



MacArthur Green

**Hagshaw Hill Wind Farm Repowering
National Vegetation Classification Survey
Technical Appendix 7.1**

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EXECUTIVE SUMMARY

MacArthur Green was commissioned by the Applicant, Hagshaw Hill Repowering Ltd, to carry out a National Vegetation Classification (NVC) and habitats survey at the Hagshaw Hill Wind Farm Repowering site, by Douglas, 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 Proposed Development site in order to identify those areas of greatest ecological interest (i.e. Annex I habitats; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE), 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 EIA Report.

Surveys were conducted on 23rd and 24th May 2018 and 7th August 2018 by MacArthur Green. In total 28 NVC communities were recorded along with various associated sub-communities, however only a small number of communities accounted for the majority of the study area. A number of non-NVC habitat types are also present, in particular non-NVC *Juncus* spp. grasslands.

The study area mainly contains a mix of typical mire, wet heath, acid grassland and upland marshy grassland and flush communities. Although some large relatively homogeneous stands of vegetation occur across the study area most of the communities often form complex mosaics and transitional areas across the study area. The habitats in the study area are subject to cattle and sheep grazing, and many areas of mire appear to have been drained historically.

The NVC surveys have also revealed the presence of a number of potential GWDTE habitats, as well as Annex I and Scottish Biodiversity List Priority Habitats.

1 INTRODUCTION

MacArthur Green was commissioned by the Applicant, Hagshaw Hill Repowering Ltd, to carry out a National Vegetation Classification (NVC) and habitats survey at the Hagshaw Hill Wind Farm Repowering site, by Douglas, 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 Proposed Development site in order to identify those areas of greatest ecological interest (i.e. Annex I habitats¹; potential Groundwater Dependent Terrestrial Ecosystems (GWDTE)²; and Scottish Biodiversity List³ (SBL) priority habitats).

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

2 THE PROPOSED DEVELOPMENT AND STUDY AREA

The Proposed Development is a repowering of the existing Hagshaw Hill Wind Farm (the 'Existing Development') by replacing the existing 26 turbine wind farm with 14 modern and larger turbines. Of these 14 turbines, seven will be within the Existing Development site boundary, with the other seven within an area of land adjacent to the south.

The site covers open hill ground around Hagshaw Hill, Broomerside Hill and Common Hill, southwards towards Low Broomerside. This ground contains a mix and mosaic of upland modified bog, wet heath and marshy and acid grasslands. These habitats are also intensively grazed by sheep and cattle. The 'study area' in which NVC and habitat surveys were undertaken is shown in Figures 7.2 and 7.3 and included, as a minimum, land within 300m of planned infrastructure, and a new access corridor to the south along the route of a dismantled railway line; linking with the main site area along the north-eastern lower slopes of Longhouse Hill. The survey data collected in 2018 was supplemented by habitat survey data collected in 2014, to the east of the Existing Development access track at Douglas West, which comprises the easternmost part of the Proposed Development's access route, towards the existing haul road. This area was surveyed as part of the Douglas West Wind Farm project, and survey results are included in Figures 7.2 and 7.3.

The Proposed Development is also surrounded by a number of other wind farm projects, including; Douglas West Community Wind Farm, Dalquhandy Wind Farm, Douglas West & Dalquhandy DP Renewable Energy Project, Hagshaw Hill Extension Wind Farm, Galawhistle Wind Farm, Nutberry Wind Farm and Cumberhead (Nutberry Extension) Wind Farm.

The study area does not overlap with any designated site with ecological or botanical qualifying features (Figure 7.1).

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.

³ As produced by the Scottish Government (2013).

3 METHODOLOGY

The vegetation was surveyed by a team of 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 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.

Botanical nomenclature in this report follows that of Stace (2010) for vascular plants, Atherton *et al.* (2010) for bryophytes and Purvis *et al.* (1992) for lichens.

4 SURVEY CONSTRAINTS

The NVC surveys for the main study area were carried out over four surveyor days on 23rd and 24th May 2018, the access corridor was surveyed over two surveyor days on 7th August 2018. All surveys were undertaken during the optimal season for habitat surveys. The weather conditions were amenable to survey; warm, bright, and relatively light to no wind.

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 this project have not therefore produced a complete list of plants and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, the results of these surveys have been reviewed and are considered to be sufficient to undertake the assessment.

5 NVC SURVEY RESULTS AND VEGETATION DESCRIPTIONS

5.1 Summary of NVC Communities

The categories of vegetation within the study area include the following 28 NVC communities recorded during the survey:

- Mires and flushes: M2, M3, M4, M6, M10, M17, M19, M20, M23, M25; M25-U6 intermediate;
- Wet heaths: M15;
- Springs: M32;
- Dry heaths: H9;
- Grasslands and bracken: U2, U4, U5, U6, U20, MG1, MG6, MG10;
- Woodlands: W7, W11, W18;
- Swamp and tall-herb fens: S9, S12; and,
- Vegetation of open habitats: OV25.

The following sections describe the flora, structure and habitats of these communities and any associated observed sub-communities, as found within this study area. For each NVC community description, the first paragraph refers to the community in Britain or Scotland as a whole, before moving on to the other paragraphs which describe the vegetation as it was found to occur within this study area. The NVC communities within each broad habitat type (e.g. woodland) are described in order of community number within the study area.

The survey results are displayed in Figure 7.2. A number of target notes were also made during surveys, often to pinpoint areas or species of special interest. These target notes are shown in Figure

7.2 and detailed within Annex A. Photographs of a number of the typical habitat types found within the study area are provided within Annex B.

5.2 Mires and Flushes

5.2.1 M2 *Sphagnum cuspidatum/fallax* bog pool community

Communities/sub-communities recorded: M2, M2b

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; Elkington *et al.*, 2001; Averis *et al.*, 2004). M2 is typically dominated by soft wet carpets of *Sphagnum cuspidatum* or *S. fallax*, or both. 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; Elkington *et al.*, 2001).

M2 is rare within the study area, but is found as a few small pools and runnels within blanket mire in the north of the study area. These areas are dominated by *Sphagnum fallax* and sometimes contain some sparse scattered *Eriophorum vaginatum*, *E. angustifolium* and *Carex* spp.

5.2.2 M3 *Eriophorum angustifolium* bog pool community

The M3 community is typically found as small stands on barer exposures of acid peat in depressions, erosion channels or shallow peat cuttings on a wide range of mire types but especially among the M19 *Calluna vulgaris* – *Eriophorum vaginatum* and M20 *Eriophorum vaginatum* mires (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). It can occur in permanently flooded pools and natural hollows on surfaces of more or less intact mires, and on dried-up hollows and among erosion features where the peat has been worn down in gullies or redistributed (Rodwell *et al.*, 1991; Elkington *et al.*, 2001; Averis *et al.*, 2004). The typical species, *Eriophorum angustifolium*, can occur as dense and often tall swards, but equally commonly it occurs as sparser shoots scattered over expanses of bare peat (Averis *et al.*, 2004).

A single narrow band of M3 was recorded within an area of M19 and M20 blanket mire in the northern study area. The community was present along a small gully of bare peat and consisted of abundant *Eriophorum angustifolium* with some sparse shoots of *Carex nigra* and *C. rostrata*.

5.2.3 M4 *Carex rostrata* - *Sphagnum fallax* mire

The M4 community is characteristic of pools and seepage areas on peat soils of topogenous and soligenous mires where the waters are fairly acid and only slightly enriched. It can occur in bog pools on the surface of basin mires but is more common in obviously soligenous areas as in mire laggs and the wettest parts of water-tracks (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). This mire typically has a cover of sedges over a carpet of semi-aquatic *Sphagnum* spp.

M4 is very rare within the study area, it was found as small percentage of some flush mosaics, however one larger mappable stand was recorded in the very north-west of the study area. The stand here contains abundant *Carex rostrata* along with lesser amounts of *C. nigra*, *C. panicea*, *Juncus effusus*, *J. squarrosus*, *Potentilla erecta*, *Eriophorum angustifolium* and *Ranunculus repens*.

