Appendix 7.1   National Vegetation Classification & Habitats Survey

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Cumberhead West Wind Farm National Vegetation Classification & Habitats Survey

Technical Appendix 7.1

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1 INTRODUCTION

MacArthur Green was commissioned by the Applicant to carry out a National Vegetation Classification (NVC) and habitats survey at the proposed Cumberhead West Wind Farm, approximately 3 km to the west of Coalburn, South Lanarkshire (hereafter referred to as the 'Proposed Development').

The aim of the NVC survey is to identify and map the vegetation communities present within the site in order to identify those areas of greatest ecological interest (i.e. Habitats Directive Annex I habitats[1]; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE)[2]; and Scottish Biodiversity List (SBL) priority habitats). This information is used to inform the wind farm design process and the ecological assessment for the Proposed Development Environmental Impact Assessment (EIA) Report.

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

2 THE PROPOSED DEVELOPMENT SITE AND STUDY AREA

The Proposed Development site ('the site') is located mainly within an area of active commercial forestry within the larger Cumberhead Forest complex, west of Douglas, South Lanarkshire. The site adjoins the existing cluster of operational and consented wind farms around Hagshaw Hill, known as the 'Hagshaw Cluster'.

The site extends over the existing Cumberhead Forest, consisting of commercial coniferous plantation and existing forestry tracks. There is also a small area of enclosed fields around Black Hill within the southeast of the site. The site boundary also includes the site access route (from junction 11 of the M74 motorway through Cumberhead Forest to the southern corner of the site). This part of the site was not surveyed because the access would make use of existing tracks. The exception to this is a short stretch of track which would be created for the Proposed Development if the proposed Douglas West Extension Wind Farm is not built in advance. This 1.38 km section of new track has been assessed separately in Appendix 3.3 of this EIA Report.

The site gradually rises from 320 m Above Ordnance Datum (AOD) in the north to 522 m AOD at the summit of Nutberry Hill in the south of the site. A number of watercourses run through the site, mainly Birkenhead Burn, Eaglin Burn, Long Burn, Logan Water and the River Nethan.

The surrounding land comprises open moorland to the west and south-west, farmland with some scattered individual properties to the north and north-east, with further coniferous plantation to the south and south-east.

The site is situated adjacent to a section of the Muirkirk Uplands SSSI, three further designated sites with habitat related or botanical qualifying interests are located within 5 km of the site. The

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

[2] As defined within SEPA (2017). Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Available for download from http://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf.

relevant designated sites and respective qualifying features are detailed in Table 2-1; see also Figure 7.1.

Table 2-1 Designated sites with habitat/botanical qualifying interests within 5km of the site

Designated Site	Distance from site boundary (km)	Qualifying Interests	Last Assessed Condition & Date
Muirkirk Uplands SSSI	Adjacent to site, west	▪ Blanket bog ▪ Upland habitat assemblage	Unfavourable No Change 20/10/2005 Favourable Maintained 21/10/2005
Coalburn Moss SAC	3.8 km east	▪ Active raised bog ▪ Degraded raised bog	Favourable Maintained 12/08/2012 Unfavourable Recovering 12/08/2012
Coalburn Moss SSSI	3.8 km east	▪ Raised bog	Unfavourable Recovering 13/10/2009
Blood Moss and Slot Burn SSSI	4.8 km west	▪ Blanket bog	Unfavourable No Change 26/08/2014

The Carbon and Peatland map[3] was consulted to determine likely peatland classes present within the site. The map 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 to promote consistency and clarity in the preparation of spatial frameworks by planning authorities"*[4]. It identifies areas of *"nationally important carbon-rich soils, deep peat and priority peatland habitat"* as Class 1 and Class 2 peatlands. Class 1 peatlands are also *"likely to be of high conservation value"* and Class 2 *"of potentially high conservation value and restoration potential"*.

Figure 7.2 indicates that, according to this map, the site is partially underlain by Class 1 peatland across the Nutberry Hill area. No other areas of Class 1 or Class 2 peatland are present within the site. As the Carbon and Peatland map is a high-level tool, detailed habitat surveys have also been carried out across the site to inform the site assessment on peatland and associated habitats, which is required to identify actual effects of the proposal; including siting, design and mitigation. The results of the habitat surveys are discussed below in Section 5.2.

The 'study area' in which NVC and habitat surveys were undertaken covered the entirety of the main site area plus a 250m buffer area (to account for the presence of potential GWDTEs), where access was permitted or observation possible. The extent of the study area therefore able to be surveyed covered an area of 1135.5 ha, as per Figure 7.3.

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[3] https://www.nature.scot/professional-advice/planning-and-development/advice-planners-and-developers/soils/carbon-and-peatland-2016-map
[4] https://www.nature.scot/professional-advice/planning-and-development/general-advice-planners-and-developers/planning-and-development-soils/carbon-and-peatland-2016-map

3 METHODOLOGY

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 study 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 necessarily 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 (study area) vegetation patterns (Rodwell, 2006).

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 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 study 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 Purvis *et al.* (1992) for lichens.

4   SURVEY DETAILS & LIMITATIONS

Surveys were undertaken from 9th to 13th September 2019 and 24th July 2020, and were therefore carried out during the optimal season for habitat surveys.

