The Repowered and Extended Ben Aketil Wind Farm

Renantis UK Limited

Appendix 7.1: Habitats and Vegetation

avian ecology

CONTENTS

ANNEXES

1 INTRODUCTION

1.1.1 This Technical Appendix has been prepared to accompany **Chapter 7: Ecology** of the Environmental Impact Assessment Report (EIAR) for the proposed Repowered and Extended Ben Aketil Wind Farm (hereafter 'The Proposed Development').

1.1.2 It presents the findings of:

- Summarised results of surveys undertaken as part of investigations into the Gleann Eoghainn Wind Farm (within the Proposed Development Site) in 2014, 2015 and 2016. These comprised a Phase 1 habitat survey and NVC Survey (JNCC, 2010 and Rodwell, 2006).

- Details of the methodology and results of updated surveys undertaken in September and October 2021. These surveys aimed to ground-truth and, where relevant, update the distribution and condition of previously recorded habitats, and to expand geographical survey coverage to areas of the Site not covered by the previous surveys for Gleann Eoghainn, to establish baseline habitat conditions at the Site in accordance with NatureScot (2020) and SEPA (2014) guidance.

1.1.3 It should be read with reference to "Gleann Eoghainn Windfarm Baseline and Ornithology Report 2014-2016, November 2016" (Caledonian Conservation on behalf of RES; hereafter 'the 2016 Report') which is provided in **Volume 4** of the EIAR as **Confidential Technical Appendix 7.7**.

1.1.4 It should also be read with reference to the following Figures, presented in Volume 2 of the EIAR:

- **Figure 7.1:** Statutory Sites Designated for Ecological Interest.

- **Figure 7.2a** and **7.2b:** Phase 1 Habitat Survey.

- **Figure 7.3a** and **7.3b:** National Vegetation Classification Survey.

1.1.5 **Annex 1** provides the scientific names for the plant species regarded in this Technical Appendix. Only common names are used throughout the text, with the exception of habitat community names.

1.2 Site Overview

1.2.1 The 'Site' is defined as everything within the red line boundary shown on **Figures 7.1, 7.2** and **7.3**. The Survey Area, as shown on the figures and defined in Chapter 7, is a 250m buffer of the 'Study Area' that was current at the time surveys were carried out.

1.2.2 The Site is located on the west and northwest slopes of Ben Aketil within the north-western part of the Isle of Skye in the Highland Council area. The Site encompasses the operational Ben Aketil Wind Farm.

1.2.3 The Site is located approximately:

- 15 km west of Portree;

- 3.5 km south of Edinbane; and

- 5 km east of Dunvegan.

1.2.4 The Site sits within broadly undulating upland moorland, gently sloping downwards from northeast to southwest. The elevations of the Site range from 20 m AOD near the crossing of the A863 over the

Caroy River, to the peak of Ben Aketil at 266 m AOD. Ben Sca, which peaks at 283 m, is located approximately 1.1 km to the northeast of the Site.

2 METHODOLOGY

2.1.1 This section provides detailed methodologies of desk studies and field studies undertaken to establish baseline habitat and vegetation information to inform the design and assessment of the Proposed Development. The field study methodologies relate to the areas surveyed in 2021. For the methodologies of the earlier surveys, reference should be made to the 2016 Report (**Confidential Appendix 7.7**).

2.1.2 The objectives of the baseline studies were to:

- Establish the spatial distribution of habitats and vegetation communities which may be impacted by the Proposed Development.
- Identify the presence and distribution of any habitat types listed on Annex 1 of the Habitats Directive[1], the Scottish Biodiversity List (SBL) or Local Biodiversity Action Plan (LBAP) and/or which represent potential Groundwater Dependent Terrestrial Ecosystems for (GWDTEs) for subsequent hydrological assessment.
- Record the presence of any protected or non-native plant species listed on Schedule 8 and 9 of the Wildlife and Countryside Act 1981 (as amended) respectively.

2.2 Desk Study

2.2.1 A desk study was undertaken to identify the proximity of the site to any statutory or non-statutory designated site for nature conservation with habitat or botanical qualifying interest and to obtain any existing records of protected and/or non-native flora within the site and the surrounding wider area. This includes relevant information from the 2016 report (**Confidential Appendix 7.7**).

2.2.2 Desk study sources, search areas and information obtained are summarised in **Table 7.1.1**

Table 7.1.1: Desk study sources.

Key Source	Information Sought	Search Area
NatureScot Sitelink; The 2016 report	Proximity to international statutory designated sites for nature conservation with habitats and/botanical interests.	Within 20 km of the turbine area.
NatureScot Sitelink; The 2016 Report	Proximity to national statutory designated sites for nature conservation with habitats and/botanical interests.	Within 5km of the turbine area
Highland Biological Recording Group (HBRG)	Existing records of protected and notable habitats and plant species and non-statutory designated sites.	Within 2 km of the turbine area.

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

2.3 Field Surveys

2.3.1 The following field surveys have been completed:

- Phase 1 habitat survey.
- National Vegetation Classification (NVC) survey.

