# **TECHNICAL APPENDIX 8.2**

Clauchrie Windfarm

National Vegetation Classification



# ITPENERGISED Earth. Smart. Solutions

## ScottishPower Renewables

9th Floor Scottish Power Headquarters

320 St Vincent Street

Glasgow

G2 5AD

## ITPEnergised

7 Dundas Street

Edinburgh

EH3 6QG

Registration Number: SC450178

Tel: 0131 557 8325

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# **Executive Summary**

National Vegetation Classification surveys were carried out in July 2019 for a proposed wind farm development site and a wider study area. The surveys, which excluded commercial conifer plantation which dominates the Study Area, revealed the presence of a relatively restricted range of habitat types, culminating in 18 standard NVC communities and one non-standard community within the Study Area, along with a range of further sub communities. Of these, a relatively small number of communities account for most of the non-plantation Study Area.

The most common and widespread semi-natural communities within the Study Area are M23 Juncus effusus/acutiflorus-Galium palustre rush pasture, M6 Carex echinata-Sphagnum fallax/denticulatum mire and H18 Vaccinium myrtillus-Deschampsia flexuosa heath. The remainder of the study area is made up of a relatively small number of mire, grassland, bracken, woodland and heath communities. The vegetation is often comprised of complex mosaic of two or more communities.

The vegetation communities have been heavily influenced by anthropogenic actions, with the single largest factor being the widespread commercial conifer plantation and its associated drainage, drying and shading effects. However, some large and relatively homogenous stands of vegetation occur, notably on hillsides in the north of the Study Area and along watercourses.

Many of the communities are potentially groundwater dependent, but those associated with plantation rides are likely to be fed by forestry drains and as such are unlikely to be truly groundwater dependent. However, likely groundwater-dependent terrestrial ecosystems also occur within the Study Area, notably toward the base of open hillsides.

## 1 Introduction

#### Background 1.1

- ITPEnergised was commissioned by ScottishPower Renewables (SPR) to carry out a National Vegetation 1.1.1 Classification (NVC) survey at the proposed Clauchrie Windfarm, located approximately 6 km northwest of Barrhill, South Ayrshire (hereafter referred to as the 'proposed Development').
- The aim of the NVC survey was to identify and map the plant communities within the Site and wider study area in 1.1.2 order to identify vegetation of nature conservation interest or areas with potential groundwater dependency.
- 1.1.3 This report details the findings of the NVC survey together with an evaluation of the communities described.

### The Site and Study Area 1.2

- 1.2.1 The area within the application boundary (hereafter referred to as the "Site") is located in Glentrool Forest, east of the operational Mark Hill Windfarm. It comprises an access corridor connecting the Site to the A714 in the south, within the Dumfries and Galloway Council Area, and a proposed turbine development area in the north within the South Ayrshire Council area. Elevations within the application boundary range from c.150m in the far south to 565m at Craigenreoch in the far north of the site.
- The Site is dominated by Sitka spruce (Picea sitchensis) plantation, with coupes of varying ages, ranging from 1.2.2 recently felled and/or re-stocked areas to mature forestry. Open habitats occur along watercourses and on some hillslopes that represent a typical upland/upland fringe habitat assemblage for the region, although they are often heavily influenced by the wider forestry. The NVC survey focussed on mapping the habitats within the Site and a 100 m buffer (hereafter referred to as the 'Study Area' - see Figure TA\_8.2.1). Because turbines would not be proposed on or near the Site boundary, a minimum 250m buffer was effectively observed around any potential deep excavations, e.g. for turbine foundations of borrow pits.
- The Study Area does not overlap with any nature conservation designation for botanical or habitat-related 1.2.3 qualifying features.

## Methods 2

#### 2.1 Data Capture and Analysis

- The survey was carried out on 23-25 July 2019 by experienced surveyors. 2.1.1
- 2.1.2 The vegetation was mapped and classified using the standard methodology (Rodwell 1991 et seq.; Rodwell 2006). It involved mapping polygons of apparently homogenous vegetation by eye and then sampling the vegetation within polygons. This was done using both quantitative (quadrats) and qualitative sampling.
- 2.1.3 Sampling involved recording the species present, together with their abundances and noting other relevant information, such as any evidence of grazing, drainage or trampling. The data were subsequently compared with the standard NVC tables and classified accordingly. Stands were classified to sub-community level where possible, although in some cases the vegetation was mapped to community level only, because vegetation patches were too small, species-poor, and/or exhibited characteristics of two or more sub-communities. Polygons with numerous small-scale changes in community type or transition zones between sub-communities, e.g. in response to underlying hydrological variation, soils or disturbance, were mapped as mosaics with an approximate percentage cover of each constituent NVC community or sub-community.
- 2.1.4 Botanical nomenclature in this report follows that of Stace (2010) for vascular plants and Atherton et al. (2010) for bryophytes.

### 2.2 Survey Limitations

- 2.2.1 The NVC surveys were carried out during the optimal season for NVC surveys and in favourable conditions for survey. Some small sections of the Study Area were not accessible owing to forestry operations or because of breeding raptor presence. However, these constraints affected less than 5% of the Survey Area and are not considered to significantly affect the validity of the survey results, or the conclusions in this report.
- 2.2.2 It should be noted that the NVC system does not cover all the semi-natural vegetation types found in Scotland. Since publication of the NVC classification in the 1990s, additional data capture has led to the identification of additional plant communities, some of which are described in Rodwell et al. (2000) and Averis et al. (2004). Where such communities are found and recorded, they are given a non-NVC community code and are described.