5.2.4 **M6 *Carex echinata* - *Sphagnum fallax/denticulatum* mire**

Communities/sub-communities recorded: M6c, M6d

This mire 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. It typically occurs as small stands among other mire communities, grasslands and heaths, and is sometimes found with swamp and spring vegetation. It is commonly found in tracts of unenclosed pasture on upland fringes, particularly between 200m and 400m (although it may also be found much higher) and is ubiquitous in the upland fringes of Britain (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). The M6 community has a distinct general character but includes a wide variation in species composition, expressed as four sub-communities (two of which are visually similar to the M23 community). It is essentially a poor-fen with small sedges or rushes dominating over a carpet of oligotrophic and base-intolerant *Sphagna* (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

M6 is widespread throughout the study area, present mostly as small flushes, runnels or soakways, and along and within occluding ditches and around minor watercourses; however, it also occurs as a notable component of many larger basin/valley/floodplain areas in mosaics with other wetland communities, in particular M23 *Juncus effusus/acuteiflorus* – *Galium palustre* rush-pasture.

The vast majority of M6 areas are of the species-poor M6c *Juncus effusus* sub-community; however, there are some stands of the very similar M6d *Juncus acuteiflorus* sub-community. A tall sward of *Juncus effusus* over a species-poor lawn of *Sphagnum fallax*, *S. palustre* and *Polytrichum commune* indicates the M6c sub-community; *Juncus acuteiflorus* 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 *Eriophorum vaginatum* and *Carex* spp.

5.2.5 **M10 *Carex dioica* - *Pinguicula vulgaris* mire**

Communities/sub-communities recorded: M10, M10a

The M10 *Carex dioica* – *Pinguicula vulgaris* mire is a soligenous mire of mineral soils and shallow peats kept very wet by base-rich, calcareous and oligotrophic waters (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). The community includes a range of distinctive calcicolous flush vegetation in which the bulk of the sward is composed of small sedges, dicotyledons and bryophytes. It is essentially a small sedge mire and is usually found in small stands. The community typically occurs in unenclosed uplands and most of the stands are grazed and trampled by large herbivores (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). The community can occur wherever there is flushing with base-rich water, either below a springhead or where water emerges more diffusely from the ground, most stands being constantly irrigated (Averis *et al.*, 2004).

A number of small and rather dry stands of M10, in particular the M10a *Carex viridula* - *Juncus bulbosus/kochii* sub-community are found scattered on the slopes of Broomerside Hill and within the gully slopes of the Windrow Burn in the eastern study area. Two of these stands of M10 were large

enough to map, however given the small nature of these features the majority were recorded as target notes (Figures 7.2 and 7.3; Annex A).

Areas of M10 appear as seepages from the slopes and the low, open and stony sward is scattered with a number of typical species, including *Pinguicula vulgaris*, *Eriophorum angustifolium*, *Carex panicea*, *C. viridula*, *C. dioica*, *C. nigra* and *Pedicularis sylvatica* over a patchy characteristic layer of brown mosses.

These small soligenous mires are typically present as narrow flushes running through other habitats. This community is a GWDTE, due to its dependency on base-rich groundwater seepages (which are usually associated with a definite source point).

5.2.6 M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire

Communities/sub-communities recorded: M17a, M17c

M17 *Trichophorum germanicum* – *Eriophorum vaginatum* blanket mire is the characteristic blanket bog vegetation of the more oceanic parts of Britain. It is typically found on deposits that are maintained in a permanently waterlogged state by a high and generally stagnant water-table (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). It usually occurs on deeper peats, i.e. greater than 2m in depth over flat or gently sloping ground (Rodwell *et al.*, 1991). However, it can also occur extensively on shallower peat. This community is dominated by mixtures of monocotyledons, ericoid sub-shrubs and *Sphagnum* spp. It can occur as extensive, relatively uniform tracts, or as hummock and hollow complexes, with this community giving way to bog pool vegetation in the hollows (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). Burning, marginal peat-cutting, and drainage have often resulted in surface drying of the peat and hence a modification of the vegetation or community shift (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

M17, and more specifically the M17c *Juncus squarrosus* – *Rhytidiadelphus loreus* sub-community is found only in the lower altitude southern study area. A mosaic of M17c and M20 *Eriophorum vaginatum* blanket mire is located on the lower south-eastern slopes of Avermarks Hill. However, the largest uniform expanse of M17c is found covering the north-eastern and eastern lower slopes of Longhouse Hill (Figure 7.2).

M17c in the study area is dominated by a mix of *Trichophorum germanicum* and short (<15cm) grazed *Calluna vulgaris* with scattered tussocks of *Eriophorum vaginatum* in variable densities from occasional and sparse to co-dominant. The sward also contains a mix of other species ranging from frequent and occasional, to locally abundant, species present included frequent *Juncus squarrosus* (characteristic of M17c) and other typical associates such as *Erica tetralix*, *Eriophorum angustifolium*, *Vaccinium myrtillus*, *Molinia caerulea*, *Empetrum nigrum*, *Potentilla erecta*, *Nardus stricta*, *Deschampsia flexuosa*, *Anthoxanthum odoratum*, *Carex nigra*, *C. echinata* and *Galium saxatile*. The basal layer includes *Sphagnum papillosum*, *S. capillifolium*, *S. fallax*, *Rhytidiadelphus loreus*, *Pleurozium schreberi*, *Dicranum scoparium* and *Polytrichum commune*.

A single area of the M17a *Drosera rotundifolia*-*Sphagnum* spp. sub-community was also recorded, this area contained less species diversity than the areas of M17c, but was a wetter stand dominated by *Trichophorum germanicum* and *Eriophorum vaginatum* over abundant *Sphagna*.

The areas of M17 are grazed, and there is evidence of historical attempts at drainage, however despite this the majority of the blanket mire remains in a reasonable condition and most areas are active mire/peat-forming, or capable of peat formation.

5.2.7 M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire

Communities/sub-communities recorded: M19a

This 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 plateaus and broad watersheds, usually above 300m, and is confined to deeper peats on flat or gently-sloping ground (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). It is generally dominated by mixtures of *Eriophorum vaginatum* and ericoid sub-shrubs (especially *Calluna vulgaris*). *Sphagnum* spp. can be prominent over wetter ground but are not as luxuriant or rich as in M17 mire (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

The M19a *Erica tetralix* sub-community is found within the study area, but is restricted to the higher altitude plateau areas over 450m on Hagshaw Hill and Wedder Hill in the very north-western study area. These areas are characterised by an abundance of *Eriophorum vaginatum* with low cropped *Calluna* as a result of livestock grazing. Other species noted throughout the sward included lesser amounts of typical species including *Erica tetralix*, *Eriophorum angustifolium*, *Vaccinium myrtillus*, *Deschampsia flexuosa* and the mosses *Sphagnum papillosum*, *S. capillifolium*, *S. compactum*, *S. fallax*, *Dicranum scoparium*, *Pleurozium schreberi* and *Polytrichum commune*. *Trichophorum germanicum* is rare in the areas of M19a.

5.2.8 M20 *Eriophorum vaginatum* blanket mire

Communities/sub-communities recorded: M20, M20a, M20b

M20 *Eriophorum vaginatum* blanket mire is a community characteristic of ombrogenous peats on bogs where certain treatments have greatly affected the vegetation; grazing and burning have been of greatest significance, but drainage has also played a part in the development of M20 (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). It is commonest on blanket mires where these factors have contributed both to floristic impoverishment and to erosion of the peats. The peats are generally drier than in M17 and most M19 bogs, often showing surface oxidation (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

M20 is very common throughout the study area and it constitutes the main blanket mire and peatland community within the study area. It is found on the plateaus and on many of the lower slopes of all the main hills within the study area. As is typical all areas of M20 are thickly dominated by a sward of tussocky *Eriophorum vaginatum*, it is likely the extensiveness of M20 in the study area is a consequence of a long history of grazing pressure resulting in the loss of most sub-shrubs in the sward, exacerbated by historical drainage of the peatland (evident from the presence of old drainage channels and as seen on aerial imagery). Some areas of M20 are becoming quite grassy as a result of the grazing legacy and transitions can be seen to juxtaposed acid grasslands, such as U6 *Juncus squarrosus* – *Festuca ovina* grassland. Both the M20a Species-poor sub-community and the

M20b *Calluna vulgaris* – *Cladonia* sub-community are present; M20b identifying areas where some sparse sub-shrubs remain in the sward.