2.3.2 Survey methodologies and subsequent interpretation of results have made reference to the following key pieces of guidance:

- Averis *et al*. (2014). - *An Illustrated Guide to British Upland Vegetation.*
- Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey - a technique for environmental audit.*
- Highland Biodiversity Partnership (2010). *Highland Biodiversity Action Plan 2010 – 2013*.
- SNH (2017). *Commissioned Report 766 - Manual of terrestrial EUNIS habitats in Scotland*.
- Rodwell (2006). *National Vegetation Community Users' Handbook*.
- Rodwell ed. (1991). *British Plant Communities. Volume 1. Woodlands and Scrub*.
- Rodwell ed. (1992). *British Plant Communities. Volume 2. Mires and Heaths.*
- Rodwell ed. (1992). *British Plant Communities. Volume 3. Grasslands and montane communities*.
- Rodwell ed. (1998). *British Plant Communities. Volume 4. Aquatic communities, swamps and tall-herb fens*.
- SNIFFER (2009). *WFD95: A Functional Wetland Typology for Scotland – Field Survey Manual*.
- Stace (1997). *Field flora of the British Isles*.
- Scottish Environment Protection Agency (2014). *Land Use Planning System Scottish Environment Protection Agency (SEPA) Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*.

Habitat Survey Area

2.3.3 The area within which detailed baseline habitat and vegetation field surveys have been undertaken has comprised all terrestrial habitats within the Survey Area, which have not been subject to previous surveys 2014-2016. In addition to the detailed baseline surveys, a walkover was carried out of the previous survey area for the Gleann Eoghainn proposal and the 2014-2016 survey results were ground-truthed to confirm there have been no notable changes in habitat composition or extent.

Phase 1 Habitat Survey

2.3.4 The Phase 1 habitat survey was undertaken on the 14th - 15th September 2021.

2.3.5 The survey was undertaken in accordance with the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010[2]).

2.3.6 During the survey all habitats within the Survey Area were mapped according to industry standards and described using a series of 'target notes' (TNs).

NVC Survey

2.3.7 An NVC survey of the Survey Area was also undertaken on 14th - 15th September 2021, following the guiding principles detailed within the 'National Vegetation Classification: User's Handbook' (Rodwell, 2006[3]).

2.3.8 The NVC survey comprised all noteworthy habitats within the Survey Area. The survey concentrated on those areas where plant communities were deemed likely to correspond with Annex I habitats and / or represent potential GWDTE.

2.3.9 During the survey, square quadrats of relevant size (per guidance) were distributed throughout homogenous stands identified, in order to provide a representative sample of the vegetation community present.

2.3.10 In each quadrat sample area, data were collected on the presence and abundance of vascular plant species using the Domin scale. These data were then analysed and classified to an NVC vegetation community, where possible, using the keys in Rodwell (various) British Plant Communities Volumes 1 to 5 (see list in section 2.3.2), aided by analysis using the Modular analysis of Vegetation Information System (MAVIS) created by the UK Centre for Ecology and Hydrology.

'Ground Truthing' of previous surveys

2.3.11 In addition to the Phase 1 and NVC surveys of previously unsurveyed areas, a walkover of the previous survey areas (2014-2016) was undertaken in order to check for any notable changes in habitat status.

Personnel

2.3.12 Surveys were conducted by M. Wood; a competent botanist with considerable experience of undertaking Phase 1 Habitat and NVC surveys for proposed wind farm developments, across numerous comparable upland sites in Scotland.

2.3.13 The NVC analysis was checked by S. Turner a competent botanist with experience of undertaking and analysing NVC surveys for similar upland sites across Scotland.

2.4 Limitations

2.4.1 Detailed habitat surveys were carried out within the Site in 2014 and 2015 for an earlier wind farm proposal (Gleann Eoghainn). As such, where the 2021 habitat Study Area for the Proposed Development overlapped with the area surveyed previously for Gleann Eoghainn, the surveyor carried out a walkover to validate the previous results and to check that there had been no substantive changes to habitat composition or condition. This ground-truthing survey was carried out by a different surveyor, at a slightly different time of year, and six years after the original surveys

[2] JNCC (2010) *Handbook for Phase 1 Habitat Survey - a technique for environmental audit.*
[3] Rodwell (2006). *National Vegetation Community Users' Handbook*.

and as such there may be minor differences in how habitats have been classified between the 2014-15 and 2021 surveys, the previous surveyor's results were not changed based on a different subjective opinion of the habitat composition; changes were only made where it was considered that the habitats present had changed notably.

2.4.2 Where habitat within the Study Area crossed from areas surveyed previously into areas for which no baseline data had yet been collected, new Phase 1 and NVC survey data were collected in line with guidance. As such there are areas where habitat classifications within a polygon differ across this border between the previous Gleann Eoghainn surveys and the survey carried out in 2021. This primarily applies to the NVC habitat classification results and to interpretation and recording of habitat mosaics, and so the approach to assessment will account for this and given the nature and protection status in Phase 1 terms of the majority of habitats present it is not considered that this will represent a constraint to the validity of the conclusions of the assessment.

