes	
W10, W10(p)	-	
W21 ¹⁶	-	
Swamps & Tall-Herb Fens		
S9	-	-
S10	-	-
S12	-	-
Vegetation of Open Habitats		
OV24	-	-
OV25	-	-
OV27	-	-
Non-NVC Types		
BD	-	-
BG	-	-
CF, CF>MG10a, CF>OV27	-	-
CP	-	-
Epal	Yes	-
ExP	-	-
Ja	Yes	-
Je	Yes	-
MG10(Ja)	Yes	-
PG	-	-
RW	-	-
SBT	-	-
SCT	-	-
SW	-	-
Tf	-	-

¹⁶ Present on-site as both scrub forms and as part of hedgerows.



NVC/Non-NVC Codes Recorded	Potential GWDTE	Annex I Habitat
UM, UM>M15b, UM>U4	-	-
YBP	-	-
YCP	-	-
YMP	-	-

7.0 Summary

MacArthur Green (now SLR¹) carried out NVC and habitat surveys within the survey area from 21 July 2025 to 24 July 2025 inclusive in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 33 NVC communities were recorded within the respective survey area along with various associated sub-communities; a number of non-NVC habitat types are also present.

The south of the survey area is mostly comprised of agricultural land, with improved grassland making up the bulk of the landscape. The vegetation in the central and northern sections of the survey area has been heavily influenced by surface mining operations. Large areas of unrestored mine remain amongst areas of marshy grassland, acid grassland, and smaller patches and pockets of several other habitat types such as woodland, bracken, neutral grassland, wet and dry heath, raised bog and blanket bog.

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

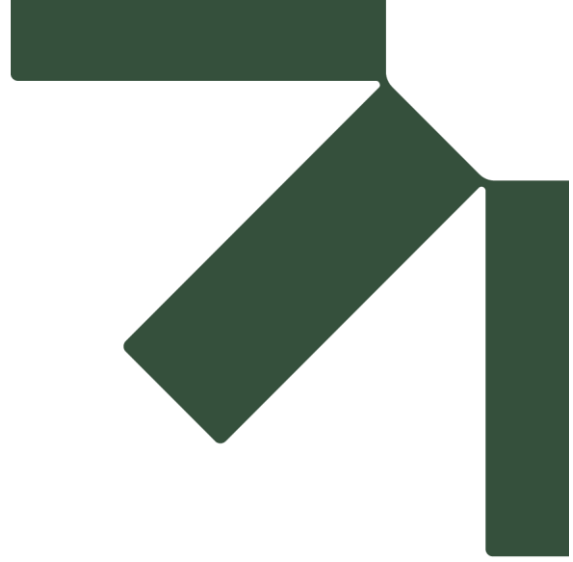
The survey results have also been compared to a number of sensitivity classifications, indicating the presence of Annex I and potential GWDTE habitats, as summarised in **Table 6-3**.



8.0 References

- Atherton, I., Bosanquet, S. & Lawley, M. (2010). Mosses and Liverworts of Britain and Ireland: a field guide. British Bryological Society.
- 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.
- 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>.
- Joint Nature Conservancy Council (JNCC). (2010). Handbook for phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.
- 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.
- Rodwell, J.S. (Ed), et al. (1991 – 2000). British Plant Communities (5 volumes). Cambridge University Press, Cambridge.
- 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.
- Rodwell, J.S. (2006). NVC Users' Handbook. ISBN 978 1 86107 574 1.
- SEPA (2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems.
<https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>.
- 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.
- Stace, C.A. (2019). New Flora of the British Isles. 4th Edition. Cambridge University Press.