All parts of the site were accessible, however, some parts of the study area, i.e. those forming part of the 250m buffer around the site were inaccessible due to access permissions and could not be surveyed in detail, these were surveyed from a suitable vantage point where possible and were for the most part recorded to Phase 1 level only. The majority of these areas were recorded as improved grassland (B4), continuous bracken (C1.1) and marsh/marshy grassland (B5). These habitats would most likely have closely identified with the NVC communities MG6 *Lolium perenne-Cynosurus cristatus* grassland, U20 *Pteridium aquilinum-Galium saxatile* community, M23 *Juncus effusus/acutiflorus-Galium palustre* rush pasture, and MG10 *Holcus lanatus-Juncus effuses* rush-pasture. To a much lesser extent semi-natural broadleaved woodland (A1.1.1), unimproved acid grassland (B1.1), unimproved neutral grassland (B2.1), and species-poor hedges (J2.1.2) were also recorded. Any areas that could not be identified reliably were mapped as No Surveyor Access (NSA) as per Figure 7.3. These constraints, however, are not considered to affect the validity of the overall survey results (as they are situated outwith site and more than 250 m from any proposed infrastructure), 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 1980s 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. 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 support the Proposed Development 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 have been reviewed and are considered to be sufficient to undertake the assessment.

5 RESULTS

5.1 Summary of Habitat Types & NVC Communities

Twenty NVC communities and eleven non-NVC communities were recorded within the study area, and these corresponded to 19 Phase 1 habitat types. These communities and habitat types, and their respective site-specific correlations are summarised below in Table 5-1.

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	W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemoreum* woodland W11 *Quercus petraea – Betula pubescens – Oxalis acetosella* woodland
A1.1.2 Broadleaved Plantation Woodland	YBP Young Broadleaved Plantation (non-NVC type)
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	MP Mixed Plantation (non-NVC type)
A4.2 Recently-Felled Coniferous Woodland	CF Clear-Felled Woodland (non-NVC type)
B1.1/B1.2 Unimproved & Semi-Improved Acid Grassland	U2 *Deschampsia flexuosa* grassland U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland
B2.1 Unimproved Neutral Grassland	MG9 *Holcus lanatus – Deschampsia cespitosa* grassland
B4 Improved Grassland	MG6 *Lolium perenne – Cynosurus cristatus* grassland
B5 Marsh/Marshy Grassland	MG10 *Holcus lanatus – Juncus effusus* rush-pasture M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture M25b *Molinia caerulea – Potentilla erecta* mire *Anthoxanthum odoratum* sub-community Je *Juncus effusus* acid grassland community (non-NVC type) Ja *Juncus acutiflorus* acid grassland community (non-NVC type)
C1.1 Bracken – Continuous	U20 *Pteridium aquilinum – Galium saxatile* community
D1.1 Dry Dwarf Shrub Heath - Acid	H9 *Calluna vulgaris – Deschampsia flexuosa* heath H12 *Calluna vulgaris – Vaccinium myrtillus* heath H21 *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heath
D2 Wet Dwarf Shrub Heath	M15 *Scirpus cespitosus – Erica tetralix* heath
D5 Dry Heath/Acid Grassland Mosaic	Mosaics of D1.1 and B1 communities
E1.6.1 Blanket Bog	M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire M18 *Erica tetralix – Sphagnum papillosum* blanket mire

Phase 1 Habitats	NVC Communities & Other Non-NVC Habitats/Features Recorded
	M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire
E1.7 Wet Modified Bog	M2 *Sphagnum cuspidatum/fallax* bog pool community
	M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire
	M20 *Eriophorum vaginatum* blanket mire
	M25a *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community
	Sph. Carpets of Sphagna in forest rides (non-NVC type)
	Pcom. *Polytrichum commune* dominated sward (non-NVC type)
E2.1 Acid/Neutral Flush/Spring	M6 *Carex echinata - Sphagnum fallax/denticulatum* mire
J2.1.2 Species Poor Intact Hedge	N/A
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 study area. Habitats are described in the order they appear within the Phase 1 classification. The survey results are displayed in Figure 7.3 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 7.3 and detailed within Annex A, target note photographs are included within Annex B. Further photographs of a number of the typical habitat types found within the study area are provided within Annex C.

5.2   Woodland & Scrub

5.2.1   A1.1.1 Broadleaved Semi-Natural Woodland

Broadleaved semi-natural woodland appears within a number of isolated areas within the study area and overall forms a very small proportion of the study area. The canopy is often composed of well established, mature, semi-natural tree species.

This habitat varies in nature being comprised of the woodland communities W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* and W11 *Quercus petrea – Betula pubescens – Oxalis acetosella* woodland.

The W7 community features within the study area, as homogenous stands, around the south-east boundary of the site, east of Nutberry Hill. The majority of the stands were recorded as the W7c *Deschampsia cespitosa* sub-community (see Annex C, Photo C-6). The canopy includes a variety of species with the most common being *Sorbus aucuparia*, *Salix* sp., *Alnus glutinosa,* and *Betula* sp. with a field layer dominated by *Deschampsia cespitosa, Agrostis* sp., *Holcus lanatus* with *Juncus effusus* becoming more abundant within the wetter areas. Within the more established areas species such as *Oxalis acetosella* and the moss *Thuidium tamariscinum* become more abundant.