Eriophorum vaginatum dominates all areas of M20, other species found with lesser frequency included *Calluna vulgaris*, *Juncus squarrosus*, *Trichophorum germanicum*, *Eriophorum angustifolium*, *Vaccinium myrtillus*, *Potentilla erecta*, *Galium saxatile*, *Anthoxanthum odoratum*, *Deschampsia flexuosa* and *Luzula multiflora*. The moss layer includes *Hylocomium splendens*, *Rhytidiadelphus squarrosus*, *Pleurozium schreberi* and *Polytrichum commune*.

5.2.9 M23 *Juncus effusus/acuteiflorus* – *Galium palustre* rush-pasture

Communities/sub-communities recorded: M23a, M23b

This rush-pasture is a community of gently-sloping ground in and around the margins of soligenous flushes, as a zone around topogenous mires and wet heaths, and in poorly drained, comparatively unimproved or reverted pasture. It can be found on a variety of moderately acid to neutral soils that are kept moist to wet for most of the year (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). As a result, this community can be, at least partially, potentially dependent on groundwater; however, it is also commonly associated with surface water flows and surface water collection. This vegetation is characterised by the abundance of either *Juncus effusus* or *J. acuteiflorus* (sometimes both), with a ground layer of mesophytic herbs common in moist or permanently wet grasslands; associates are quite diverse. Acidophilous *Sphagna* and *Polytrichum commune* are rare in the M23 community (Averis *et al.*, 2004).

M23 is quite common throughout the study area, the larger expanses are at lower altitudes around watercourse floodplains and in damp grazing pastures and gently sloping ground in the southern study area, and along the access track corridor. Both the M23a *Juncus acuteiflorus* sub-community and M23b *Juncus effusus* sub-community are present. M23b is more common, as small stands, in the more elevated sections of the study area, whereas M23a is restricted more to lower ground.

The community as a whole is quite species-poor throughout the whole study area, being dominated by mixtures of *Juncus effusus* and/or *Juncus acuteiflorus* with patches of a low diversity of grasses such as *Deschampsia cespitosa*, *Holcus lanatus*, *Poa trivialis*, *Anthoxanthum odoratum* and *Agrostis* spp. The herb layer, where present, is usually dominated by *Trifolium repens*, *Rumex acetosa* and *Ranunculus repens*. Many areas contain little more diversity than this.

Some of these *Juncus acuteiflorus* stands are species-poor and lack much in the way of mesophytic herbs, and in a lot of cases could be referred to as the non-NVC *Juncus acuteiflorus* neutral grassland as described by Averis & Averis (2015), rather than M23a. The vegetation here is rather like the MG10a *Holcus lanatus-Juncus effusus* rush-pasture typical sub-community but with *J. acuteiflorus* instead of *J. effusus*; it therefore has some relationship with M23a. As noted by Averis & Averis (2015) it occurs patchily on moist and neutral soils at low altitudes, mostly in grazed farmland in the lowlands and upland margins; this fits the setting of most of these *J. acuteiflorus* stands within the study area. Given the mosaics present and their transitional nature, and the difficulty in separating such very similar stands of rush vegetation, most have been mapped as M23a unless a characteristic

associated flora was recorded, in which case the stands were recorded as M6d (section 5.2.4 above) or *J. acutiflorus* grassland (section 5.11.2 below) dependent on the precise species assemblage.

More characteristic areas of M23 only contained rare to occasional typical associate species, and these were absent from many stands. However, the following additional species were incidentally recorded in some areas; *Juncus articulatus*, *Cirsium palustre*, *Cardamine pratensis*, *Lychnis flos-cuculi*, *Prunella vulgaris*, *Dactylorhiza maculata*, *Epilobium palustre*, *Carex nigra*, *C. leporina*, *Caltha palustris*, *Filipendula ulmaria*, *Rumex obtusifolius*, *Viola palustris*, *Galium palustre*, *Ranunculus flammula*, *Menyanthes trifoliata*, *Succisa pratensis*, *Pedicularis palustris*, *Crepis paludosa*, *Potentilla palustris*, *P. erecta*, *Hydrocotyle vulgaris*, *Molinia caerulea*, *Lathyrus pratensis*, *Viola palustris*, *Veronica serpyllifolia*, *Achillea ptarmica*, *Heracleum sphondylium* and *Valeriana officinalis*. Wefts of mosses are also common between these species and patchily carpeting the ground, with the main species including *Calliergonella cuspidata*, *Brachythecium* spp., *Kindbergia praelonga* and *Rhytidiadelphus squarrosus*. These species are widely frequent to occasional but are abundant locally.

5.2.10 M25 *Molinia caerulea* – *Potentilla erecta* mire

Communities/sub-communities recorded: M25, M25a, M25b

M25 mire is a community of moist, but usually well aerated, acid to neutral peats and peaty soils (Rodwell *et al.*, 1991). It generally 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; Elkington *et al.*, 2001; Averis *et al.*, 2004). *Molinia caerulea* is the most abundant species found in this community. The associated flora is usually species-poor and consists largely of *Juncus* spp. and a few dicotyledons; occasionally sub-shrubs can be quite common. Treatments such as burning, grazing and drainage are likely to be largely responsible for the development of this community over ground that would naturally host some other kind of mire or wet heath vegetation (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

M25 is uncommon and only found as a few relatively small scattered stands within the study area. It appears relatively dry and located on shallow peat within a wider matrix of acid grasslands, wet heath and mires. Transitions to acid grasslands are common, evident by the M25 within the study area mostly being referable to the M25b *Anthoxanthum odoratum* sub-community and also the presence of intermediate stands (e.g. see section 5.2.11 below).

The M25b in the study area is dominated by *Molinia caerulea* in a sometimes tussocky and sometimes low and more open sward. Species recorded amongst the *Molinia* included in variable abundances *Vaccinium myrtillus*, *Potentilla erecta*, *Galium saxatile*, *Anthoxanthum odoratum*, *Holcus lanatus*, *Rumex acetosa*, *Agrostis capillaris*, *Juncus squarrosus*, *J. acutiflorus*, *J. effusus*, *Trichophorum germanicum*, *Deschampsia cespitosa*, *Carex leporina*, *C. nigra* and the mosses *Polytrichum commune* and *Pleurozium schreberi*.

5.2.11 M25 - U6 intermediate community

An area of ground was mapped as an M25-U6 intermediate community as the vegetation was characterised by a co-dominance of *Molinia caerulea* and *Juncus squarrosus* along with some sparse

associates such as *Potentilla erecta* and *Galium saxatile*. The vegetation in this stand was of a nature that it could not be accurately defined as either M25 mire or U6 grassland, and was therefore mapped as an intermediate community.

5.3 Wet Heaths

5.3.1 M15 *Trichophorum germanicum* – *Erica tetralix* wet heath

Communities/sub-communities recorded: M15d

This wet heath community is characteristic of moist and generally acid and oligotrophic peats and peaty mineral soils in the wetter western and northern parts of Britain. It is also associated with thinner or better drained areas of ombrogenous peat (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). It is a vegetation type with few constant species and wide variation in its flora and dominant species. *Calluna vulgaris*, *Molinia caerulea*, *Trichophorum germanicum* and *Erica tetralix* are usually all of high frequency, and it is mixtures of these species that give the vegetation its general character. However sometimes one or two of them may be missing and their relative proportions can be very diverse (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). M15 is generally an extremely variable community which can change markedly over short distances. Grazing and burning have important effects on the floristics and structure of this community and draining and peat-cutting have extended its coverage to formerly deeper and wetter peats in which blanket mire communities (i.e. M17-M19) were initially present (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

M15 wet heath is present as a relatively small number of stands, most of these are found in a restricted band across the upper-middle slopes of Common Hill and Broomerside Hill, with a few small outliers elsewhere. Where present the wet heath bridges the gap between blanket mire upslope on flatter plateaus and the acid and marshy grasslands further downslope. The wet heath present is all of the M15d *Vaccinium myrtillus* sub-community.