2.4.3 The survey area used for surveys in 2021 followed an intended access track route to the south. Following responses from consultees to scoping, this route was changed in November 2022, to follow the route of the crofters track from Feorlig (see Chapter 2). This change to the design took place outwith the recommended habitat survey season. This has meant that there is a small area (2.21 ha) of track which has not been surveyed and so which is within the RLB but not within the survey area.

2.4.4 Although the southern access largely follows an existing track, the crofters track will need widening in places, and so will be subject to areas of habitat loss. The exact locations and extent of engineering works to the track, and so the exact locations of loss of new habitat as opposed to the upgrade of a track that is already there, are not known at this stage. The approach to assessment will account for the gap in survey data and take a precautionary worst-case scenario approach (for more detail of how this has been addressed see **Paragraph 7.5.31** in **Chapter 7: Ecology**); it is not considered that this will represent a constraint to the validity of the conclusions of the assessment.

3 RESULTS

3.1 Desk Study

3.1.1 This section provides details of existing habitat information and existing records of protected and notable plant species identified within and in proximity to the Site from desk study sources listed in **Table 7.1.1**.

Statutory Designated Sites for Nature Conservation

3.1.2 On review of Sitelink, the Survey Area does not form a part of any statutory designated site for nature conservation.

3.1.3 There are no international or national designated sites located within 10 km of the Proposed Development.

Non-statutory Designated Sites for Nature Conservation

3.1.4 The data returned by the HBRG identifies that the Survey Area does not form part of any non-statutory designated sites for nature conservation with habitat and/or botanical interests, and is not located within 2 km of any such site.

Existing Habitat and Botanical Records

HBRG

3.1.5 The data request submitted to the HBRG returned no records of notable plant species from within the Survey Area. Two records of invasive non-native seaweed species *Sargassum muticum* were returned within the 2 km search area, but outside the Survey Area.

3.2 Habitat Survey Results: Overview

3.2.1 This section presents the results of baseline field surveys from 2014-2016 and 2021, including an overview of habitat types present within the Survey Area and their distribution. It should be read with reference to **Figures 7.2** and **7.3** and to **Confidential Appendix 7.7**. Where areas of habitat are too limited in extent to show as an area on the figures they are instead described in target notes.

3.2.2 Phase 1 habitat survey target notes are detailed in **Annex 2**, and 2021 NVC tables are presented in **Annex 3**, with 2021 photographic plates presented in **Annex 4**.

3.2.3 The Ben Aketil Survey Area is largely situated with Gleann Eoghainn, with the Caroy River running south in the valley bottom where it terminates at the sea. The Survey Area rises to 266 m at the summit of Ben Aketil on its eastern side, and is bordered by Sitka spruce plantation to the north.

3.2.4 The Survey Area is mostly gently sloping with neither many flat areas or steep areas. The shallow contours of the landscape have facilitated the accumulation of deep peat, upon which a variety of bog plant communities are found. Where this peat becomes shallow, mostly around the summit of Ben Aketil there are wet heath habitats.

3.2.5 The bog is broken by several burns, some of which have cut into the bedrock to form deep narrow gullies, within these areas acid grassland, dry heath and remnant native broadleaf woodland is found. Also scattered along sections of these burn lines, rush-dominated marshy grassland and acid flush vegetation can be found. Some wet acid flushes and springs can also be found within the main bog areas.

3.2.6 The southern part of the Survey Area, along the proposed southern access route. is a mix of improved fields for fodder and grazing with some remnant patches of bog and some areas of planted broadleaf and acid grassland and there are some agricultural buildings and houses near the road at Feorlig. Where the Survey Area reaches the sea, there is some intertidal mud and sand.

3.3 Habitat Survey Results: Walkover of Previously Surveyed Areas.

3.3.1 The 2021 walkover did not record notable changes to the habitats mapped in 2015/2016. As described in the limitations section, there were areas where different surveyors may have classified the habitats and/or recorded mosaics differently, however, in most instances these differences were not substantial/certain enough to warrant revision of the results recorded during the previous surveys (see Section 2.4: Limitations).

3.4 Habitat Survey Results: Phase 1 Habitats

Table 7.1.2: Summary of Phase 1 Habitats.

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
A1.1.1	Broadleaved semi-natural woodland	Not present	Not present	This woodland is found in three narrow gullies that cross the central area in a wide area of bog, and also in a wider gully near the sea at Caroy. The trees form a fairly dense canopy of around 10m high consisting mainly of hazel, rowan and birch and with lesser amounts of aspen, eared willow, ash, sycamore. The ground layer includes broad buckler fern, lemon-scented fern and common heather, primrose and great woodrush. Invasive cotoneaster is present and has become well established.
A1.1.2	Broadleaved woodland plantation	Not present.	A strip of well-established but young plantation broadleaved woodland occurs along the eastern extent of the Caroy River. Tree species include silver birch, downy birch, alder, willow species and hazel.	There are some small areas between fields, consisting mostly of birch, willows and alder, around 5m tall. The ground layer is a mix of rush dominated marshy grassland and purple moor grass tussock bog.
A1.2.2	Coniferous woodland plantation	A commercial Sitka spruce plantation between 15 and 25 years old [in 2016] is situated within 200 m of the northern boundary of the revised core survey area.	Not present.	This is only found in the northern buffer of the site and is composed of densely planted Sitka spruce with some lodgepole pine. It has been primarily planted directly onto bog or wet heath but the ground layer is now mostly dense dead needles. The