# Results

3

#### 3.1 Overview

- 3.1.1 The survey results are displayed in Figure TA\_8.2.2. The figure also shows the locations of Target Notes (TNs), which have been produced to illustrate particular stands of vegetation; TNs and any accompanying plates are provided in Annex TA 8.2.A. A list of plant species is provided in Annex TA 8.2.B, where the reader will also find the scientific names of species mentioned below.
- 3.1.2 With the exception of commercial conifer plantation, categories of vegetation within the study area include the following 19 plant communities:
  - Standing water: A9;
  - Mires and flushes: M2, M6, M17, M19, M20, M23, M25;
  - Wet heaths: M15, M16;
  - Dry heaths: H18;
  - Grasslands and Montane Communities: U2, U5, U16, U20, MG10, non-standard NVC community Festuca rubra-Holcus lanatus-Anthoxanthum odoratum grassland; and

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- Woodland and scrub: W2, W4.
- 3.1.3 Areas of conifer plantation do not align with NVC communities. They have been described in broad Phase 1 habitat survey terms in ITPEnergised (2019).
- 3.1.4 The following sections describe the flora, structure and habitat of these communities within the Study Area. The NVC communities within each broad habitat type (e.g. woodland) are described in order of community number within the study area.

#### 3.2 Standing Water

A9 Potamogeton natans community

- 3.2.1 Sub-communities recorded: No clear alignment with described sub-communities.
- 3.2.2 Waterbodies with A9 vegetation are uncommon in the Study Area but were recorded in three places within the potential turbine area, including Loch Scalloch and ponds within disused quarries (see TN2). The vegetation is poor and limited to broad-leaved pondweed (Potamogeton natans) and water horsetail (Equisetum fluviatile), with most of the water surface having no vegetation.
- This community is common in a range of waterbodies in the uplands, with broad-leaved pondweed being tolerant 3.2.3 of a range of trophic states (Rodwell 1995, Averis et al. 2004).
- Mires and Flushes 3.3

M2 Sphagnum cuspidatum/fallax bog pool community

- 3.3.1 Sub-communities recorded: The M2b Sphagnum fallax sub-community
- 3.3.2 A single area of M2 was recorded underneath an overhead power line in the north-western part of the Site, where pools occur in mosaic with other vegetation (see TN5). They may have formed in old vehicle ruts. The pools were dominated and often completely infilled by flat-topped bog-moss (Sphagnum fallax), but feathery bog-moss (Sphagnum cuspidatum) was locally co-dominant. The surrounding vegetation, which was mainly characterised by dominant sharp-flowered rush (Juncus acutiflorus), sometimes with abundant papillose bog-moss (Sphagnum papillosum), keys out as M6 mire and M23 rush-pasture (see below).
- 3.3.3 This community is typically found in pools and lawns on the surface of very wet and base-poor peats on ombrogenous and topogenous mires in the less oceanic parts of Britain (Rodwell et al. 1991, Averis et al. 2004). This community has been reduced by widespread drainage and cutting of mires, so that often just small and modified fragments remain within predominantly agricultural landscapes. However, this community also readily colonises shallow flooded workings (Rodwell et al. 1991), and this is likely to be the origin within the Site, where is occurs within a forestry ride.

## M6 Carex echinata–Sphagnum recurvum<sup>1</sup>/denticulatum mire

- Sub-communities recorded: The M6c Juncus effusus sub-community and the M6d Juncus acutiflorus 3.3.4 subcommunity.
- 3.3.5 M6 mire is widespread and common throughout the Study Area, especially within rides fed by drainage water from forest coupes. However, it also occurs as larger, more natural stands on hillsides in the north of the Site and along watercourses (e.g. TN7-14). It is consistently represented by the two rush-dominated sub-communities, characterised by soft-rush (Juncus effusus) (see TN1 for an example) or sharp-flowered rush, or sometimes both, over a dense layer of flat-topped bog-moss and locally abundant purple moor-grass (Molinia caerulea) and common haircap (Polytrichum commune). Associates are infrequent and present at low abundance but included Yorkshire fog (Holcus lanatus), tufted hairgrass (Deschampsia cespitosa), wavy hairgrass (Deschampsia flexuosa), bent grasses

3.3.6 M6 mire is essentially a poor-fen with dominant small sedges or rushes over a carpet of oligotrophic and baseintolerant bog-mosses (Rodwell et al. 1991). It is the major soligenous community of peats and peaty gleys irrigated by base poor waters in the sub-montane zone of northern and western Britain and occurs in wet hollows, seepage lines, flushes, shallow gullies cutting down hillsides, and along the margins of streams within expanses of blanket mire, dwarf shrub heath or acid grassland (Averis et al. 2004). It is commonly found in tracts of unenclosed pasture on upland fringes, particularly between 200 m and 400 m although it may also be found much higher (Rodwell et al. 1991). M6 mires do not have a rich flora and are not the home of many rare plant species, although they do contribute to the diversity of the vegetation of the upland margins (Averis et al. 2004).

M17 Scirpus cespitosus<sup>2</sup>–Eriophorum vaginatum blanket mire

- Sub-communities recorded: The M17c Juncus squarrosus-Rhytidiadelphus loreus sub-community (poor fit). 3.3.7
- 3.3.8 M17 blanket mire was recorded in a single location, a forestry ride in the north-west of the Site, where it occurs in mosaic with M6 mire. The vegetation is dominated by deergrass (Trichophorum germanicum), with purple moorgrass and heather (Calluna vulgaris) being locally abundant. Associated species included wavy hair-grass, hare'stail cottongrass (Eriophorum vaginatum), heath rush (Juncus squarrosus), blaeberry (Vaccinium myrtillus) and crossleaved heath (Erica tetralix), as well as acute-leaved/red bog-moss.
- 3.3.9 M17 blanket mire is the characteristic blanket bog vegetation of the more oceanic parts of Britain and is typically found on peat deposits that are maintained in a permanently waterlogged state by a high and generally stagnant water-table (Rodwell et al. 1991). Even though the M17c is the driest of the three described sub-communities (Averis et al. 2004), the location of the M17 vegetation with a forestry ride with M6 mire suggests that the substrate is nevertheless wet. However, the overall fit with the community is poor and this may reflect the highly modified nature of the forestry rides within the Site.