M15d is at the dry end of the M15 continuum, and in the study area it has been intensively grazed which has resulted in a quite dry, open, mossy and grassy wet heath with only rare to occasional *Sphagna*; and it verges on being a 'heathy-grassland'. The M15d here consists of a sward of abundant *Trichophorum germanicum* and *Vaccinium myrtillus*, only rarely is there some *Erica tetralix* and/or *Molinia caerulea* present, and *Calluna* has been grazed out apart from rare small young sprigs in only a few of the stands. Other species featuring in variable quantities in the sward include *Potentilla erecta*, *Galium saxatile*, *Anthoxanthum odoratum*, *Festuca ovina*, *Juncus squarrosus* and *Luzula multiflora*. The moss layer contains mostly *Hylocomium splendens*, *Pleurozium schreberi*, *Hypnum jutlandicum* and *Rhytidiadelphus* spp. Occasionally there are small patches of *Sphagnum capillifolium*, *S. fallax* and *Cladonia* spp. (lichens).

5.4 Springs

5.4.1 M32 *Philonotis fontana* – *Saxifraga stellaris* spring

Communities/sub-communities recorded: M32b

M32 is a community of springs and rills at moderate to high altitudes, mainly from 450m to over 1000m, where there is irrigation with circumneutral and oligotrophic waters. This is one of the most

common and widespread types of spring vegetation in the uplands of north-west Britain and is dependent on sustained irrigation by groundwater (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). These bryophyte-dominated springs, flushes and rills are striking in appearance; *Philonotis fontana* is usually dominant and visually obvious by its bright green colour.

Four areas of M32, all of the M32b *Montia fontana* – *Chrysosplenium oppositifolium* sub-community, were recorded within the study area. There were all springs, with three stands of associated rill/flush vegetation large enough to map; the other stand recorded as a target note only (Annex A). Three of these areas of M32b are on the western slopes of Burnt Rig, in the gully to the east of the upper Windrow Burn. The other isolated stand of M32b is located on Broomerside Hill.

These areas stand out due to their bright green colour, and are dominated by the moss *Philonotis fontana* along with abundant *Montia fontana*. Other species noted in some of these stands included *Caltha palustris*, *Juncus effusus*, *Agrostis* spp., *Cirsium palustre*, *Rumex acetosa*, *Ranunculus flammula*, *Pinguicula vulgaris*, *Succisa pratensis*, *Carex nigra* and *Cerastium fontanum*.

5.5 Dry Heaths

5.5.1 H9 *Calluna vulgaris* – *Deschampsia flexuosa* heath

Communities/sub-communities recorded: H9c

This heath is a characteristic sub-shrub vegetation of acid and impoverished soils at low to moderate altitudes. It is normally found on very base-poor soils, highly oligotrophic and at least moderately free-draining, often excessively so (Rodwell *et al.*, 1991; Elkington *et al.*, 2001). *Calluna vulgaris* is typically the most abundant plant in this community, often forming a fairly low and open canopy. No other sub-shrubs are consistently frequent throughout, although some can be quite common and locally abundant. Bryophytes and lichens are rarely abundant and associated species diversity is low (Rodwell *et al.*, 1991; Elkington *et al.*, 2001).

A single small area of dry heath, most closely resembling the H9c species-poor sub-community was recorded in a mosaic with U4 and U5 acid grasslands on a patch thin soil and steep banks in the upper gully of the Windrow Burn, west of Burnt Rig. The vegetation here consisted of little other than an area of short grazed *Calluna* over some sparse pleurocarpous mosses.

5.6 Calcifugous Grasslands and bracken-dominated vegetation

5.6.1 U2 *Deschampsia flexuosa* grassland

Communities/sub-communities recorded: U2, U2b

This grassland is characteristic of base poor soils that are free draining but not parched and are sometimes quite moist. It occurs through the upland fringes and in moderately oceanic parts of the lowlands. The community is often seen in close association with some heaths and mires and can grade into them. *Deschampsia flexuosa* grassland comprises swards in which often tussocky *D. flexuosa* is the obvious dominant with a number of sparse associates (Rodwell *et al.*, 1992). Many stands of U2 grassland have evidently been derived from some sort of disturbance in previous heath, mire or woodland (Averis *et al.*, 2004).

U2 is rare within the study area, but a few small areas were recorded, best fitting the U2b *Vaccinium myrtillus* sub-community (despite *V. myrtillus* being largely absent). The vegetation present includes quite abundant *Deschampsia flexuosa* over and through extensive mounds of the mosses *Polytrichum commune*, *Pleurozium schreberi* and *Hypnum* spp. Other species noted in the swards and more common in U2b included *Juncus effusus*, *J. squarrosus*, *Nardus stricta*, *Molinia caerulea*, *Potentilla erecta* and *Galium saxatile*.

5.6.2 U4 *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* grassland

Communities/sub-communities recorded: U4, U4a, U4b, U4d

The U4 *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland is a form of predominately upland grassland of well-drained, acidic and base-poor mineral soils throughout the wet and cool regions of north-west Britain where it dominates extensive areas of pastureland (Rodwell *et al.*, 1992; Cooper, 1997). Throughout this geographic range the community can often be found forming a distinctive component of larger mosaics of grasslands, heaths, and mires.

U4 grassland communities are generally identified on the presence of an often close-cropped, grass-rich sward dominated by various combinations of *Agrostis capillaris*, *Festuca ovina* and *Anthoxanthum odoratum*, with *Galium saxatile* and *Potentilla erecta* consistent associates. A well-developed moss layer is also characteristic, but in the U4b sub-community it may be limited by the dense, relatively productive sward of grasses.

U4 is common throughout the study area and it forms patches of varying sizes, all are grazed by livestock. U4 in the more elevated parts of the study area is generally unimproved, smaller and patchier amongst a mosaic of mires, heaths and other acid and marshy grasslands. These areas are for the most part of the U4a typical sub-community or U4d *Luzula multiflora* - *Rhytidiadelphus loreus* sub-community. Lower down in the increasingly pastoral southern study area U4 is more extensive and appears slightly more improved, generally being of the U4b *Holcus lanatus* - *Trifolium repens* sub-community.

Overall, the stands of U4 within the study area tend to have variable amounts of the grasses *A. capillaris*, *F. ovina*, *H. lanatus* and *A. odoratum*, and the mosses *Rhytidiadelphus squarrosus*, *Hylocomium splendens* and *Pleurozium schreberi*. Typical quantities of these species and associate species differ between the respective sub-communities. Other species common to U4 within the study area includes *Galium saxatile*, *Potentilla erecta*, *Nardus stricta*, *Rumex acetosa*, *Luzula* spp., *Cerastium fontanum* and *Juncus effusus*.

Swards of U4b tend to have a lusher cover of broader leaved grasses, an increase in the number of herbs associated with improvement, and a decrease in the abundance and diversity of mosses. In these areas *Holcus lanatus* and *Trifolium repens* are abundant characteristic associates that grow with lesser amounts of the main community grasses, other species appearing in the areas of U4b include *Cynosurus cristatus*, *Festuca rubra*, *Plantago lanceolata* and occasional patches of *Euphrasia* spp. and *Cirsium arvense*.