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
				trees are around 8 m to 10 m tall and some parts are dead from fire damage.
A1.3.2	Mixed woodland plantation	Not present.	Several mature conifer and broadleaved trees are present in the grounds of the residential dwelling located near the southern end of the potential access route.	Not present
A2.1	Continuous scrub	Not present.	Small but dense stands of gorse are present across the area, including on the edge of the Caroy River and adjacent to tracks leading from the A863 at the southern end of the potential access route.	There is a tiny area of gorse dominated scrub along a roadside embankment in the South of the buffer near Caroy.
A2.2	Scattered scrub	A small patch of scattered scrub consisting mainly of goat willow and eared willow is present in the south on the banks of the Rageary Burn.	Not present.	Not present
A3.1	Scattered broadleaved trees	Not present.	Scattered broadleaved trees are present on the slopes of the narrow ravine and along the length of the Aketil Burn, including willow species, hazel, oak and rowan. Bog-mosses are occasional on the wet crag faces here, and woodland plant species include greater fork-moss, wood-sorrel, lemon-scented fern, pignut, slender St John's-wort, yellow pimpernel and hard-fern. The humidity-demanding liverwort long-leaved pouncewort was also recorded on a hazel tree by the Aketil Burn.	Not present
B1.1	Unimproved acid grassland	Not present	Not present	There are a few small patches of this habitat in the form of mat grass dominated grassland on the south-

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
				western slopes of Ben Aketil, on shallow soil that is better drained and so drier than the surrounding bog and wet heath. Also present are a mix of other herbs, grasses and sedges including tormentil, sheep's fescue, common bent, heath rush, carnation sedge, star sedge and glaucous sedge. In the far south of the Study Area there is another small area of similar acid grassland, but with abundant viviparous bent.
B1.2	Semi-improved acid grassland	Not present.	Areas of moderate to heavily grazed grassland occur along margins of narrow tributaries and on low grassy knolls on higher ground north of the Aketil Burn. These short, sheep-grazed grasslands have occasional soft-rush and taller grasses in the sward. Grasses dominate with occasional to frequent forbs, including frequent indicators of agricultural improvement such as crested dog's-tail, white clover, pineappleweed, common sorrel and common mouse-ear. Acid indicators persist, including wavy hair-grass, sweet vernal-grass, tormentil, heath-grass and heath bedstraw. Other herbaceous plants are occasional, including ribwort plantain), selfheal, eyebright and smooth cat's-ear. The pleurocarpous mosses glittering wood-moss, springy turf-moss and red-stemmed feather-moss are	This habitat is found in similar conditions to the unimproved areas but is largely focussed around burn lines and is under more intense grazing pressure, resulting in a very short cropped grassland. The habitat is largely composed of grasses such as sheep's fescue, common bent, sweet vernal grass, with some mat grass, and herbs including tormentil, heath bedstraw, yarrow, white clover, along with mosses including common hair cap moss and springy turf-moss.

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
			also occasional to frequent.	
B2.2	Semi-improved neutral grassland	Not present.	Areas of mesotrophic grassland occur along the floodplain of the Caroy River, dominated by grasses including red fescue, Yorkshire-fog and crested dog's-tail with a species-rich low sward of herbaceous flora. There are also areas of semi-improved neutral grassland dominated with tall swards of false oat-grass and Yorkshire-fog, with frequent to locally abundant wild angelica. Locally frequent common sedge indicates areas of impeded drainage. A small area of semi-improved neutral grassland dominated by a tall sward of false oat-grass occurs north of the Aketil Burn, beyond the livestock fence.	Not present
B3.1	Unimproved calcareous grassland	Not present.	A small area of calcareous grassland occurs on a shallow free-draining rocky knoll to the south of the Aketil Burn. Low growing and inconspicuous heather is infrequent here and it has likely been reduced in frequency due to sheep grazing. Calcareous grassland also occurs along the Caroy River. The grasses are shortly grazed and wild thyme and selfheal are occasional to frequent.	Not present
B4	Improved grassland	Not present.	Improved grassland is present in the most heavily grazed fields to the south of the [2016] potential access route survey area. Grasses dominate the sward with frequent perennial rye-grass, crested dog's-tail, Yorkshire-fog, daisy, white clover, creeping	This habitat is confined to the enclosed fields in the south which are used for grazing livestock and the production of winter fodder. The habitat is very species poor. In the

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
			thistle and marsh thistle.	areas where it is reseeded for fodder, it consists of perennial rye grass and meadow grasses with herbs such as creeping buttercup and common sorrel. The grazed areas are a little more diverse and contain crested dog's-tail, common mouse-ear, white clover and scattered tussocks of soft rush.
B5	Marsh/marshy grassland	Not present.	Two areas of soft-rush dominated marshy grassland occur adjacent to the potential access route within agriculturally improved fields. Marsh thistle, marsh willowherb, common marsh-bedstraw, marsh violet, tormentil and meadow buttercup are occasional to frequent. Grasses including red fescue, Yorkshire-fog and crested dog's-tail are also present. Marshy grassland with a similar species composition occurs along narrow burns flowing through areas of bog and wet heath in the north. Marshy grassland is also frequent along the floodplain of the Caroy River, with some areas dominated by tall stands of meadowsweet with frequent soft-rush and occasional tufted hair-grass, common sorrel, marsh willowherb and common marsh-bedstraw.	Not present
B6	Poor semi-improved grassland	Not present.	These grasslands occur adjacent to the Caroy River where grazing is not as intense as in areas of improved grassland, but	Not present.