M19 Calluna vulgaris–Eriophorum vaginatum blanket mire

- Sub-communities recorded: The M19c Vaccinium vitis-idaea-Hylocomium splendens sub-community. 3.3.10
- 3.3.11 M19 blanket mire was recorded on Pinbreck Hill in the north of the Site (see TN17). The vegetation is characterised by heather, hare's-tail cottongrass, and the mosses red-stemmed feathermoss (Pleurozium schreberi), acuteleaved/red bog-moss and flat-topped bog-moss. Associates present at lower abundance include wavy hair-grass, purple moor-grass, tormentil, blaeberry and glittering wood-moss (Hylocomium splendens). The extent of the community was relatively small but its condition relatively good, with no obvious signs of drainage or hagging, unlike in areas outside the Study Area where hagging is more common (see TN18).
- 3.3.12 M19 is the typical blanket bog vegetation of high-altitude ombrogenous peats in the wet and cold climate of the uplands of northern Britain. In particular, it occurs on high-level plateaux and broad watersheds, usually above 300 m, and is confined to deeper peats on flat or gently-sloping ground (Rodwell et al. 1991). It is typically present on drier peats than M17 blanket mire (Averis et al. 2004).

## M20 Eriophorum vaginatum blanket mire

- Sub-communities recorded: The M20b Calluna vulgaris-Cladonia species sub-community. 3.3.13
- 3.3.14 M20 blanket mire was recorded on Polmaddie Hill, off the northern Site boundary. The vegetation is dominated by hare's-tail cottongrass with locally abundant heath plait-moss and red-stemmed feathermoss. Species present at low abundance include wavy hair-grass, sheep's fescue (Festuca ovina), stiff sedge (Carex bigelowii), blaeberry and Cladonia lichens. The occasional presence of tormentil and little shaggy-moss (Rhytidiadelphus loreus) could

<sup>&</sup>lt;sup>1</sup> Now known as Sphagnum fallax

suggest local transition to other vegetation, notably M19 blanket mire, although, as noted by Averis et al. (2004), it is quite common to find bogs dominated by hare's-tail cottongrass that do not correspond well to either of the two described M20 sub-communities.

3.3.15 M20 blanket mire occurs from about 300 m up to over 900 m in Scotland. It is characteristic of ombrogenous peats where past influences from grazing, burning, drainage and/or pollution have reduced the diversity of the vegetation and in some places led to gross erosion and drying of the peat (Rodwell et al. 1991). As such, it is probably derived from M19 Calluna-Eriophorum mire (Averis et al. 2004).

M23 Juncus effusus/acutiflorus–Galium palustre rush-pasture

- Sub-communities recorded: The M23a Juncus acutiflorus sub-community and the M23b Juncus effusus sub-3.3.16 community.
- 3.3.17 M23 rush-pasture is widespread at mainly lower altitudes within the Survey Area, where it notably occurs along watercourses, as well as in rides and other open areas within forestry and in former clear-fells. The rushes, notably soft-rush but in some places sharp-flowered rush, typically dominate the vegetation, whereas abundant associates varied between stands but often include one or more of Yorkshire fog, purple moor-grass, tufted hair-grass, marsh thistle (Cirsium palustre) and common sorrel, as well as pointed spear-moss (Calliergonella cuspidata) and springy turf-moss. Associated species present at lower abundance include purple moor-grass, bent grasses, creeping buttercup (Ranunculus repens), meadowsweet (Filipendula ulmaria), rosebay willowherb (Chamerion angustifolium), bracken (Pteridium aquilinum), Angelica (Angelica sylvestris), common marsh bedstraw, broadleaved dock (Rumex obtusifolius) and marsh ragwort (Senecio aquaticus).
- M23 rush-pasture is a community of gently-sloping ground in and around the margins of soligenous flushes, as a 3.3.18 zone around topogenous mires and wet heaths, and in poorly drained, comparatively unimproved or reverted pasture (Rodwell et al. 1991). It can be found on a variety of moderately acid to neutral soils that are kept moist to wet for most of the year.

M25 Molinia caerulea-Potentilla erecta mire

- 3.3.19 Sub-communities recorded: The M25a Erica tetralix sub-community.
- M25 mire occurs in mainly forestry rides, often in mosaic with other communities, where it is characterised by the 3.3.20 dominance of purple moor-grass (see TN4). Associated species are generally low in abundance, but include softrush, red fescue (Festuca rubra), tormentil, marsh bedstraw, flat-topped bog-moss, heath plait-moss and common haircap.
- 3.3.21 M25 mire is a community of moist, but usually well aerated, acid to neutral peats and peaty soils (Rodwell et al. 1991). It occurs over gently-sloping ground, marking out seepage zones and flushed margins of topogenous mires, but also extends onto the fringes of ombrogenous mires (Rodwell et al. 1991, Averis et al. 2004). The community clothes ground where there would once have been woodland or where there is the potential for woodland to develop, and many square kilometres of purple moor-grass grassland have been lost under forestry plantations (Averis et al. 2004). Frequent burning and grazing can convert wet heath and blanket bog to M25 mire, especially when these treatments are combined with artificial drainage (Averis et al. 2004).