5.6.3 U5 *Nardus stricta* – *Galium saxatile* grassland

Communities/sub-communities recorded: U5, U5a, U5b

U5 grassland tends to be found on damp mineral soils which have peaty upper horizons. U5 typically occupies slopes where the depth and wetness of the soil are intermediate between those of the drier podsoles under U4 grasslands and wet shallow peats found under U6 grassland. The underlying rock can be anything from acid to basic, but the soils are generally acidic (Rodwell *et al.*, 1992; Averis *et al.*, 2004). U5 is common on the higher hill slopes of the cool, wet north and west of Britain (Rodwell *et al.*, 1992; Cooper, 1997).

U5 is common as patches throughout the study area, with a few large stands also present. U5 tends to be found on the middle to upper slopes on a number of the hills within the study area. U5 here as is typical is dominated by a sward of *Nardus stricta*. Other associates noted through the sward included *Agrostis capillaris*, *Festuca ovina*, *Anthoxanthum odoratum*, *Juncus squarrosus*, *Potentilla erecta*, *Galium saxatile*, *Campanula rotundifolia*, *Molinia caerulea*, *Deschampsia flexuosa*, *Vaccinium myrtillus*, *Juncus effusus*, *Carex* spp., *Luzula* spp. and the mosses *Rhytidiadelphus squarrosus*, *Hylocomium splendens* and *Pleurozium schreberi*. Two areas of the U5b *Agrostis canina* – *Polytrichum commune* sub-community were recorded due to the associated frequency of *Polytrichum commune* in the sward of those stands.

5.6.4 U6 *Juncus squarrosus* – *Festuca ovina* grassland

Communities/sub-communities recorded: U6

U6 *Juncus squarrosus* - *Festuca ovina* grassland is characteristic of moist peats and peaty mineral soils, almost always base-poor and infertile, over gentle slopes and plateaux at higher altitudes (400m to 800m) in the cool and wet north and west of Britain (Rodwell *et al.*, 1992; Cooper, 1997). U6 is often a secondary vegetation type, strongly encouraged by particular kinds of grazing and burning treatments in damper upland pastures and on the drying fringes of blanket mires. The spread of *J. squarrosus* in upland pastures tends to be encouraged where uncontrolled heavy and selective grazing has been applied over rather ill-drained ground (Rodwell *et al.*, 1992; Cooper, 1997).

A number of relatively substantial areas of U6 are present within the study area, these are often transitional areas difficult to separate from adjoining community's due species overlap, or are present in mosaics with other acid grassland communities. Areas of U6 were seen to be transitional with M20 and M25 mires in some parts of the study area. The largest patches of U6 are found on Windrow Hill and on gently sloping to flat ground to the east of High Broomerside towards Windrow Burn.

Areas of U6 in the study area are dominated by *Juncus squarrosus* but not overly so, and as a result also contain varying abundances of associate species including; *Festuca ovina*, *Anthoxanthum odoratum*, *Nardus stricta*, *Molinia caerulea*, *Potentilla erecta*, *Galium saxatile*, *Vaccinium myrtillus*, *Deschampsia flexuosa* and occasionally *Eriophorum vaginatum* in areas transitional with M20 mire. Typical acid grassland mosses are also abundant, along with occasional patches of *Sphagna*.

5.6.5 **U20 *Pteridium aquilinum* – *Galium saxatile* community**

Communities/sub-communities recorded: U20, U20a

The U20 *Pteridium aquilinum* – *Galium saxatile* community is vegetation dominated by *Pteridium aquilinum*, which can form extensive stands. The community is most common on lower hill slopes and on marginal ground, including abandoned fields, where it forms mosaics and transitions with heaths, grasslands and woodlands. The community covers fairly deep, well aerated but often moist, base-poor and infertile soils (Rodwell *et al.*, 1992; Cooper, 1997). It is largely absent from wet ground and strongly flushed slopes. *Pteridium aquilinum* is the sole dominant and is overwhelmingly abundant in some stands. This is a community of little ecological value.

A number of small areas of U20 are found throughout the southern study area, generally on steep slopes and dry soils in the gullies of watercourses. These stands are generally of the U20a *Anthoxanthum odoratum* sub-community, here *P. aquilinum* is accompanied by a grassland species assemblage reflecting close affinities to the U4 grassland described above.

5.7 **Mesotrophic Grasslands**

5.7.1 **MG1 *Arrhenatherum elatius* grassland**

Communities/sub-communities recorded: MG1

MG1 is essentially ungrazed grassland in which coarse-leaved tussock grasses are dominant in the sward. It is found on circumneutral and free draining soils throughout the British lowlands. Key to its development is the irregularity or absence of grazing (Rodwell *et al.*, 1992).

A few small stands of MG1 are present with the easternmost section of the access track study area. The vegetation here contains a mix of *Arrhenatherum elatius*, *Dactylis glomerata*, *Holcus lanatus*, *Deschampsia cespitosa*, *Agrostis* spp., *Poa* spp., *Rumex obtusifolius*, *Rubus idaeus*, *R. fruticosus* agg., *Centaurea nigra*, *Plantago lanceolata*, *Lotus corniculatus*, *Tussilago farfara*, *Heracleum sphondylium*, *Equisetum arvense*, *Galium aparine*, *Stachys sylvatica*, *Trifolium repens*, *T. pratense* and *Cirsium arvense*.

5.7.2 **MG6 *Lolium perenne* – *Cynosurus cristatus* grassland**

Communities/sub-communities recorded: MG6

MG6 is the major permanent pasture type on moist but freely draining circumneutral brown soils in lowland Britain and is often found in enclosed stands. It has usually been subjected to some form of improvement such as fertiliser application and drainage, and many stands have been derived from historical ploughing and re-seeding (Rodwell *et al.*, 1992).

A single small patch of MG6 was recorded in the southern study area, the area is intensively grazed and contains *Lolium perenne*, *Cynosurus cristatus*, *Trifolium repens* and is scattered with tufts of *Juncus effusus*.

5.7.3 **MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture**

Communities/sub-communities recorded: MG10a

MG10 is a form of rush-pasture characteristic of areas with strongly impeded drainage over a wide range of usually acid to neutral mineral soils on level to gently sloping ground (Rodwell *et al.*, 1992; Cooper, 1997). This community requires consistently high soil moisture (Rodwell *et al.*, 1992). It occurs across most of the British lowlands, with the typical sub-community being particularly prominent towards the north and west. Although found on various soil types including brown earth and calcareous earth throughout its range, this habitat 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.

MG10 is common throughout the southern study area on the grazed damp pastures and poor pastoral ground present there. All MG10 in the study area is of the MG10a Typical sub-community; the community frequently forms mosaics with other *Juncus* spp. dominated communities common in the study area.

MG10a in the study area is dominated by a thick, 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* and *Trifolium repens*. More occasional and only in some stands there were additional records of *Deschampsia cespitosa*, *Senecio jacobaea*, *Cirsium arvense*, *C. palustre*, *Rumex obtusifolius*, *Equisetum arvense*, *Cynosurus cristatus*, *Prunella vulgaris*, *Juncus articulatus* and *Taraxacum officinale* agg. Mosses such as *Kindbergia praelonga* and *Rhytidiadelphus squarrosus* often form diffuse wefts over the damp soil and among the larger plants.

5.8 **Woodland and Scrub**

Woodlands are scarce within the study area, with only a few relatively small stands or plantations in the southern study area, along the access track corridor.

5.8.1 **W7 *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemoreum* woodland**

Communities/sub-communities recorded: W7, W7c

W7 is typical of moist to very wet mineral soils which are only moderately base-rich and not very eutrophic (Rodwell *et al.*, 1991; Hall *et al.*, 2004). It is most extensive in the wetter parts of Britain, but usually occurs in soils where there is no great tendency for peat accumulation. *Alnus glutinosa* is the main tree species and is commonly accompanied by other species such as *Fraxinus excelsior*, *Betula* spp., *Salix* spp. and *Acer pseudoplatanus*. The field layer can be very varied; the wetness and nutrient status of the soil determines what other species may occur, these being mainly grasses and herbaceous dicotyledons (Rodwell *et al.*, 1991; Hall *et al.*, 2004). There are three sub-communities; differences between them are related to the extent of waterlogging, the nature of the water supply and its movement.