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
			where some grazing has reduced the diversity of herbaceous flora and the sward is dominated by grasses including crested dog's-tail, Yorkshire-fog, red fescue and common bent.	
C1.1	Continuous bracken	Not present.	Two small areas dominated by bracken are present on moderate slopes adjacent to the Caroy River and the Aketil Burn.	There are a few small areas where bracken proliferates, in the south mostly near burns and growing on or next to acid grassland habitats
C3.1	Tall ruderal	Not present.	An area of tall ruderal is present on the eastern bank of the Caroy River and includes common hogweed, common nettle, Yorkshire-fog, wild angelica, common sorrel and creeping thistle. Scattered willow and birch species occur here. This area is fenced off to protect it from grazing animals.	Not present
D1	Dry dwarf shrub heath	Not present.	Small areas of dry heath occur on shallow soils on rocky knolls adjacent to the Caroy River and on the steeper slopes above the Aketil Burn. Some areas of shallow peat occur on moderately sloping knolls across the heather-clad bogs, and the stands of heather are carpeted with acute-leaved bog-moss. Hare's-tail cottongrass is occasional to frequent as these areas occur in transition to the surrounding bog vegetation.	This habitat is very limited in its distribution, mostly being restricted to areas of shallow peat and crags, along burn lines or within the gullies with semi-natural broadleaf woodland. It is dominated by thick common heather with some bell heather and occasional bilberry. Mosses are numerous but mostly limited to glittering wood moss and red-stemmed feather moss, and ferns such as hard fern and broad buckler fern are frequent. Herbs and sedges include green ribbed sedge, tormentil, devil's bit scabious and

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
				heath bedstraw. In some areas wild angelica was locally common.
D2	Wet dwarf shrub heath	Wet heath is dominated by heather with frequent cross-leaved heath and crowberry, with acute-leaved bog moss. Purple moor-grass and deergrass are also present, but never dominant. This habitat is largely restricted to the higher areas west of centre of Gleann Eoghainn and on the lower slopes of Ben Aketil, where the peat depth is less than 0.5 m. Steep slopes and drainage channels in these areas prevent the ground from becoming waterlogged and creating blanket bog. Wet heath has also recolonised the rides in the coniferous forestry block.	Wet heath occurs on areas of shallow peat (<0.5 m) to the north of the Aketil Burn. Common heather is dominant with frequent cross-leaved heath and purple moor-grass, occasional deergrass and occasional to frequent acute-leaved bog-moss. Other bog-mosses including lustrous bog-moss, feathery bog-moss, papillose bog-moss and compact bog-moss, along with occasional other types of moss including glittering wood-moss, springy turf-moss and large white-moss. An area of wet heath to the north of the Aketil Burn which is fenced-off from grazing sheep has frequent tall heather and hazel saplings. Purple moor-grass is also frequent in this area with occasional acute leaved bog-moss. The grazed wet heath to the west of the Caroy River occurs on shallow, wet, peaty ground and is dominated by purple moor-grass with occasional to frequent cross-leaved heath and acute leaved bog-moss. Bent grasses, sweet vernal-grass, wavy hair-grass, heath rush and tormentil are occasional to frequent. These shallow peatlands are crossed by drainage ditches which drain eastwards to the Caroy River.	This habitat is mostly found around the summit of Ben Aketil and in some scattered pockets on the western side of the study area. It occurs where the peat is shallower than 50cm, on a few steeper slopes or above small hillocks in the landscape. It is generally quite damp but not overly wet. The habitat is largely dominated by deer grass, with abundant common cotton grass, and also diminutive common heather and cross-leaved heath. Carnation and star sedges are often present and there is a mix of other species such as non-tussocky purple moor grass, heath rush, tormentil and bog asphodel.
D6	Wet heath-acid	Not present.	Wet heath-acid grassland vegetation is present on areas of shallow peat in the	A mosaic of the acid grassland and wet heath communities described