Annex A

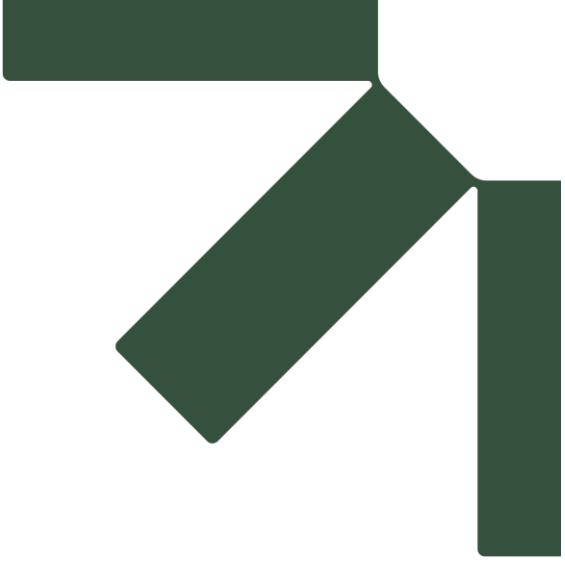
NVC Target Notes

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

Table A-1: Survey Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
1	263103	623038	M10	Stony flush near river with abundant <i>Pinguicula vulgaris</i> .	Photo B-1
2	263449	622662	n/a	Several historic drainage grips run through the area, which are occluded with M6c vegetation and do not seem to be actively draining the area.	Photo B-2
3	261971	621533	n/a	Non-NVC type spring/seepage emerging from side of old opencast workings. Dominated by large population of sterile (no capsules) <i>Dicranella cerviculata</i> . This species is known mainly from damp acidic soils of various kinds, including colliery spoil. It is quite uncommon, with a widespread but patchy/localised distribution in Britain.	Photo B-3
4	261319	620749	n/a	Eroded bank of peat at edge of Low Moss raised bog.	Photo B-4
5	261247	620992	M2	Example of M2 bog pool in Low Moss containing abundant <i>Rhynchospora alba</i> .	Photo B-5
6	261425	621092	n/a	Example of an occluded drainage ditch through modified bog, not actively draining area.	Photo B-6





Annex B

**Target Note
Photographs**

The following photographs correlate to the target notes described within **Annex A, Table A-1**.

Photo B-1 Target Note 1 – M10 flush



Photo B-2 Target Note 2 – Drainage grips through wet modified bog occluded with M6c vegetation



Photo B-3 Target Note 3 – Spring/seepage dominated by *Dicranella cerviculata*



Photo B-4 Target Note 4 – Eroded peat bank at edge of raised bog

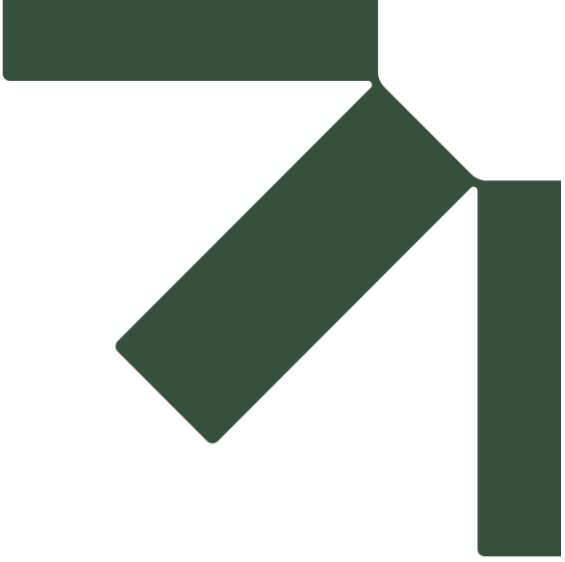


Photo B-5 Target Note 5 – M2 bog pool with abundant *Rhynchospora alba*



Photo B-6 Target Note 6 – Occluded drainage ditch through wet modified bog





Annex C

**General Community
Photographs**

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

Photo C-1 W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemorum* woodland



Photo C-2 U4b *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland, *Holcus lanatus*-*Trifolium repens* sub-community



Photo C-3 MG6 *Lolium perenne* – *Cynosurus cristatus* grassland



Photo C-4 MG10a *Holcus lanatus* – *Juncus effusus* rush-pasture, Typical sub-community



Photo C-5 MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland



Photo C-6 'Epal' *Equisetum palustre* neutral mire



Photo C-7 Low Moss raised bog, with M17a *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire, *Drosera rotundifolia* – *Sphagnum* spp. sub-community and M2 *Sphagnum cuspidatum/fallax* bog pool



Photo C-8 M18 *Erica tetralix* – *Sphagnum papillosum* blanket mire, with some self-seeded conifer encroachment



Photo C-9 M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire



Photo C-10 M25a^ *Molinia caerulea* – *Potentilla erecta* mire, *Erica tetralix* sub-community on deep peat



Photo C-11 'Tf' *Tussilago farfara* dominant vegetation



Photo C-12 'UM' unrestored opencast mine





Making Sustainability Happen