A couple of small stands of W7, mostly the W7c *Deschampsia cespitosa* sub-community, were recorded. These areas generally have a canopy of *Alnus glutinosa* and *Betula* spp. with occasional

Salix spp. and *Sorbus aucuparia*. The field layer contains abundant *Deschampsia cespitosa* and a range of other more occasional species including *Juncus effusus*, *Poa trivialis*, *Dryopteris* spp., *Rubus fruticosus* agg., *R. idaeus* and the moss *Rhytidiadelphus squarrosus*.

5.8.2 W11 *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* woodland

Communities/sub-communities recorded: W11

W11 is a community of moist, free-draining base-poor brown earth soils in the cooler, wetter north-west of Britain. It is characteristic of substrates that are neither markedly calcareous nor strongly acidic. The character of the community is often heavily influenced by grazing (Rodwell *et al.*, 1991; Hall *et al.*, 2004). These woodlands usually have a canopy of *Betula* spp. and/or *Quercus* spp. and a field layer dominated mainly by grasses.

W11 is scarce and found as a couple of small areas within the study area, the most significant area is in the gully of the Windrow Burn, north of the Windrow Wood conifer plantation. Here the canopy includes *Betula* spp., *Alnus glutinosa*, *Sorbus aucuparia*, *Fraxinus excelsior*, some scattered *Pinus sylvestris* and occasional *Salix* spp. over a field layer resembling the U4 and U20 calcifugous communities described above.

5.8.3 W18 *Pinus sylvestris* – *Hylocomium splendens* woodland

Communities/sub-communities recorded: W18c

W18 *Pinus sylvestris* – *Hylocomium splendens* woodland is a community of strongly leached, lime-free, podzolic soils in the central and north-western highlands of Scotland (Rodwell *et al.*, 1991; Hall *et al.*, 2004). The stands of woodland mapped as W18, specifically the W18c *Luzula pilosa* sub-community, within the study area are areas of *Pinus sylvestris* plantation over a grassy field layer.

5.9 Swamps and Tall-Herb Fens

5.9.1 S9 *Carex rostrata* swamp

Communities/sub-communities recorded: S9

S9 swamp is generally a community of the north and west of Britain. The vegetation is typically a swamp of shallow to moderately deep, mesotrophic to oligotrophic standing waters with organic substrates. It also occurs more fragmentarily in peat cuttings (Rodwell *et al.*, 1995). The S9 community is readily recognised by the tall, dense growth of *Carex rostrata* rooted in shallow water. Separation from other communities in which *C. rostrata* is present is based on its almost exclusive dominance in this community and the low cover and richness of associates.

A single small patch of S9 was recorded within the southern study area in a wetland mosaic with M6c and M23b *Juncus effusus* communities; the stand of S9 standing out as an area of dominant and species-poor *Carex rostrata*.

5.9.2 **S12 *Typha latifolia* swamp**

Communities/sub-communities recorded: S12

S12 is most characteristic of standing or slow-moving, mesotrophic to eutrophic, circumneutral to basic waters with silty substrates. It is frequent around lowland lakes ponds and reservoirs and along canals and sluggish streams. *Typha latifolia* is always dominant in this type of swamp, forming an open or closed cover of shoots usually 1-2m tall.

A single very small patch of S12 was recorded within the study area in a drying up pool, the stand was recorded as a target note (Annex A) as it was only a few square meters in size.

5.10 **Vegetation of Open Habitats**

5.10.1 **OV25 *Urtica dioica* – *Cirsium arvense* community**

Communities/sub-communities recorded: OV25

OV25 is a tall-herb weed community. This community is found throughout lowland Britain, on disturbed, nutrient-rich soils, usually where there are patches of bare or lightly covered ground, in which *Cirsium* spp. can establish themselves. It is typically found in poorly managed meadows, on abandoned arable land or waste land, on disturbed verges and tracks, and in cleared woodland or young plantations (Rodwell *et al* of OV25 was recorded in the access track study area, identifying an area within semi-improved grassland where there were dense patches of *Cirsium arvense*).

5.11 **Non-NVC Communities & Categories**

5.11.1 **Overview**

A number of non-NVC vegetation types or features were mapped during the survey. These were classified as follows. Codes used in Figure 7.2 are given in parentheses:

- Conifer plantation (CP) and young conifer plantation (YCP)
- Young broadleaved plantation (YBP)
- Bare ground, soil, rock, hardstandings (BG)
- Buildings and associated driveways (BD)
- Gardens and amenity grassland (PG)
- *Juncus effusus* acid grassland community (Je)
- *Juncus acutiflorus* acid to neutral grassland community (Ja)

The plantation areas were unremarkable in terms of their flora and species composition. These woodland plantation areas, along with areas of bare ground, buildings and associated gardens are floristically impoverished and of negligible botanical importance. The other bulleted non-NVC vegetation types recorded above, i.e. Je and Ja, are described below.

5.11.2 *Juncus effusus* acid (Je) and *J. acutiflorus* (Ja) acid to neutral grasslands

The 'Je' and 'Ja' acid grassland communities are present here as patches of *Juncus effusus* or *J. acutiflorus* dominated calcifuge grasslands. This is vegetation in which very dominant and tall tussocks of *J. effusus* or swards of *J. acutiflorus* grow abundantly among a few shorter 'acid grassland' swards including frequent to occasional *Agrostis capillaris*, *Holcus lanatus*, *Deschampsia flexuosa*, *Nardus stricta*, *Molinia caerulea*, *Juncus squarrosus*, *Rumex acetosa*, *Potentilla erecta* and *Galium saxatile*; mosses such as *Pleurozium schreberi* and *Rhytidiadelphus squarrosus* are also common. This vegetation does not fit into any NVC community as it lacks the wetland element of M6 and M23 *Juncus* spp. mires and has a more acidophilous flora than MG10 *Juncus effusus* rush-pasture; it is therefore classed separately.

A number of areas of a more mesotrophic *J. acutiflorus* community are also present, this is not quite as acid as described above, and still does not have the wetland elements of M6 or M23. This is very similar to the MG10a community but with *J. acutiflorus* instead of *J. effusus*, the other frequent to abundant species that characterise this community are *Holcus lanatus*, *Agrostis* spp., *Ranunculus repens*, *Trifolium repens* and *Rumex acetosa*.

This vegetation is generally of limited botanical interest, but in light of the SEPA classification of potential GWDTEs these non NVC types Je and Ja should also qualify for potential GWDTE status. The classification of moderate sensitivity is in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

5.12 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.

5.13 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 CORRESPONDENCE WITH PHASE 1 HABITATS

For each of the above-described vegetation and habitats types found in this survey, Table 6-1 shows the equivalent habitats according to the Phase 1 habitat classification (JNCC, 2010) for this study area, taking into account the species composition and habitat quality. For instance, most areas of typical blanket bog communities such as M17, M19 and M20 have been classed as 'wet modified bog' due to the evident impacts from grazing, forestry, drainage, and historical disturbance from the Existing Development; however, some areas of relatively undisturbed and better-quality peat-forming mire are classified as 'blanket bog'.

Many other NVC communities can also span different Phase 1 types. For example, M25 mire can be classified as a blanket or modified mire, or a marshy grassland depending on peat depth. M25 in the study area all appeared to be on shallow peaty soils and is primarily of the grassier M25b sub-community (see section 5.2.10 above), and has as such been classified as marshy grassland throughout the study area.

The Phase 1 results are also shown on Figure 7.2 and have been interpreted from the field surveys, mapping data, and the NVC polygon data broadly using Table 6-1. Polygons where there are mosaic NVC communities have generally been assigned a single Phase 1 classification based on the dominant NVC type (despite many polygons containing multiple Phase 1 types, often in low percentages). Therefore, Figure 7.2 is a relatively broad overview, and the NVC data should be consulted for further detail in a specific area.