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
	grassland		grazed fields to the south and west of the existing access track. The vegetation is shortly grazed and heather is inconspicuous to almost absent in places. The vegetation present includes frequent wavy hair-grass, Yorkshire-fog, sweet vernal-grass, heath-grass and cross-leaved heath. Purple moor-grass is frequent to abundant. Acute-leaved bog-moss and bog bead-moss are occasional to frequent. The fungus scarlet wax cap (*Hygrocybe coccinea*) was recorded in the south-east (Target Note 9),this indicates low nutrient input coupled with high levels of grazing.	above.
E1.6.1	Blanket bog	This habitat occurs on deep, waterlogged peat, characterised by the presence of hare's-tail cottongrass and papillose bog-moss. Other common plants include common cottongrass, deergrass, heather, bog asphodel, tormentil, acute leaved bog-moss and lustrous bog-moss. *S. capillifoliu*m and *S. subnitens*. In the west the peat is more waterlogged, with increased presence of magellanic bog-moss.	Hare's-tail cottongrass and cross-leaved heath are frequent over carpets of pleurocarpous mosses and frequent bog-mosses. To the south of Aketil Burn there are extensive swards of intact bog to the east of the (2016) potential access route. North of the Aketil Burn intact bog is the most prevalent habitat. Small areas of bog also occur in depressions amongst extents of wet heath where the ground is undulating and peat depth is variable. Drainage channels and historic and recent burning of the heather has occurred and is particularly extensive within the largest area of blanket bog to the east of the potential access route, however bog-mosses remain abundant, with the key peat-former papillose bog-moss occasional	Blanket bog covers the vast majority of the area and is found on deep peat over 50cm. There are two main types of blanket bog, deer grass dominated areas which are generally much wetter and common heather dominated areas which are generally drier. Both areas have a high proportion of hare's tail cotton grass, particularly the heather areas. Other species present include a range of bog-mosses including acute-leaved, papillose and feathery bog-mosses. Woolly fringe moss and cup lichens are present in drier areas. In wetter areas bog asphodel and round-leaved sundew are also present. Many of the heather

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
			to frequent. These bogs have therefore been categorised as 'intact bog' rather than 'modified bog'	dominated areas appear to have suffered from fire in the recent past, these areas appear to be dominated by hare's tail cotton grass, however abundant small, young heather plants are present.
E1.7	Wet modified bog	Much of the revised core survey area comprises wet modified bog. The layer of peat is >0.5 m deep and is clearly visible from channels or excavations. Some areas of bog are dominated by dry hummocks of hare's-tail cottongrass and pleurocarpous mosses, particularly glittering wood-moss. Bog-mosses are restricted to wet runnels. The condition of areas of bog may be derived from repeated burning and heavy grazing. A small component of the heavily modified bog in the central part of the area is dominated by purple moor-grass. Large areas of the heather have been burnt here. Heather is a slow-growing plant and, although many of these muirburns are several years old, the regrowth has only reached a height of up to 10 cm; allowing faster growing colonisers such as deergrass and purple moor-grass to dominate. In addition to muirburns, the grazed by cattle and sheep which facilitate nutrient enrichment and peat erosion of the bog.	Not present.	This habitat is found on peat over 50cm deep, and is generally dry underfoot. It is dominated by dense purple moor grass tussocks with a very low diversity of other species including occasional tormentil, common heather, cross-leaved heath and bog asphodel. The ground layer is mostly a dense thatch of dead grass leaves but there are some hypnoid mosses and in wetter areas acute-leaved bog moss is present.
E2.1	Acid/neutral flush	Acid flushes are common where the flow	Ubiquitous, naturally occurring channels	A variety of acid flush habitats and

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
		of drainage channels slows so that plants including rush, sedge, violet and orchid species have been able to colonise in association with flat-topped bog-moss and blunt-leaved bog-moss. Very small acidic mires occur around the springs west of Gleann Eoghainn, dominated by bottle sedge growing through a mat of bog-mosses, mainly flat-topped bog moss. A small tributary, which originates from the large opening of wet heath within the commercial forestry, is slowed by a track leading to the newer Ben Aketil Wind Farm turbines, which has caused the channel to widen, leading to colonisation by soft-rush and the presence of a carpet of bog-mosses.	traverse the extensive bog habitats. These are largely dominated by frequent soft-rush and abundant bog-moss species, notably flat-topped and blunt-leaved. Other areas of flush which traverse the bog are dominated by feathery bog-moss and include frequent round-leaved sundew and occasional to frequent papillose bog-moss on their margins. Soft-rush dominated vegetation over flat topped and blunt leaved bog-mosses also occurs in a wet depression within the grazed agricultural fields to the south of the Aketil Burn. Flushes have also been target noted where too small to map.	springs are found across the site, mostly in wet areas within the blanket bog habitats and along bog drainage channels and streams.
E2.2	Basic flush	Patches of basic flush occur along rocky stretches of minor burns, mainly in an area west of the summit of Ben Aketil. The small rocky flushes are reliant on base-rich waters seeping from rocks along the watercourses. This habitat was also recorded in association with linear stretches of acid neutral flush in close proximity to tributary burns which feed into Gleann Eoghainn.	Not present.	Not present
E2.3	Bryophyte dominated spring	These are small spring-fed habitats, usually dominated by mosses including marsh forklet-moss and fountain apple-moss. Areas too small to map are target	Not present.	This flush community is heavily dominated with curled hook-moss