#### 3.4 Wet Heaths

## M15 Scirpus cespitosum<sup>2</sup>–Erica tetralix wet heath

- 3.4.1 Sub-communities recorded: The M15a Carex panicea sub-community and the M15d Vaccinium myrtillus subcommunity.
- 3.4.2 M15 wet heath occurs in larger rides and in open areas in mainly the northern part of the Study Area, but it does not form extensive stands. The species composition varies but most stands aligned to the M15d Vaccinium myrtillus sub-community and, as such, can be regarded as a wetter associate of the more extensive areas of blaeberrydominated dry heath within the Study Area (see H18 heath below). The main characteristic species include heather,

3.4.3 M15 wet heath is a community of shallow, wet or intermittently waterlogged, acid peat or peaty mineral soils on hillsides, over moraines, and within tracts of blanket mire. It also extends on to deep peat where the original bog vegetation has been damaged or modified by burning, grazing, drainage and peat cutting (Averis et al. 2004).

M16 Erica tetralix–Sphagnum compactum wet heath

- 3.4.4 Sub-communities recorded: The M16d Juncus squarrosus-Dicranum scoparium sub-community.
- 3.4.5 M16 wet heath was recorded in only a single location within the Study Area; in an open area adjacent to plantation forestry in the west of the Study Area. It is characterised by bog myrtle (Myrica gale), purple moor-grass, sharpflowered rush, common sorrel, compact bog-moss (Sphagnum compactum) and red-stemmed feather-moss, whereas less abundant associates include Yorkshire fog, soft-rush, cross-leaved heath, marsh willowherb and marsh bedstraw. However, the absence of heather and the presence of foxglove (Digitalis purpurea) make this a relatively poor fit with M16.
- 3.4.6 M16 wet heath typically occurs on shallow acid peat on sloping ground, on moist and intermittently waterlogged soils (Averis et al. 2004). It may in some cases be derived from bog through frequent or severe burning and heavy grazing and trampling.

### 3.5 Dry Heaths

H18 Vaccinium myrtillus–Deschampsia flexuosa heath

- 3.5.1 Sub-communities recorded: The H18a Hylocomium splendens-Rhytidiadelphus loreus sub-community and the H18b Alchemilla alpina-Carex pilulifera sub-community.
- 3.5.2 H18 heath is common the north of the Study Area, where it dominates large areas on Fell Hill, Cairn Hill and Pinbreck Hill (see TN6). It is normally dominated by blaeberry and with a high abundance of wavy hair-grass. Other species present at high abundance included one or more of sweet vernal-grass, velvet bent (Agrostis canina), heath plaitmoss, glittering wood-moss and springy turf-moss. Large patches of greater woodrush (Luzula sylvatica) are often present (see U16 below). Species present at low abundance include some or more of red fescue, stiff sedge, heath bedstraw, tormentil, common sorrel, harebell (Campanula rotundifolia), fir clubmoss (Huperzia selago) and rusty swan-neck moss (Campylopus flexuosus). The local presence of species atypical of H18 heath would suggest transition to other communities; for example scattered individuals of heath spotted-orchid (Dactylorhiza maculata) might suggest a local transition to H21 Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium heath, and elsewhere occasional bog asphodel, ribwort plantain (Plantago lanceolata), marsh thistle or wild thyme (Thymus polytrichus) could similarly suggest transitions to other communities.
- 3.5.3 H18 is consistently associated with well-drained, acid to neutral mineral soils, humic rankers and dry peats, and the community has a wide altitudinal range (Averis et al. 2004).
- 3.6 Grasslands and Montane Communities

U2 Deschampsia flexuosa grassland

- 3.6.1 Sub-communities recorded: The U2b Vaccinium myrtillus sub-community.
- 3.6.2 U2 grassland occurs in clear-felled areas of plantation along the access track in the south-central part of the Study Area, and the vegetation is also locally present in recent clear-fells (e.g. TN3). The vegetation is dominated by wavy hair-grass and abundant or locally abundant Yorkshire fog, purple moor-grass, sharp-flowered rush, heath bedstraw, heather and blaeberry, as well as springy turf-moss. Associated species present at lower abundance

include soft-rush, tufted hair-grass, common sorrel, common marsh bedstraw, marsh thistle, tormentil, bracken, and mosses including common haircap, little shaggy-moss, waved silk-moss (*Plagiothecium undulatum*) and bristly haircap (Polytrichum piliferum). The occasional presence of soft-rush, marsh violet (Viola palustris), foxglove and bramble (Rubus fruticosus) would suggest a local transition to other vegetation, and some stands also contained regenerating trees, notably Sitka spruce (Picea sitchensis) and silver birch (Betula pendula).

U2 grassland is characteristic of base poor, moist but free-draining soils (Averis et al. 2004). It occurs through the 3.6.3 upland fringes, often in close association with some heaths and mires and can grade into them. In many places the community represents the first stage of recolonising vegetation within felled conifer plantations where it forms an untidy grassland among the dead stumps and branches of the felled trees (Averis et al. 2004).