The W11 community features a single stand along the northern boundary of the site with a mature canopy of *Betula* sp. with a field layer dominated by *Pteridium aquilinum*.

5.2.2 A1.1.2 Broadleaved Plantation Woodland

Broadleaved plantation woodland was recorded south of Standingstone Hill within the central part of the study area. This was composed of a young broadleaved plantation with saplings of *Salix* sp., *Betula* sp., *Alnus glutinosa* and *Sorbus aucuparia*. This habitat is a non-NVC community (YBP) and is therefore not represented within the NVC.

5.2.3 A1.2.2 Coniferous Plantation Woodland

Coniferous plantation woodland was the most dominant habitat, extending across much of the site and study area, and forms homogenous stands of planted *Picea sitchensis*. In certain areas the coniferous plantation woodland has been recently planted and is at a much earlier stage of growth, being identified as young conifer plantation (see Annex C, Photo C-1). These habitats are non-NVC communities (CP & YCP) and are therefore not represented within the NVC.

5.2.4 A1.3.2 Mixed Plantation Woodland

A small area of mixed plantation woodland, comprising of a mix of Scots pine *Pinus sylvestris*, beech *Fagus sylvatica* and alder is located beside Blackhill farm, outside of the site boundary. The habitat is a non-NVC community (MP), with an open ground layer of marshy grassland (section 5.3.4).

5.2.5 A4.2 Recently Felled Coniferous Woodland

Recently felled coniferous woodland was recorded to the north-west of Nutberry Hill within the study area. This area of clear-fell, due to the short time since felling, contains little other than stumps, brash, and disturbed ground. This habitat is a non-NVC community (CF) and is therefore not represented within the NVC.

5.3 Grasslands & Marsh

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

Unimproved (B1.1) and Semi-improved (B1.2) acid grassland within the site and study area is made up of the U2 *Deschampsia flexuosa* grassland community and the U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland community. These communities form small areas of grassland, often being found within open areas or clearings surrounded by conifer plantation woodland. Overall, the unimproved grassland is much more dominant than semi-improved grassland areas, this being likely as a result of the site and study area being mostly managed for forestry rather than grazed agricultural land.

U2 is uncommon and was recorded in a single very small stand; recorded as the U2a *Festuca ovina – Agrostis capillaris* sub-community. This area of U2a is largely dominated by *Deschampsia flexuosa,* and the occasional associates, *Agrostis capillaris, Calluna vulgaris* and *Galium saxatile*. The most abundant bryophytes present were *Hylocomium splendens* and *Rhytidiadelphus squarrosus*.

Overall, U4 is the dominant grassland present, and the stands of U4 tend to have variable amounts of the grasses *Agrostis capillaris, Holcus lanatus,* occasional *Molinia caerulea, Deschampsia flexuosa* and *Anthoxanthum odoratum,* and the mosses *Rhytidiadelphus squarrosus, R. loreus, Hylocomium*

splendens and *Pleurozium schreberi*. Other species common to U4 within the study area includes *Galium saxatile*, *Potentilla erecta*, *Rumex acetosa*, *Achillea millefolium*, *Juncus squarrosus* and *Blechnum spicant*. Several areas were mapped as the U4a *Typical* sub-community, and U4d *Luzula multiflora - Rhytidiadelphus loreus* sub-community (see Annex C, Photo C-2) featuring on damper ground with coarser looking swards with *Deschampsia cespitosa*. The more semi-improved grassland areas were recorded as the U4b *Holcus lanatus – Trifolium repens* sub-community where grazing levels are higher and more visible. In some areas the U4 community forms mosaics with other mire and grassland communities.

5.3.2   B2.1 Unimproved Neutral Grassland

Unimproved neutral grassland is represented within the main part of the site by the damp mesotrophic community MG9 *Holcus lanatus – Deschampsia cespitosa* grassland.

The MG9 community appears within mosaics with other mire, heath and grassland communities within the study area. The grass species *Deschampsia cespitosa* is dominant with other associates such as *Juncus effusus* and *Holcus lanatus* abundant. Further species diversity was often limited to *Rumex acetosa*, *Galium palustre*, and *Cirsium palustre*. Moss cover included *Calliergonella cuspidata* and *Rhytidiadelphus squarrosus*. These areas were found to be generally species poor. A number of the stands were found to relate to the MG9a *Poa trivialis* sub-community.

5.3.3   B4 Improved Grassland

Improved grassland is limited within the study area to two areas outwith the site, within the very north, west of Birkenhead, and was recorded as the MG6 *Lolium perenne – Cynosurus cristatus* grassland community. This is an area subjected to improvement from fertiliser application, drainage and higher grazing levels. Species diversity is often limited with the main dominants often being *Lolium perenne*, *Cynosurus cristatus*, *Trifolium repens* with scattered tufts of *Juncus effusus.* The moss *Rhytidiadelphus squarrosus* can dominate in small patches.

5.3.4   B5 Marsh/Marshy Grassland

Marsh/marshy grassland within the study area is predominately made up of M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture and MG10 *Holcus lanatus – Juncus effusus* grassland, with some smaller areas of the M25b *Molinia caerulea – Potentilla erecta* mire *Anthoxanthum odoratum* sub-community, together with the non-NVC communities *Juncus acutiflorus* (Ja) and *Juncus effusus* (Je).