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
		noted (**Target Notes 15 and 16**).		
G2	Running water	The survey areas and surrounding environment have a network of tributaries, the largest of which are the Rageary and Aketil burns. These are incised south west flowing tributary burns which flow west into the Caroy River, which eventually meets the head of the Loch Caroy sea-loch. The Caroy River has a rocky substrate with a riverbed of boulders and gravel. In the northern extent of the revised core survey area the water is drained from the surrounding hillsides and bogs, causing it to become peat-stained and acidic. These tributary channels have soft banks and are often eroded by livestock.		
H1.1	Intertidal mud/sand	Not present	Not present	This was not looked at in detail but appeared to be a mix of rock, mud and sand that is covered by the sea at high tide and frequented by several wading birds and wildfowl.
H2	Saltmarsh	Not present.	Frequent to abundant red fescue and sea plantain with frequent to occasional thrift, stonecrop species and sea aster.	Not present
H5	Strandline vegetation	Not present.	Spear-leaved orache, common chickweed cleavers and silverweed are abundant above the strandline.	Not present
J1.2	Amenity grassland	Not present.	A small area of private ground at Caroy Cottage includes regularly and irregularly mown grassland, and a mixture of native and non-native trees and shrubs.	Not present
J2.4	Fence	Several fences are present.	Not present.	Not present
J2.6	Ditch	Not present.	A deep ditch, dry at time of survey, runs from west to east on the boundary between an agriculturally improved field and an area of marshy grassland.	Not present
J2.7	Boundary removed	A short section of boundary consisting of fallen fence posts.	Not present.	Not present
J3.1	Agricultural	Not recorded	Not recorded	There are a few metal cattle sheds

Phase 1 habitat Code	Habitat type	Core survey area 2016*	Potential access route survey area 2016*	New survey areas 2021
	buildings			and barns in the South of the site adjacent to private houses.
J5	Other	Ben Aketil Wind Farm and access track	Farm tracks and public roads.	Not present

* Note these descriptions are taken from the 2016 Report, and were ground-truthed in 2021

3.5 Habitat Survey Results: NVC Communities

Table 7.1.3: Summary of NVC communities

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland	Not present	A relatively short-grazed sward of grasses including sweet vernal-grass, heath-grass, viviparous fescue, sheep's-fescue and common bent, with frequent wild thyme, tormentil, common bird's-foot-trefoil, white clover and selfheal. Frequent mosses include golden-head moss, broom fork-moss, glittering wood-moss and springy turf-moss. This community occurs on the floodplain of the Caroy River and the Aketil Burn.	Not present
H10 *Calluna vulgaris – Erica cinerea* heath	Small areas of H10 dry heath occur along the Rageary Burn and in smaller patches on rocky and well-drained ground as part of the mosaic of habitats across the steeper slopes.	Small areas of dry heath occur on shallow soils on rocky knolls adjacent to the Caroy River and on the steeper slopes above the Aketil Burn.	This dry heath community is largely restricted to the banks and narrow gullies along the watercourses. The peat is shallow or rocky and well drained, and the community often occurs with U4 grassland or within the semi-natural woodland. It is dominated by thick common heather with a lesser amount of bell heather. These are quite tall and thick and do not appear to be well grazed, probably due their

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
			location on harder to access slopes. Other species include a variety of hypnoid mosses, ferns such as broad buckler fern, hard fern, sedges such as green-ribbed sedge, and herbs such as tormentil, heath bedstraw, devil's-bit scabious and in a few areas wild angelica.
M2 Sphagnum cuspidatum bog pool community	This bog pool community (along with M3) occurs throughout the survey areas as a component of the blanket bog communities. The bog pool vegetation consists of mats of cow-horn bog-moss with feathery bog-moss growing in deeper water; occasional shoots of common cottongrass protrude through. Bog pools are frequent within the bog to the east of the potential access route (**Target Notes 17-19** [see the 2016 Report; **Confidential Appendix 7.7**]), forming a complex mosaic within M17 and M19 bog habitats.		This small bog pool community occurs in a few locations within the flattest areas of M17 blanket mire. They have formed on deep peat in some of the wettest areas. The bog pool vegetation is largely dominated by thick feathery bog-moss with some common cotton grass, with some other species around the edges such as papillose and acute-leaved bog-mosses, cross-leaved heath and round-leaved sundew.
M3 – *Eriophorum angustifolium* bog pool community	This bog pool community (along with M2) occurs as a component of the blanket bog communities.		Not present
M4 *Carex rostrata* – *Sphagnum fallax* mire	Very small acidic M4 mires occur around the springs west of Gleann Eoghainn, dominated by bottle sedge growing through a mat of *Sphagnum* mosses, mainly *Sphagnum fallax*.	Very small acidic M4 mires occur along tributary burns of the Caroy River to the east of the potential access route amongst bog and wet heath vegetation, in association with M23 and M6. M4 is also present within a depression amongst wet heath and bog vegetation (**Target Note 20** [see the 2016 Report; **Confidential Appendix 7.7**]). The M4 vegetation is dominated by bottle sedge growing through a mat of bog-mosses, mainly flat-topped bog-moss.	Not present
M6 – *Carex echinata* – *Sphagnum fallax*	Sub-communities of M6 mire line parts of the Caroy River tributaries and flushes	M6 mire lines parts of the tributaries and flushes across the peatlands to the north	The M6c sub- community is widespread but limited in its extent to damp or wet areas,