## U5 Nardus stricta–Galium saxatile grassland

- Sub-communities recorded: The U5a species-poor sub-community, the U5b Agrostis canina-Polytrichum commune 3.6.4 sub-community and the U5d Calluna vulgaris-Danthonia decumbens sub-community.
- 3.6.5 U5 grassland is present in rides in the north-western part of the Study Area, where it occurs in mosaic with other vegetation, such as M6 and M25 mire. It is dominated by mat-grass (Nardus stricta), with common associates including sheep's fescue, sweet vernal-grass, bent grasses, wavy hair-grass, tormentil and heath bedstraw, as well as mosses such as glittering wood-moss, red-stemmed feather-moss, heath plait-moss and springy turf-moss.
- U5 grassland occurs in a range of settings, from alluvial soils, damp mineral soils which have peaty upper horizons, 3.6.6 as well as deep peats from which the original mire vegetation has been lost, e.g. through burning, heavy grazing or drainage. As such, most stands are anthropogenic (Averis et al. 2004).

## U16 Luzula sylvatica–Vaccinium myrtillus tall-herb community

- Sub-communities recorded: The U16b Anthoxanthum odoratum-Festuca ovina sub-community and the U16c 3.6.7 species-poor sub-community.
- U16 occurs in the north of the Study Area, notably within H18 heath, where it locally forms large patches (see 3.6.8 TN19). The vegetation is dominated by greater woodrush, which in places was the only vascular species; however, the vegetation typically also includes blaeberry and mosses such as heath plait-moss, springy turf-moss and redstemmed feathermoss.
- 3.6.9 U16 is most common in the uplands, between 400 m and 600 m, where it probably represents a near-natural form of vegetation, and it usually occurs on shaded slopes facing between north and east and which can be mildly flushed (Averis et al. 2004). The succulent shoots of greater woodrush are favoured by grazing animals and the community therefore occurs in places where grazing is light or absent.

## U20 Pteridium aguilinum–Galium saxatile community

- Sub-communities recorded: The U20b Vaccinium myrtillus-Dicranum scoparium sub-community. 3.6.10
- 3.6.11 U20 vegetation dominated by bracken was recorded adjacent to the access track in the southern part of the Study Area. In some areas the bracken is dense and features few associates; however, elsewhere associates present at low abundance include Yorkshire fog, wavy hair-grass, common bent (Agrostis capillaris), wood sage (Teucrium scorodonia), heath bedstraw, tormentil and/or heather. Mosses include red-stemmed feathermoss and common haircap. It grades into scrub and tall herb vegetation, with rosebay willowherb, foxglove, ribwort plantain, bramble, common broom (Cytisus scoparius) and regenerating Sitka spruce and sycamore (Acer pseudoplatanus).
- U20 is typical of the zone where the farmed lowlands adjoin the unenclosed uplands. It is most common on lower 3.6.12 hill slopes and on marginal ground, including abandoned fields, where it forms mosaics with heaths, grasslands and woodlands. The community covers fairly deep, well-drained but moist, base-poor and infertile soils (Averis et al. 2004).

## MG10 Holcus lanatus–Juncus effusus rush-pasture

- 3.6.13 Sub-communities recorded: The MG10a typical sub-community, and the MG10b Juncus inflexus sub-community.
- 3.6.14 MG10 rush-pasture is widespread across the Study Area, although the largest stands are located in the north (e.g. TN15-16). The vegetation is characterised by locally abundant or dominant soft-rush, hard rush (Juncus inflexus), Yorkshire fog, creeping bent (Agrostis stolonifera), marsh thistle and creeping buttercup, together with mosses such as springy turf-moss. Species present at low abundance include red fescue, sweet vernal-grass, tormentil, common sorrel, white clover (Trifolium repens) and bog stitchwort (Stellaria alsine). The vegetation locally transitions into other community types, with blaeberry and tufted hair-grass being locally frequent.
- MG10 is a form of rush-pasture characteristic of damp acid to neutral soils on level to gently sloping ground (Averis 3.6.15 et al. 2004). Although found on various soil types including brown earth and calcareous earth throughout its range, the community can also have close associations with various types of mire vegetation and can form significant parts of rush-dominated mire mosaics in areas of suitably moist soils.

## Non-standard NVC Community Festuca rubra-Holcus lanatus-Anthoxanthum odoratum arassland

- 3.6.16 Sub-communities recorded: N/a.
- 3.6.17 A single stand of Festuca rubra-Holcus lanatus-Anthoxanthum odoratum grassland was recorded in the north of the Study Area. This vegetation is not described in the NVC but is mentioned in Rodwell et al. (2000). It is characterised by common bent, sweet vernal-grass, red fescue and Yorkshire fog, false oat-grass (Arrhenatherum elatius), ribwort plantain, white clover, springy turf-moss and red-stemmed feathermoss, although atypical species such as tufted hair-grass, soft-rush, marsh thistle and meadowsweet occur at low abundance and might suggest affinity with M23 rush-pasture.
- 3.6.18 The NVC described grassland dominated by red fescue and Yorkshire fog and with a distinctive maritime element, but subsequent surveys, including in Scotland, have recognised that similar, often species-poor and rank swards without a maritime contingent are widely distributed (Rodwell et al. 2000).
- 3.6.19 The vegetation has little intrinsic floristic value and is therefore not a conservation priority. It is not a wetland community and is therefore not potentially groundwater dependent.

### 3.7 Woodland and Scrub

W2 Salix cinerea-Betula pubescens-Phragmites australis woodland

- 3.7.1 Sub-communities recorded: The W2a Alnus glutinosa-Filipendula ulmaria subcommunity.
- 3.7.2 W2 woodland was recorded in a single location at the central part of the Study Area, where it occurs in mosaic with the U20 bracken community. It is characterised by grey willow (Salix cinerea), silver birch, downy birch (Betula pubescens), alder (Alnus glutinosa) and common reed (Phragmites australis). Associated species include tufted hairgrass, Yorkshire fog, rosebay willowherb and bog myrtle.
- W2 woodland develops on fen peat and terraces of river valley mires and notably occurs in East Anglia and north-3.7.3 west England, whereas it is considered scarce in Scotland (Averis and Rodwell 2006). As such the vegetation within the Study Area might be in flux following forestry operations and it may ultimately develop into a community more typical of South-west Scotland.