Table 6-1 Phase 1 habitat type equivalents of NVC communities and other habitats recorded

Phase 1 Equivalents	NVC & Other Habitats/Features Recorded
A1.1.1 Woodland: broadleaved, semi-natural	W7, W11
A1.1.2 Woodland: broadleaved, plantation	YBP
A1.2.2 Woodland: coniferous, plantation	W18, CP, YCP
B1.1 Acid grassland: unimproved	U2, U4 (a & d), U5, U6
B1.2 Acid grassland: semi-improved	U4b
B2.1/B2.2 Neutral grassland: unimproved/semi-improved	MG1, MG10 (intensively grazed stands)
B5 Marsh/marshy grassland	M6, M23, M25, M25b, MG10, Je, Ja, M25-U6 intermediate
B6 Poor semi-improved grassland	MG6
C1.1 Bracken: continuous	U20
C3.1 Other tall herb & fern: tall-ruderal	OV25
D1.1 Dry dwarf shrub heath - acid	H9
D2 Wet dwarf shrub heath	M15
D5 Dry heath/acid grassland mosaic	Mosaics of B1 and D1.1 communities
D6 Wet heath/acid grassland mosaic	Mosaics of B1 and D2 communities
E1.6.1 Bog: blanket	M17, M19, M20
E1.7 Bog: wet modified	M2, M3, M17, M19, M20, M25a
E2.1 Flush/spring: acid/neutral	M4, M6
E2.2 Flush/spring: basic	M10
E2.2 Flush/spring: bryophyte dominated	M32
F1 Swamp	S9, S12
J3.6 Buildings	BD
J1.2 Amenity grassland	PG
J4 Bare ground	BG

7 EVALUATION OF BOTANICAL INTEREST

7.1 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 GWDTE;
- Habitats Directive (92/43/EEC) Annex I habitats; and
- Scottish Biodiversity List (SBL) priority habitats

7.2 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2017). 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 habitat's respective conservation importance. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment (see Chapter 11: Hydrology, Hydrogeology & Geology).

Using SEPA's (2017) guidance, Table 7-1 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 7-1 Communities within the study area which may potentially be classified as GWDTE

NVC Code	NVC Community Name
M15	<i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath
M25	<i>Molinia caerulea</i> – <i>Potentilla erecta</i> mire
MG10	<i>Holcus lanatus</i> – <i>Juncus effusus</i> rush pasture
U6	<i>Juncus squarrosus</i> – <i>Festuca ovina</i> grassland
Je & Ja ⁴	<i>Juncus effusus</i> and <i>Juncus acutiflorus</i> non-NVC grasslands
W7	<i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>Lysimachia nemoreum</i> woodland
M6	<i>Carex echinata</i> – <i>Sphagnum fallax/denticulatum</i> mire
M10	<i>Carex dioica</i> - <i>Pinguicula vulgaris</i> mire
M23	<i>Juncus effusus/acutiflorus</i> – <i>Galium palustre</i> rush pasture
M32	<i>Philonotis fontana</i> – <i>Saxifraga stellaris</i> spring

The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see Figure 7.3.

Within Figure 7.3 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, 2017). 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 at all. Determining the actual groundwater dependency of particular areas or habitat requires further assessment (see Chapter 11: Hydrology, Hydrogeology & Geology).

⁴ In light of the SEPA classification on potential GWDTEs the non NVC types ‘Je’ and ‘Ja’ should also qualify for potential GWDTE status. The classification of moderate sensitivity is keeping in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

7.3 Annex I Habitats

7.3.1 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, substrates and so on.

Using Joint Nature Conservation Committee (JNCC) Annex I habitat listings and descriptions⁵, 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 7-2.

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

Table 7-2 NVC Communities Recorded and Corresponding Annex I Habitat Types

NVC Code	NVC Community Name	Annex I Code	Annex I Title
M2	<i>Sphagnum cuspidatum/fallax</i> bog pool community	7130	Blanket bog
M3	<i>Eriophorum angustifolium</i> bog pool community	7130	Blanket bog
M4	<i>Carex rostrata</i> - <i>Sphagnum fallax</i> mire	7140	Transition mires and quaking bogs
M10, M10a	<i>Carex dioica</i> - <i>Pinguicula vulgaris</i> mire	7230	Alkaline fens
M15d	<i>Trichophorum germanicum</i> – <i>Erica tetralix</i> wet heath	4010	Northern Atlantic wet heaths with <i>Erica tetralix</i>
M17c	<i>Trichophorum germanicum</i> – <i>Eriophorum vaginatum</i> blanket mire	7130	Blanket bog
M19a	<i>Calluna vulgaris</i> – <i>Eriophorum vaginatum</i> blanket mire	7130	Blanket bog
M20, M20a, M20b	<i>Eriophorum vaginatum</i> blanket mire	7130	Blanket bog
H9	<i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heath	4030	European dry heaths

7.3.2 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*

⁵ <http://jncc.defra.gov.uk/page-1523>

spp., or *Molinia caerulea* in certain circumstances, together with *Calluna vulgaris* and other ericaceous species. The most abundant NVC blanket bog types are M17, M18, M19, M20 and M25.

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

As noted above, M25 mire can also fall within the blanket bog Annex I type, usually where the underlying peat depth is greater than 0.5m and the habitat is wet and contains peat forming species. As described in section 5.2.10 above, M25 within the study area is for the most part quite species-poor, grassy, at the drier end of the scale and generally lacks *Sphagnum* on what appear to be shallow peaty soils. The M25 within the study area is also grazed, in some areas quite intensively, and this has resulted in many areas of M25 appearing transitional to acid grassland communities (especially U6) and in intricate mosaics with these same communities. General field observations and the character of the majority of M25 within the study area mean that it has not been considered to be of Annex I habitat quality in this case.

7.3.3 7140 Transition mires and quaking bogs

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

7.3.4 7230 Alkaline fens

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

7.3.5 4010 Northern Atlantic wet heaths with *Erica tetralix*

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures *Erica tetralix*, *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses. All examples of M15 wet heath were included within the 4010 Northern Atlantic wet heaths category.

7.3.6 4030 European dry heaths

European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf shrubs dominate the vegetation. The most common dwarf shrub is *Calluna vulgaris*. Just a single small area of H9 *Calluna* heath was recorded within the study area.

7.3.7 Annex I Woodlands

None of the woodlands within the study area consisted of Annex I woodland types such as 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, 91C0 Caledonian forest or 91A0 Old

sessile oak woods with *Ilex* and *Blechnum* in the British Isles, as the species assemblages, specific geographical or landscape settings etc did not align with any of these Annex I habitat types.

7.4 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 a large number of NVC types.

The relevant SBL priority habitat types (descriptions of which can be found on SNH's website⁶), and associated NVC types recorded within the study area are as follows:

- **Wet woodland:** W7;
- **Blanket bog:** M17, M19, M20 (including M2/M3 where associated with M17-M20);
- **Upland flushes, fens and swamps:** M4, M6, M10, S9, S12, M23a and M32;
- **Upland heathland:** M15 and H9;

These SBL priority habitats correspond with UK Biodiversity Action Plan (BAP) Priority Habitats⁷.

7.5 Summary

Table 7-3 provides a summary of all the NVC communities recorded within the study area, and any associated habitat sensitivities as described in the sections above.