These communities can be found scattered across the study area, the largest of which was found to the north east at Todaw. This habitat was often closely connected with areas of damp ground, particularly riparian areas along the main watercourses and associated tributaries.

The M23 NVC community is often species poor and often recorded in mosaics with other grassland and mire communities. The floristic components were often dominated by *Juncus effusus* with a low diversity of grass species which included *Holcus lanatus*, *Festuca rubra* and occasional *Molinia caerulea*. Other associates included *Galium palustre*, *Rumex acetosa* and *Ranunculus repens*. Mosses were dominated by *Rhytidiadelphus squarrosus* and *Calliergonella cuspidata.* The majority of the stands were found to relate to the M23b *Juncus effusus* sub-community (see Annex C, Photo C-3) although a small amount of the M23a *Juncus acutiflorus* sub-community was also recorded.

The M25 NVC community appears once as a homogenous stand, classified as Marsh/marshy grassland where the M25b *Anthoxanthum odoratum* sub-community was recorded. It often relates to areas that are dominated more by grassland species within this community. The M25b was dominated by *Molinia caerulea* in a sometimes tussocky sward. In some places where the *Molinia* was not purely dominant, species included variable abundances of *Potentilla erecta, Galium saxatile, Anthoxanthum odoratum, Holcus lanatus, Rumex acetosa, Agrostis capillaris, Juncus effusus,* and the mosses *Polytrichum commune* and *Pleurozium schreberi*.

The MG10 community was most often recorded as the MG10a Typical sub-community. As would be expected, this community appears within areas of damper ground. The community is dominated by a scattered, dense, tussocky, species-poor sward of *Juncus effusus.* Growing through the tussocks there is usually and typically variable amounts of *Holcus lanatus, Agrostis* spp.*, Ranunculus repens, Rumex acetosa, Trifolium repens, Cirsium palustre* and *Cirsium arvense.* The moss *Rhytidiadelphus squarrosus* dominated the basal layer at times.

The 'Je' and 'Ja' acid grassland non-NVC communities are present within the study area here as patches of a *Juncus* spp. dominated calcifuge grassland, where they most commonly form mosaics with other grassland and mire communities. This is vegetation in which very dominant and tall tussocks of *Juncus effusus* or swards of *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, Deschampsia cespitosa, Molinia caerulea* and *Ranunculus repens*. The most common mosses are *Polytrichum commune, Pseudoscleropodium purum,* and *Rhytidiadelphus squarrosus.*

The Je community is by far the more prevalent of the two non-NVC communities and can often be found as an early and dominant coloniser of the damp disturbed ground. Both the Ja and Je vegetation types do not fit into any NVC community as they lack the wetland element and key indicators of M6 and M23 *Juncus* spp. mires and often have 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/C1.2 Bracken: Continuous & Scattered

Continuous and scattered bracken is made up of the U20 *Pteridium aquilinum – Galium saxatile* community. This community was found to be concentrated along the Birkenhead Burn in the north and within the open areas around Eaglinside to the east of the study area. This community often appears within mosaics with other grassland, mire and heath communities.

Within the continuous areas of bracken, *Pteridium aquilinum* dominates entirely with few other species being present. Within the more scattered areas of bracken, *P. aquilinum* is accompanied by a grassland species assemblage reflecting close affinities to the U4 grassland described above. Several of the stands were found to relate to the U20a *Anthoxanthum odoratum* sub-community.

5.5   Heathland

5.5.1   D1.1 Dry Dwarf Shrub Heath – Acid

Acid dry dwarf shrub heath appears infrequently within the study area. The majority is of H12 *Calluna vulgaris – Vaccinium myrtillus* heath, although there are also some very small patches of H9 *Calluna vulgaris – Deschampsia flexuosa* heath and H21 *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heath. These heaths can appear as both homogenous stands or within mosaics with other grassland and mire communities across the study area.

The H9 community was often recorded as species poor with dense areas of *Calluna vulgaris* with a few open patches allowing some diversity with *Galium saxatile*, *Blechnum spicant* and the mosses *Pleurozium schreberi* and *Hylocomium splendens*. A single stand was found to relate to the H9c *Species-poor* sub-community.

The H12 community species assemblage is heavily dominated by *Calluna vulgaris*, and contained a low density of *Vaccinium myrtillus,* and generally lacking in species diversity. Other species found in the sward included occasional *Eriophorum angustifolium, Deschampsia flexuosa, Empetrum nigrum, Juncus squarrosus, Potentilla erecta, Galium saxatile* and the mosses *Pleurozium schreberi* and *Hylocomium splendens*. This community is present as the H12a *Typical* sub-community.

The H21 community appears once within a mosaic dominated by the H12 community. As expected, the community is dominated by *Calluna vulgaris* with *Vaccinium myrtillus* and carpets of *Sphagnum capillifolium* moss. Within the more open areas of *Calluna, Pteridium aquilinum* was found to be scattered throughout. The community was recorded as the H21a *Calluna vulgaris – Pteridium aquilinum* sub-community.

5.5.2   D5 Dry Heath/Acid Grassland Mosaic

Dry heath/Acid grassland mosaic appears within the south-east of the study area where there is a mixture of dry heath and acid grassland. These areas are dominated by the U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland community, H9 *Calluna vulgaris – Deschampsia flexuosa* heath, and H12 *Calluna vulgaris – Vaccinium myrtillus* heath.