W4 Betula pubescens–Molinia caerulea woodland

- 3.7.4 Sub-communities recorded: The W4b Juncus effusus subcommunity.
- W4 woodland was recorded in a single location in the far south of the Study Area. It is dominated by grey willow, 3.7.5 with frequent silver birch, downy birch and goat willow (Salix caprea). Soft-rush is common in the ground layer, whereas heather, Yorkshire fog and common haircap occur at low abundance.

3.7.6 W4 is a community of moist to wet acidic peaty soils, on raised and valley bogs that are progressing to woodland and in base-poor flushes throughout the lowlands and uplands. One or more of purple moor-grass, bog-mosses or common haircap are ordinarily common (Averis and Rodwell 2006); although the latter was present, it was only at low abundance, and the vegetation within the Study Area might therefore be in flux following forestry operations.

## **Evaluation** 4

### **Reference** lists 4.1

- 4.1.1 In the following section the NVC communities recorded in the Study Area are compared to a number of published lists to assess their potential nature conservation interest or groundwater dependency. The following lists of international, national or council area importance have been used:
  - Potential nature conservation interest:
    - Annex I habitats on Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) (the 'Habitats Directive') as summarised for the UK on the Joint Nature Conservation Committee (JNCC) website (JNCC, no date);
    - Priority habitats on the Scottish Biodiversity List (SBL) (Scottish Government 2013). The SBL was published in 2005 to satisfy the requirement under Section 2(4) of The Nature Conservation (Scotland) Act 2004, and it effectively supersedes the former UK Biodiversity Action Plan (BAP); however, habitat descriptions in the UK BAP, as provided in Maddock (2011), remain valid.
    - Priority habitats on the Ayrshire Local BAP (Ayrshire Biodiversity Action Plan Partnership 2008) for habitats north of council area boundary in the access track corridor c. 6km north of the A714; and
    - Priority habitats on the Dumfries and Galloway Local BAP (Dumfries and Galloway Local Biodiversity Partnership) – for habitats in the access track corridor between the A714 and c.6km to the north of this.
  - Potential groundwater dependency:

Environment Protection Agency (SEPA) (SEPA 2017).

### 4.2 Evaluation

- 4.2.1 The Study Area has a significant presence of commercial forestry and most of the NVC communities recorded in the study are likely to be influenced by forestry operations as well as forest hydrology (both in terms of drains channelling flows and in terms of drying impacts from the trees) as well as shade. Exemptions to this included the larger lochan, Loch Scalloch, wide watercourse corridors and larger areas of open hillside in the north of the Study Area. These areas are therefore likely to represent the least disturbed examples of semi-natural vegetation in the Study Area. Notable amongst these is H18 dry heath and M15 wet heath in the north of the Study Area.
- 4.2.2 Elsewhere, such as in forestry rides and in recent clear-fells, communities are typical of recent or historical disturbance, including forestry drainage and shade, and fragmentation. The vegetation is often comprised of tallrush dominated vegetation, representing the M23 and M6 communities, depending on whether bog-mosses are absent or present. These communities are often species poor and of limited nature conservation interest.
- 4.2.3 Potential groundwater dependency is shown on Figure TA\_8.2.3. Forestry drainage typically results in wet rides, which therefore support communities of potentially high or moderate groundwater dependence. Again, these commonly include M6 and M23, but they are likely to be predominantly surface water fed, as they are associated with forestry drains. However, more natural examples also occur, notably at the base of the hill slopes in the north of the Study Area, although with bedrock across the Site comprising a low productivity aquifer, and superficial geology across much of the Site likely to inhibit groundwater flow, there is limited potential for substantial groundwater to be present near the surface. Rather they may be areas where surface runoff from the hills naturally shed and gather.
- 4.2.4 Table TA\_8.2.1, overleaf, summarises the nature conservation interest and/or potential groundwater dependency of each NVC category recorded.

- Potentially groundwater dependent terrestrial ecosystems (GWDTEs) as defined by the Scottish