Table 7-3 Summary of study area NVC communities and sensitivities

NVC Codes Recorded	Potential GWDTE Status	Annex I Type Code	SBL Priority Habitat Type
Mires & Wet Heath			
M2, M2b	-	7130 Blanket bogs (examples associated with M17-M20)	Blanket bog
M3	-	7130 Blanket bogs (examples associated with M17-M20)	Blanket bog
M4	-	7140 Transition mires and quaking bogs	Upland flushes, fens and swamps
M6c, M6d	High	-	Upland flushes, fens and swamps
M10, M10a	High	7230 Alkaline fens	Upland flushes, fens and swamps
M15d	Moderate	4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>	Upland heathland
M17a, M17c	-	7130 Blanket bogs	Blanket bog
M19a	-	7130 Blanket bogs	Blanket bog

⁶ <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list>

⁷ <http://jncc.defra.gov.uk/page-5718>

NVC Codes Recorded	Potential GWDTE Status	Annex I Type Code	SBL Priority Habitat Type
M20, M20a, M20b	-	7130 Blanket bogs	Blanket bog
M23a, M23b	High	-	Upland flushes, fens and swamps (applies to <u>M23a</u> only)
M25 ⁸ , M25a, M25b, M25-U6 intermediate	Moderate	-	-
M32b	High	-	Upland flushes, fens and swamps
Dry Heaths			
H9c	-	4030 European dry heaths	Upland heathland
Calcifugous Grasslands			
U2, U2a	-	-	-
U4, U4a, U4b, U4d	-	-	-
U5, U5a, U5b	-	-	-
U6	Moderate	-	-
U20, U20a	-	-	-
Mesotrophic Grasslands			
MG1	-	-	-
MG6	-	-	-
MG10a	Moderate	-	-
Woodland & Scrub			
W7, W7c	High	-	Wet woodland
W11	-	-	-
W18c	-	-	-
Swamps & Tall-Herb Fens			
S9	-	-	Upland flushes, fens and swamps
S12	-	-	Upland flushes, fens and swamps
Vegetation of Open Habitats			
OV25	-	-	-

8 SUMMARY

MacArthur Green carried out NVC and habitat surveys within the Proposed Development habitats study area in May and August 2018 in order to identify those areas of vegetation communities with the greatest ecological or conservation interest.

In total 28 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 non-NVC *Juncus* spp. grasslands.

⁸ M25 can fall with Annex I and SBL classifications if the underlying peat depths are over 0.5m in depth. However, areas of M25 within the study area are limited, patchy and appeared on shallow peat and were of the grassy M25b sub-community (section 5.2.10); as such M25 at the site has not been considered Annex I or SBL Priority Habitat.

The study area mainly contains a mix of typical mire, wet heath, acid grassland and upland marshy grassland and flush communities. Although some large relatively homogeneous stands of vegetation occur across the study area most of the communities often form complex mosaics and transitional areas across the study area. The habitats in the study area are subject to cattle and sheep grazing, and many areas of mire appear to have been drained historically.

The survey results have also been compared to a number of sensitivity classifications, indicating the presence of Annex I, SBL and potential GWDTE habitats, as summarised in Table 7-3.

GLOSSARY

acidophilous: plants/bryophytes that prefer to grow in an acidic environment.

base-poor: environments which have few chemical bases, they are dominated by environmental acids (usually organic acids) and so are acidic.

base-rich: environments which are neutral or alkaline.

base-richness: the level in soil or water of chemical bases, such as calcium or magnesium ions. Chemical bases are alkalis. Many plants and bryophytes are restricted to base-rich or base-poor environments.

basiphilous: plants/bryophytes that prefer to grow in a basic environment.

calcareous: calcareous grassland forms on soils that are base-rich.

calcicolous: a plant that grows and thrives in soil rich in lime.

calcifugous: growing or living in acid soil.

circumneutral soil: nearly neutral, having a pH between 6.5 and 7.5.

dicotyledon: a plant that produces flowers and has two cotyledons (i.e. embryonic leaves).

forb: a herbaceous flowering plant that is not a graminoid (grasses, sedges and rushes).

graminoid: grasses; monocotyledonous, usually herbaceous plants with narrow leaves growing from the base. They include the true grasses, of the family Poaceae (also called Gramineae), as well as the sedges (Cyperaceae) and the rushes (Juncaceae).

mesophytic: a land plant that grows in an environment having a moderate amount of moisture, neither a particularly dry nor particularly wet environment.

mesotrophic grassland: neutral grassland, characterised by vegetation dominated by grasses and herbs on a range of circumneutral soils.

lagg: zone where water draining a bog meets that from adjoining mineral soils. A characteristic of the lagg zone is that normally it has more available plant nutrients, is more alkaline and hence shows greater species diversity.

monocotyledons: flowering plants group which have just one cotyledon.

mosaic: a pattern of two or more vegetation types disposed in intimate relationships to one another.

oligotrophic: lacking in plant nutrients.

ombrogenous: dependant on rain for its formation. Ombrogenous bog is a peat-forming vegetation community lying above groundwater level: it is separated from the mineral soil, and is thus dependent on rain water for mineral nutrients. The resulting lack of dissolved bases gives strongly

acidic conditions. Two types of ombrogenous bogs are commonly distinguished: raised bogs and blanket bogs.

pleurocarpous: A type of moss in which the female sex organs and capsules are borne on short, lateral branches, and not at the tips of branches. Pleurocarpous mosses tend to form spreading carpets rather than erect tufts.

podsol: a soil that develops in temperate to cold moist climates under coniferous or heath vegetation; an organic mat over a grey leached layer.

soligenous: where water movements are predominantly lateral. Produced by inflow of surface water or rise of groundwater and not completely by locally precipitated water.

topogenous mire: a type of mire that forms under climatic conditions of reduced rainfall, with consequent lower humidity and summer drought, which restrict the growth of wetland vegetation to areas where precipitation is concentrated (e.g. valley bottoms).

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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 7.2 and detailed within Table A-1 below. A sample of corresponding general photographs is provided in Annex B.

Table A. 1 Study Area Target Notes

TN ID	Grid reference	NVC Community	Feature Type	Description
1	NS 79740 31134	M10	Flush	M10 flush with <i>Pinguicula vulgaris</i> , <i>Eriophorum angustifolium</i> , small <i>Carex</i> spp. and brown mosses.
2	NS 79749 30608	M32b	Spring	Two M32b springs dominated by <i>Philonotis fontana</i> and frequent <i>Montia fontana</i> .
3	NS 79374 30037	M10	Flush	M10 flush on slope, quite dry, <i>Carex</i> spp., <i>Pinguicula vulgaris</i> , <i>Pedicularis sylvatica</i> & brown mosses.
4	NS 79476 30029	M10	Flush	Number of quite dryish M10 flushes at this location.
5	NS 78684 31038	S12	Swamp	<i>Typha latifolia</i> dominates a very small area with some mossy areas around the fringes with <i>Rhytidiadelphus squarrosus</i> and <i>Calliergonella cuspidata</i> .
6	NS 78340 30958	M10a	Flush	<i>Pinguicula vulgaris</i> , <i>Eriophorum angustifolium</i> , <i>Carex nigra</i> present.
7	NS 78339 30961	M10a	Flush	<i>Pinguicula vulgaris</i> , <i>Eriophorum angustifolium</i> , occasional <i>Eriophorum</i> spp.
8	NS 78333 30966	M10a	Flush	As TN7.

ANNEX B. 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, which are described in section 5 above.

Photograph B1: M20 *E. vaginatum* mire, looking north-east from Common Hill to Henrys Hill.



Photograph B2: M20 blanket mire on lower eastern slopes of Longhouse Hill



Photograph B3: M20 mire with M6d and M6c flush (i.e. runnel of *Juncus* spp.)



Photograph B4: Grazed M17c blanket bog on north-eastern slopes of Longhouse Hill



Photograph B5: Area of M2 *Sphagnum fallax* mire within M20



Photograph B6: M10 basic flush community



Photograph B7: M32b springhead community



Photograph B8: Large M32 spring and associated wetland in headwater gully of Windrow Burn



Photograph B9: Heavily grazed M15d wet heath – *Calluna* is grazed out



Photograph B10: Flat area with mosaic of *Juncus* spp. dominated mires and grasslands



Photograph B11: M23a *J. acutiflorus* mire and neutral 'Ja' grassland mosaic



Photograph B12: Je - *Juncus effusus* acid grassland non-NVC type - mossy variant



Photograph B13: Tussocky U5 *Nardus stricta* grassland in foreground



Photograph B14: MG1 coarse neutral grassland