The floristic assemblage of the U4 grassland community resembles that detailed in Section 5.3.1 above and the H9 and H12 heath communities closely resemble these communities referred to in Section 5.5.1 above.

5.5.3   Wet Heath

Some small areas of M15 *Scirpus cespitosus – Erica tetralix* wet heath were recoded across shallow slopes in the Black Hill area to the southeast of the site, blending to areas of wet modified M20 *Eriophorum vaginatum* blanket mire on the hilltop, and M25 *Molinia caerulea – Potentilla erecta* mire (see section 5.6.2).   The M15 habitat has a mosaic mix of *Molinia caerulea* and *Trichophorum cespitosum* with *Erica tetralix, Eriophorum angustifolium, Vaccinium myrtillus* and pleurocarpous mosses.

5.6   Mire

5.6.1   E1.6.1 Blanket Bog

Blanket bog is represented in the study area by M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire, M18 *Erica tetralix – Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire and is mostly concentrated around Nutberry Hill and north of Standingstone Hill within the study area. These communities classified as blanket bog, rather than wet modified bog (Section 5.6.2) often represent areas of relatively undamaged and better quality blanket bog where *Sphagnum* moss is often abundant. M19 is the most common community, however there is also a substantial area of M18; M17 is very scarce.

M17 appears in a single small area on the high ground to the west of the study area, north-east of Priesthill Height. 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, where species present included *Erica tetralix, Eriophorum angustifolium, Vaccinium myrtillus, Molinia caerulea, Empetrum nigrum, Deschampsia flexuosa* and *Galium saxatile*. The basal layer includes *Dicranum scoparium, Hypnum* sp., and *Rhytidiadelphus loreus*. There were also extensive carpets of *Sphagnum* moss including *Sphagnum capillifolium, S. palustre, S. papillosum* and *S. compactum.*

M18 occurs as a large patch in the northern study area, recorded as the M18a *Sphagnum magellanicum – Andromeda polifolia* sub-community (see Annex A, TN1) in a mosaic with M19 mire. This particular area is subject to the encroachment from self-seeding conifer trees from the surrounding conifer plantation. This sward contains *Calluna vulgaris, Eriophorum vaginatum, Erica tetralix, Vaccinium myrtillus*, occasional *Trichophorum germanicum, Molinia caerulea,* and *Empetrum nigrum* along with an abundance of *Vaccinium oxycoccus* and *Drosera rotundifolia*. Carpets of *Sphagnum* moss dominated much of the basal layer with *Sphagnum papillosum, S. magellanicum, S. capillifolium* and *S. fallax*.

M19 is the most common bog community present, often dominating many of the larger open areas within the study area, particularly across Nutberry Hill (see Annex A, TN4). It commonly appears in the form of M19b *Empetrum nigrum* sub-community in homogenous stands. These areas are characterised by the co-dominance of *Calluna vulgaris* and *Eriophorum vaginatum* with often an equal abundance of *Vaccinium myrtillus* and *Empetrum nigrum*. Where the *Calluna* is less dominant *Deschampsia flexuosa, Eriophorum angustifolium* and *Molinia caerulea* become more established with occasional patches of *Juncus squarrosus*. Within the richer swards *Rubus chamaemorus* becomes more prevalent along with *Drosera rotundifolia* and patches of *Narthecium ossifragum. Sphagnum* moss is abundant in many places with *Sphagnum papillosum, S. capillifolium, S. palustre,* and *S. compactum*. Within the drier patches of this community the levels of *Sphagna* diminish with the increase in other mosses such as *Pleurozium schreberi, Rhytidiadelphus loreus, Hylocomium splendens, Dicranum scoparium,* and *Polytrichum commune.*

5.6.2   E1.7 Wet Modified Bog

Wet modified bog encompasses the M2 *Sphagnum cuspidatum/fallax* bog pool community, M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire, M20 *Eriophorum vaginatum* blanket mire and M25 *Molinia caerulea – Potentilla erecta* mire (mainly M25a) NVC communities together with the

non-NVC communities Pcom. and Sph. Associated species within stands of wet modified bog largely mirror the species assemblages described for blanket bog above, but generally with less *Sphagna*. The separation of habitats generally being made on evidence of habitat alteration or modification through time, here predominately through and the negative effects of commercial coniferous woodland planting with associated drainage, disturbance, drying out and shading of vegetation and habitats. As a result, this habitat was recorded across the study area, most often within the forest rides or areas in close proximity to plantation woodland.

The M2 bog pool community appears as single example within an area of M19 blanket mire. It is generally species poor and consists of an extensive carpet of *Sphagnum fallax.*

M19 blanket mire in this case and recorded as wet modified bog is not as rich in its vegetative composition with some areas becoming much drier with the *Sphagnum* mosses becoming a lot more sporadic and giving way to more dominant pleurocarpous and acrocarpous mosses. This community was often identified within homogenous stands although at times would form mosaics with other grassland and mire communities, and often in the form of the M19a *Erica tetralix* sub-community (see Annex C, Photo C-4). The general character of the community remains very similar with *Calluna vulgaris* and *Eriophorum vaginatum* dominating throughout with a similar assemblage of species referred to within the blanket bog habitat (see Section 5.6.1 above) although the frequency and variety of species is notably less. The level of *Sphagnum* moss diminishes with isolated patches of *Sphagnum fallax, S. capillifolium* and *S. palustre*. Within the drier patches of this community the bryophytes *Pleurozium schreberi, Rhytidiadelphus loreus, Hylocomium splendens, Dicranum scoparium,* and *Polytrichum commune* have a much greater coverage.