## Table TA\_8.2.1 – Evaluations

NVC Community	Annex I Habitat	SBL Priority Habitat	Ayrshire Local BAP	Dumfries and Galloway Local BAP	Potential GWDTE Status
A9 Potamogeton natans community	Not listed	Ponds are priority habitats	Not listed	* Not relevant – the community was not	Not listed
, ,		Oligotrophic and dystrophic lakes are listed only as habitats on		recorded within the council area	
		which negative impacts should be avoided			
		Waterbodies with A9 vegetation within the Study area are likely to align with either of the two categories			
M2 Sphagnum cuspidatum/fallax bog	M2 is included in the priority habitat	M2 is included in the priority habitat description for blanket mire	Blanket bog, including bog pools, is a priority	* Not relevant – the community was not	Not listed
pool community	description for 7130 Blanket bogs	(Maddock 2011)	habitat but listed as not requiring active	recorded within the council area	
			conservation management		
M6 Carex echinata–Sphagnum recurvum/denticulatum mire	Not listed	Upland flushes, fens and swamps are listed with a watching brief only	Not listed but are mentioned as part of the priority description for <b>blanket bog</b>	Upland springs and flushes	Potentially <b>highly</b> groundwater dependent
M17 Scirpus cespitosus–Eriophorum vaginatum blanket mire	7130 Blanket bogs	Blanket mire	Blanket bog	* Not relevant – the community was not recorded within the council area	Not listed
M19 Calluna vulaaris–Eriophorum	7130 Blanket bogs	Blanket mire	Blanket bog	* Not relevant – the community was not	Not listed
vaginatum blanket mire				recorded within the council area	
M20 Eriophorum vaginatum blanket mire	7130 Blanket bogs	Blanket mire is a priority habitat, but M20 mires are generally less	Blanket bog is a priority habitat, but M20	* Not relevant – the community was not	Not listed
	_	valuable for nature conservation than the stands of less modified	mires are generally less valuable for nature	recorded within the council area	
		and impoverished blanket bog from which they have been derived	conservation than the stands of less modified		
		(Averis et al. 2004)	and impoverished blanket bog from which they		
			have been derived (Averis et al. 2004)		
M23 Juncus effusus/acutiflorus–Galium	Not listed	M23a is listed in the description for upland flushes, fens and	Purple moor-grass and rush-pastures are	Purple moor-grass and rush-pastures are	Potentially highly
palustre rush-pasture		swamps (Maddock 2011), which are listed with a watching brief only	priority habitats, although it is the richer M23a	priority habitats, although it is the richer	groundwater dependent
		Purple moor-grass and rush-pastures are priority habitats, although	vegetation, which is described	M23a vegetation, which is described	
		it is the richer M23a vegetation, which is described			
M25 Molinia caerulea–Potentilla erecta	7130 Blanket bogs (on peat deeper	M25 is included in the priority habitat description for <b>blanket mire</b>	Blanket bog is a priority habitat but the prioriy	* Not relevant – the community was not	Potentially moderately
mire	than 0.5 m)	(Maddock 2011)	habitat description focuses on species-rich	recorded within the council area	groundwater dependent
			vegetation		
M15 Scirpus cespitosus–Erica tetralix wet	4010 Northern Atlantic wet heaths	M15 is included in the priority habitat description for both <b>blanket</b>	Upland heath	* Not relevant – the community was not	Potentially moderately
neath	With Grieg totroliv	mire and upland heathland (Maddock 2011)		recorded within the council area	groundwater dependent
M16 Erica tetralix_Sphaanum	4010 Northern Atlantic wet heaths	Unland heathland	Lipland heath	* Not relevant - the community was not	Potentially moderately
compactum wet beath	with		opialid lieath	recorded within the council area	groundwater dependent
	Frica tetralix				groundwater dependent
H18 Vaccinium myrtillus–Deschampsia	4030 European dry heaths	Upland heathland	Unland heath	* Not relevant – the community was not	Not listed
flexuosa heath				recorded within the council area	Nothisted
U2 Deschampsia flexuosa grassland	Not listed	Listed in the priority habitat description for lowland (to 300 m) <b>dry</b>	* Not relevant – the community was not	Acid grassland (both lowland and upland	Not listed
, , , , , , , , , , , , , , , , , , , ,		acid grassland (Maddock 2011)	recorded within the council area	types)	
U5 Nardus stricta–Galium saxatile	Not listed	Nardus stricta-Galium saxatile grassland listed with a watching brief	Lowland dry acid grassland	Acid grassland (both lowland and upland	Not listed
grassland		only		types)	
U16 Luzula sylvatica–Vaccinium myrtillus	Not listed	U16 is not a conservation priority in its own right but can support	Not listed	* Not relevant – the community was not	Potentially <b>highly</b>
tall-herb community		species of conservation interest, notably in inaccessible locations		recorded within the council area	groundwater dependent
		such as inland rock outcrop and scree habitats, which is listed as a			
		habitat on which negative impacts should be avoided. However, this			
		specific category is absent from the Study Area			
U20 Pteridium aquilinum–Galium saxatile community	Not listed	Not listed	Not listed	Not listed	Not listed
MG10 Holcus lanatus–Juncus effusus	Not listed	Not listed	Not listed	* Not relevant – the community was not	Potentially moderately
rush-pasture				recorded within the council area	groundwater dependent
Non-standard NVC Community Festuca	Not listed	Not listed	Not listed	* Not relevant – the community was not	Not listed
rubra-Holcus lanatus-Anthoxanthum				recorded within the council area	
odoratum grassland					
W2 Salix cinerea-Betula pubescens-	W2a is listed in the description for	Wet woodland	Wet woodland	Not listed	Potentially moderately
Phragmites australis woodland	91E0 Alluvial forests with Alnus				groundwater dependent
	glutinosa and Fraxinus excelsior				
	(Aino-Paaion, Ainion incanae,				
WA Betula nubescens-Molinia caerulaa	Not listed	Unland hirchwoods	* Not relevant - the community was not	Native birchwoods	Potentially <b>highly</b>
woodland	Not listed		recorded within the council area		groundwater dependent

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M19 Calluna vulgaris–Eriophorum vaginatum blanket mire M20 Eriophorum vaginatum blanket mire M23 Juncus effusus/acutiflorus–Galium

palustre rush-pasture M25 Molinia caerulea–Potentilla erecta mire

M15 Trichophorum cespitosum-Erica tetralix wet heath M16 Erica tetralix–Sphagnum compactum wet heath H18 Vaccinium myrtillus–Deschampsia

flexuosa heath U2 Deschampsia flexuosa grassland U5 Nardus stricta–Galium saxatile

grassland U16 Luzula sylvatica–Vaccinium myrtillus tall-herb community U20 Pteridium aquilinum–Galium saxatile

community MG10 Holcus lanatus–Juncus effusus rush-pasture

Non-standard NVC Communities Festuca rubra– Holcus lanatus– Anthoxanthum odoratum grassland W2 Salix cinerea–Betula pubescens– Phragmites australis woodland W4 Betula pubescens–Molinia caerulea woodland

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![](_page_27_Picture_1.jpeg)

Target Note	Description
Target Note       5       6	Description     Image: Constraint of the study Arreal Possibly colosisation of vehicle ruts
	M2 Sphagnum cuspidatum/fallax bog pool community by a pylon in the north of the Study Area. Possibly colobisation of vehicle ruts
6	
	H18 Vaccinium myrtillus–Deschampsia flexuosa heath in the north of the Study Area. Scattered Sitka spruce
	occur
7	Area of M6c mire at the foot of an open hill. Although flanked by two small watercourses, the vegetation is likely to be fed in parts by groundwater from the hillslope.

Target Note	Description
8	Area of M6c mire at the foot of an open hill. Likely to

![](_page_28_Picture_2.jpeg)

to be fed by groundwater from the hillslope.

Registered Address:

7 Dundas Street

Edinburgh

EH3 6QG

+44 (0) 131 557 8325

Target Note	Description	Target Note	Description
9	Area of M6c mire at the foot of an open hill. Likely to be fed by groundwater from the hillslope.	18	and the second
10	Area of M6c mire at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		
11	Area of M6c mire at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		
12	Area of M6c mire at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		
13	Area of M6d/U16c mosaic at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		and the second se
.4	Area of MG10a/M6d/U16c mosaic at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		
5	Area of MG10a rush pasture at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		and the second s
.6	Area of MG10a rush pasture at the foot of an open hill. Likely to be fed by groundwater from the hillslope.		the second se
		19	View to hagging north of Study Area. This situation in
	M19 Calluna vulgaris–Eriophorum vaginatum blanket mire in the north of the Study Area		

![](_page_29_Picture_1.jpeg)

![](_page_29_Picture_2.jpeg)

# Annex TA\_8.2.B: Species List

Common name	Scientific Name
Acute-leaved/red bog-moss	Sphagnum capillifolium
Angelica	Angelica sylvestris
Bent grasses	Agrostis spp
Blaeberry	Vaccinium myrtillus
Blunt-leaved bog-moss	Sphagnum palustre
Bog asphodel	Narthecium ossifragum
Bog myrtle	Myrica gale
Bog stitchwort	Stellaria alsine
Bracken	Pteridium aquilinum
Bramble	Rubus fruticosus
Bristly haircap	Polytrichum piliferum
Broadleaved dock	Rumex obtusifolius
Broad-leaved pondweed	Potamogeton natans
Common bent	Agrostis capillaris
Common broom	Cytisus scoparius
Common haircap	Polytrichum commune
Common marsh bedstraw	Galium palustre
Common sedge	Carex nigra
Common sorrel	Rumex acetosa
Creeping bent	Agrostis stolonifera
Creeping buttercup	Ranunculus repens
Cross-leaved heath	Erica tetralix
Crowberry	Empetrum nigrum
Deergrass	Trichophorum germanicum
Downy birch	Betula pubescens
False oat-grass	Arrhenatherum elatius
Feathery bog-moss	Sphagnum cuspidatum
Fir clubmoss	Huperzia selago
Flat-topped bog-moss	Sphagnum fallax
Foxglove	Digitalis purpurea
Glittering wood-moss	Hylocomium splendens
Greater woodrush	Luzula sylvatica
Grey willow	Salix cinerea
Hard rush	Juncus inflexus
Hare's-tail cottongrass	Eriophorum vaginatum
Harebell	Campanula rotundifolia
Heath bedstraw	Galium saxatile
Heath plait-moss	Hypnum jutlandicum
Heath rush	Juncus squarrosus
Heath spotted-orchid	Dactylorhiza maculata
Heather	Calluna vulgaris
Heath-grass	Danthonia decumbens
Little shaggy-moss	Rhytidiadelphus loreus
Marsh ragwort	Senecio aquaticus
Marsh thistle	Cirsium palustre
Marsh violet	Viola palustris
Mat-grass	Nardus stricta

Common name	Scientific Name
Meadowsweet	Filipendula ulmaria
Papillose bog-moss	Sphagnum papillosum
Pointed spear-moss	Calliergonella cuspidata
Purple moor-grass	Molinia caerulea
Red fescue	Festuca rubra
Red-stemmed feathermoss	Pleurozium schreberi
Ribwort plantain	Plantago lanceolata
Rosebay willowherb	Chamerion angustifolium
Rusty swam-neck moss	Campylopus flexuosus
Sharp-flowered rush	Juncus acutiflorus
Sheep's fescue	Festuca ovina
Silver birch	Betula pendula
Sitka spruce	Picea sitchensis
Soft-rush	Juncus effusus
Springy turf-moss	Rhytidiadelphus squarrosus
Stiff sedge	Carex bigelowii
Sweet vernal-grass	Anthoxanthum odoratum
Sycamore	Acer pseudoplatanus
Tormentil	Potentilla erecta
Tufted hairgrass	Deschampsia cespitosa
Velvet bent	Agrostis canina
Water horsetail	Equisetum fluviatile
Waved silk-moss	Plagiothecium undulatum
Wavy hairgrass	Deschampsia flexuosa
White clover	Trifolium repens
Wild thyme	Thymus polytrichus
Wood sage	Teucrium scorodonia
Yorkshire fog	Holcus lanatus

![](_page_30_Picture_3.jpeg)

![](_page_31_Picture_0.jpeg)