M20 blanket mire was found most often over the higher ground within the study area, often as pure stands of vegetation, identified by the dominant tussocks of *Eriophorum vaginatum* and often found in close association with the M19 community, both as homogenous stands (see Annex C, Photo C-5) and within mosaics. Other species were noted in small amounts, namely, *Vaccinium myrtillus, Calluna vulgaris, Potentilla erecta, Galium saxatile* and occasional *Molinia caerulea*. The mosses *Sphangum fallax* and *Polytrichum commune* also formed strong components of this community, otherwise the overall assemblage was species poor. The M20a *Species-poor* sub-community was most commonly found although in one instance the M20b *Calluna vulgaris-Cladonia* sub-community was recorded.

The M25 mire areas were often identified due to *Molinia* dominating the sward within the study area. This community appears mainly as the M25a *Erica tetralix* sub-community, and also within mosaics with other mire, heath and grassland communities, although a small area of the M25b *Anthoxanthum odoratum* sub-community was found in the southeast around Black Hill. The majority of the species found within this assemblage along with *Molinia caerulea* were species poor with *Calluna vulgaris, Juncus squarrosus, Vaccinium myrtillus, Deschampsia flexuosa, Holcus lanatus,* and very occasional *Trichophorum germanicum*. Within the wetter areas of this community, the rush *Juncus effusus* became more abundant along with dense patches of *Sphagnum* moss, particularly *Sphagnum capillifolium* along with other mosses such as *Polytrichum commune* and *Hylocomium splendens.*

Two non-NVC communities Sph. and Pcom. were also recorded as wet modified bog habitat within several narrow and heavily shaded forest rides. The abbreviation Sph. denotes several areas where there was a pure carpet of *Sphagnum* moss dominated by *Sphagnum fallax* and *S. capillifolium* with no vascular species present. The abbreviation Pcom. denotes an area that was completely dominated by the moss *Polytrichum commune* with no other species present.

5.6.3   E2.1 Acid/Neutral Flush/Spring

Acid/neutral flushes within the study area are represented by the M6 *Carex echinata - Sphagnum fallax/denticulatum* mire NVC community. This community was often found within areas where there are small flushes, runnels or soakways, and along and within occluding ditches and around minor watercourses or as small components of modified bog. In a number of locations, the community appears in a mosaic with other mire and grassland NVC communities.

The vast majority of M6 areas are of the species poor M6c *Juncus effusus* sub-community with occasional stands of the very similar M6d *Juncus acutiflorus* sub-community and, in one instance, the M6b *Carex nigra-Nardus stricta* sub-community where *Carex nigra* becomes much more pronounced. A tall sward of *Juncus effusus* over a species-poor lawn of *Sphagnum fallax, S. palustre, S. capillifolium* and *Polytrichum commune* most often identified the M6c sub-community; *Juncus 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 *Molinia caerulea, Deschampsia flexuosa, Anthoxanthum odoratum, Rumex acetosa* and *Cirsium palustre.*

5.7   Miscellaneous

5.7.1   J3.6 Buildings

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

5.7.2   J4 Bare Ground

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

5.7.3   NSA No Surveyor Access

No surveyor access refers to areas within the study area where access was not permitted or could not be surveyed.

5.8   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 study area.

5.9   Notable Species

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

6 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) (SEPA 2017a; 2017b);

- Habitats Directive (92/43/EEC)[5] Annex I habitats; and

- Scottish Biodiversity List (SBL)[6] priority habitats.

6.2 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2017a & 2017b). Wetlands or habitats containing these particular NVC communities are to be considered GWDTE unless further information can be provided to demonstrate this is not the case. Many of the NVC communities on the list are very common habitat types across Scotland, 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 11: Hydrology, Hydrogeology & Geology of the EIA Report).

Using SEPA's guidance, Table 6-1 shows which communities recorded within the study area may be considered GWDTE. Those communities which may have limited (moderate) dependency on groundwater in certain settings are marked in yellow and NVC communities recorded that are likely to be considered high, or sensitive GWDTE in certain hydrogeological settings are highlighted in red.

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

NVC Code	NVC Community Name
M15	*Scirpus cespitosus - Erica tetralix wet heath*
M25	*Molinia caerulea – Potentilla erecta* mire
MG9	*Holcus lanatus – Deschampsia cespitosa* grassland
MG10	*Holcus lanatus – Juncus effusus* rush pasture

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[5] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

[6] https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

NVC Code	NVC Community Name
Je & Ja[7]	*Juncus effusus* and *Juncus acutiflorus* acid grasslands
W7	*Alnus glutinosa – Fraxinus excelsior – Lysimachia nemoreum* woodland
M6	*Carex echinata – Sphagnum fallax/denticulatum* mire
M23	*Juncus effusus/acutiflorus – Galium palustre* rush pasture

The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see Figure 7.4.

Within Figure 7.4 the potential GWDTE sensitivity of each polygon containing a potential GWDTE is classified on a four-tier approach as follows:

- 'Highly – dominant' where potential high GWDTE(s) dominate the polygon

- 'Highly - sub-dominant' where potential high GWDTE(s) make up a sub-dominant percentage cover of the polygon

- 'Moderately – dominant' where potential moderate GWDTE(s) dominate the polygon and no potential high GWDTEs are present

- 'Moderately - sub-dominant' where potential moderate GWDTE(s) make up a sub-dominant percentage cover of the polygon and no potential high GWDTEs are present.

Where a potential high GWDTE exists in a polygon it outranks any potential moderate GWDTE communities within that same polygon.

GWDTE sensitivity has been assigned solely on the SEPA listings (SEPA, 2017a & 2017b). 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 11: Hydrology, Hydrogeology & Geology of the EIA Report).

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.

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

Using Joint Nature Conservation Committee (JNCC) Annex I habitat listings and descriptions[8], which have then been compared with survey results and field observations, the following NVC communities within the study area which constitute 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
91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemoreum* woodland
4010 Northern Atlantic wet heaths *with Erica tetralix*	M15 *Scirpus cespitosus - Erica tetralix wet heath*
4030 European dry heaths	H9 *Calluna vulgaris – Deschampsia flexuosa* heath H12 *Calluna vulgaris – Vaccinium myrtillus* heath H21 *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heath
7130 Blanket bog	M2 *Sphagnum cuspidatum/fallax* bog pool community M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire M18 *Erica tetralix – Sphagnum papillosum* blanket mire M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire M20 *Eriophorum vaginatum* blanket mire M25 *Molinia caerulea – Potentilla erecta* 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, M25 and the bog pool communities M1- M3 where these form part of a larger blanket mire.

Annex I type 7130 Blanket bog therefore correlates directly with a number of NVC communities within the study area such as the M2, M17, M18, M19, M20 and M25 mires.

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. As described in Section 5.6.2 above, M25 within the study area was for the most part

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[8] http://jncc.defra.gov.uk/page-1523

species poor and at the drier end of the scale, however there were some areas where *Sphagnum* moss was abundant, particularly where the M25a *Erica tetralix* sub-community was recorded. Therefore, these areas have also been classified as potential Annex I blanket bog, to represent a worst-case scenario.

6.3.3   4030 European dry heaths

European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf shrubs dominate the vegetation. The most common dwarf shrub is *Calluna vulgaris*.

The dry heath communities recorded – H9, H12, and H21 – 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 study area are lower altitudinal examples so they all potentially fall under the 4030 European dry heaths Annex I type.

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

6.3.4   4010 Northern Atlantic wet heaths

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 of *Erica tetralix*, *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses.

Wet heath category M15 falls within this description, although the extent of this is limited to a small area around Black Hill, forming mosaics with wet modified bog.

6.3.5   91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

This Annex I type comprises woods dominated by *Alnus glutinosa* and *Salix* spp. on floodplains in a range of situations from islands in river channels to low-lying wetlands alongside the channels. The habitat typically occurs on moderately base-rich, eutrophic soils subject to periodic inundation. Many such woods are dynamic, being part of a successional series of habitats. Their structure and function are best maintained within a larger unit that includes the open communities, mainly fen and swamp, of earlier successional stages. On the drier margins of these areas other tree species such as *Fraxinus excelsior* and *Ulmus* spp., may become abundant. In other situations, the *Alnus glutinosa* woods occur as a stable component within transitions to surrounding dry-ground forest.The ground flora is correspondingly varied. Some stands are dominated by tall herbs, reeds and sedges, with species such as *Urtica dioica*, *Phragmites australis*, *Carex paniculata* and *Filipendula ulmaria*. Other stands have lower-growing communities with *Ranunculus repens*, *Galium palustre*, *Chrysosplenium oppositifolium* and *Caltha palustris*.

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

There are a number of areas of W7 woodland present within the study area along the banks of the upper River Nethan, although all stands are relatively small and often isolated and fragmented.

However, these small stands of W7 along the River Nethan may be considered small fragmented patches of this Annex I habitat type.

6.4 Scottish Biodiversity List Priority Habitats

The SBL is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was published in 2005 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004.

The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland: these are termed 'priority habitats'. Some of these priority habitats are quite broad and can correlate to many NVC types.

The relevant SBL priority habitat types (full descriptions of which can be found on the NatureScot (formerly SNH) website[9]), and associated NVC types recorded within the study area are as follows:

- Wet woodland: W7;

- Blanket bog: M2, M15, M17, M18, M19, M20 and M25 where peat depth is greater than 0.5 m;

- Upland flushes, fens and swamps: M6 and M23a; and

- Upland heathland: H9, H12 and H21.

These SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats[10].

6.5 Sensitivity Summary

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

Table 6-3 Summary of study area communities and sensitivities

NVC/Non-NVC Codes Recorded	Potential GWDTE Status	Annex I Habitat	SBL Priority Habitat Type
Mires			
M2	-	7130 Blanket bogs	Blanket bog
M6b, M6c, M6d	High	-	Upland flushes, fens and swamps
M15	Moderate	4010 North Atlantic wet heaths	Upland heathland
M17	-	7130 Blanket bogs	Blanket bog
M18a	-	7130 Blanket bogs	Blanket bog
M19, M19a, M19b	-	7130 Blanket bogs	Blanket bog
M20, M20a, M20b	-	7130 Blanket bogs	Blanket bog

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[9] https://www.nature.scot/scotlands-biodiversity/habitat-definitions
[10] http://jncc.defra.gov.uk/page-5718

NVC/Non-NVC Codes Recorded	Potential GWDTE Status	Annex I Habitat	SBL Priority Habitat Type
M23a, M23b	High	-	Upland flushes, fens and swamps (applies to **M23a** only)
M25a, M25b	Moderate	7130 Blanket bogs (where peat depth > 0.5 m)	Blanket bogs (where peat depth > 0.5 m)
Dry Heaths			
H9, H9c	-	4030 European dry heaths	Upland heathland
H12, H12a	-	4030 European dry heaths	Upland heathland
H21a	-	4030 European dry heaths	Upland heathland
Calcifugous Grasslands & Bracken			
U2a	-	-	-
U4, U4a, U4b, U4d	-	-	-
U20, U20a	-	-	-
Mesotrophic Grasslands			
MG6	-	-	-
MG9, MG9a	Moderate	-	-
MG10, MG10a	Moderate	-	-
Woodland & Scrub			
W7, W7c	High	91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Wet woodland
W11	-	-	-
Non-NVC Types			
BD	-	-	-
BG	-	-	-
CF	-	-	-
CP	-	-	-
Ja	Moderate	-	-
Je	Moderate	-	-
MP	-	-	-
Pcom.	-	-	-
Sph.	-	-	-
YBP	-	-	-
YCP	-	-	-

7 SUMMARY

MacArthur Green carried out NVC and habitat surveys within the study area from 9th to 13th September 2019 inclusive, and July 2020, in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 19 NVC communities were recorded within the respective study area along with various associated sub-communities; a number of non-NVC habitat types are also present, in particular coniferous plantation woodland which is extensive and dominates the site.

Outside the coniferous plantation areas the study area is mainly open upland habitats, the most common and widespread communities making up the bulk of the unplanted landscape is blanket bog dominated by the M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire NVC community, and to a lesser extent, the M18 *Erica tetralix – Sphagnum papillosum* blanket mire NVC community. Integrated in and around the areas of coniferous plantation and blanket bog there are other habitat types such as acid grassland, marshy grassland, wet modified bog and dry heath.

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

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

8   REFERENCES

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ANNEX A. NVC TARGET NOTES

A number of target notes were also made during surveys, often to pinpoint springs/flushes, or an area or species of interest, these target notes are shown on Figure 7.3 and detailed within Table A.1 below. A representative sample of corresponding target note photographs is provided in Annex B.

Table A-1 Study Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
1	276236	636095	M18a	Area of active peatland with evidence of conifer encroachment. Contains *Calluna vulgaris, Eriophorum vaginatum, Erica tetralix, Empetrum nigrum, Vaccinium myrtillus*, abundant *Vaccinium oxycoccus, Drosera* rotundifolia, occasional *Trichophorum germanicum*, occasional *Molinia caerulea, Sphagnum capillifolium, S. fallax, S. papillosum, S. magellanicum, Hypnum* sp., and lichen *Cladonia* sp.	B-1
2	273839	633259	M20	Example of recolonised drainage channel with *Eriophorum vaginatum, Sphagnum fallax, S. capillifolium* and *Polytrichum commune*.	
3	273901	633430	M19a	Dense hummocks of *Calluna vulgaris* with *Eriophorum vaginatum*. Areas of *Drosera rotundifolia, Sphagnum papillosum* and *S. capillifolium*. Low grazing levels and some signs of historic drainage channels.	
4	274365	633973	M19b	*Calluna vulgaris, Vaccinium myrtillus, Eriophorum vaginatum, Empetrum nigrum, Deschampsia flexuosa, Rumex chamaemorus, Sphagnum capillifolium, S. compactum, Pleurozium schreberi* and *Rhytidiadelphus loreus*.	B-2

ANNEX B.   TARGET NOTE PHOTOGRAPHS

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

Photo B-1 Target Note 1: M18a *Erica tetralix – Sphagnum papillosum* blanket mire - *Sphagnum magellanicum – Andromeda polifolia* sub-community

Photo B-2 Target Note 4: M19b *Calluna vulgaris – Eriophorum vaginatum* blanket mire – *Empetrum nigrum* sub-community

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 study area.

Photo C-1: Young and mature conifer plantation typical of the site

Photo C-2: U4d *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland - *Luzula multiflora - Rhytidiadelphus loreus* sub-community

Photo C-3: M23b *Juncus effusus/acutiflorus – Galium palustre* rush-pasture - *Juncus effusus* sub-community in foreground

Photo C-4: M19b *Calluna vulgaris – Eriophorum vaginatum* blanket mire – *Empetrum nigrum* sub-community

Photo C-5: M20 *Eriophorum vaginatum* blanket mire outwith site but within study area

Photo C-6: W7c *Alnus glutinosa – Fraxinus excelsior– Lysimachia nemorum* woodland - *Deschampsia cespitosa* sub-community

Photo C-7: U4 grassland banks abutting forestry track within the site

Photo C-8: Non-NVC type 'Sph.' representing forestry ride dominated by *Sphagnum capillifolium* and *Sphagnum fallax*