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
/denticulatum mire	surrounding Gleann Eoghainn (e.g. **Target Note 12** [see the 2016 Report; **Confidential Appendix 7.7**]). These include small-sedge dominated M6a mire and the rush dominated mires of M6c and M6d.	and south of Aketil Burn. The majority of the M6 community present is characteristic of M6c rush dominated mire. The small-sedge dominated M6a mire is associated with a tributary immediately north of the Aketil Burn.	along the banks of burns and rivers, or in moist areas within wider grassland. It is mostly grazed but not heavily. Vegetation is largely dominated by soft rush, although there are a few areas where sharp-flowered rush becomes a little more apparent. Mosses are abundant particularly common haircap moss, blunt-leaved bog moss and flat-topped bog moss. Grasses are represented by Yorkshire fog and creeping bent, and herbs by common sorrel, marsh violet and tormentil. Occasional sedges are present including carnation sedge. The M6a sub-community is widespread but limited in scale to small flushes, usually within steep rocky areas of M15 wet heath, or M17 bog where the peat is shallow. It is dominated by a variety of small sedges including star, common yellow, glaucous, flea and carnation sedges, and common cotton grass. There can also be a mix of bog-mosses present and some other bog species such as hare's tail cotton grass.
M9 *Carex rostrata - Calliergon cuspidatum/ giganteum* mire	Areas of wet ground around the tributaries running into Gleann Eoghainn contain communities of M9 mire (**Target Notes 10 and 11** [see the 2016 Report; **Confidential Appendix 7.7**]), dominated by a bed of mosses such as pointed spear-moss and hooked scorpion-moss. A sward of bottle sedge and other sedges grows through the bog-moss carpet, and other vascular plants occur frequently	Not present	Not present

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
	here, including bogbean, marsh cinquefoil and lesser spearwort. The sward, particularly the bottle sedge, is very heavily grazed. This community relies on base-rich water seeping from springs amongst the bog and is a notably scarce habitat (Averis *et al.*, 2004).		
M10 *Carex dioica-Pinguicula vulgaris* mire	Base-enriched M10 mire occurs in small (less than 5 m²) patches along rocky stretches of minor burns, mainly in an area west of the summit of Ben Aketil and in association with linear stretches of acid neutral flush in close proximity to tributary burns which feed into Gleann Eoghainn. The vegetation is composed of sedges such as common yellow-sedge, carnation and dioecious sedge growing among *Scorpidium* mosses. Areas too small to map are target noted (**Target Note 13** [see the 2016 Report; **Confidential Appendix 7.7**]). M10 is of conservation interest as it adds to the diversity of upland vegetation (Averis *et al.*, 2004). The assemblage of plants which occur within this community is localised within the site to these flushes.	Not present	Not present
M15 *Trichophorum germanicum – Erica*	The wet heath consists primarily of the typical sub-community of M15b, with a	The wet heath recorded within the (2016) potential access route survey area is largely	This wet heath community is widespread but is most extensive on the slopes of Ben Aketil

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
tetralix wet heath	mixture of common heather, acute-leaved bog-moss and deergrass. Also present is the drier M15c sub-community, with dry hummocks of bell heather and pleurocarpous mosses such as glittering wood-moss. M15c occurs on well-drained slopes, primarily as a minor component of mosaics with other communities; it becomes more prevalent on the slopes of Ben Aketil and along the Rageary Burn. The wet, sedge dominated sub-community of M15a also occurs here as a very minor component of bog mosaics in small, fragmented stands.	characteristic of the typical sub-community M15b. One area to the north of the Aketil Burn which is fenced-off from grazing sheep has tall stands of heather (c. 0.75 m) with frequent purple moor-grass and occasional acute-leaved bog-moss. The majority of the habitat elsewhere has lower growing heather with frequent purple moor-grass, deergrass, acute-leaved bog-moss and occasional to frequent glittering wood-moss and springy turf-moss. Large white-moss and compact bog-moss were also recorded. Small discrete areas of M15a occur with locally frequent carnation sedge, star sedge and lustrous bog -moss. These areas occur in a complex mosaic amongst bog habitat. Where M15 occurs in a mosaic with U4 acid grassland the heather is much reduced, with frequent sweet vernal-grass, wavy hair-grass and heath rush. Acute-leaved bog-moss cross-leaved heath and bog-bead moss remain occasional to frequent.	where it forms a mosaic with M17 bog and U4 and U5 acid grassland communities. It is exposed to moderate levels of grazing by sheep and cattle. It forms on areas of shallow peat and is largely dominated by deergrass with sparser ericoids, mostly cross-leaved heath but with some common heather. Reindeer lichen and acute-leaved bog-moss are frequent, as are herbs including bog asphodel and tormentil.
M17 *Trichophorum germanicum* – *Eriophorum vaginatum* mire	This community occurs throughout the area on the more gently sloping ground on deep, waterlogged peat, and is characterised by the presence of hare's-tail cottongrass and papillose bog-moss. The M17b *Cladonia* (lichen) species sub-community is found mainly at the southern and western fringes, where burning and grazing impacts are relatively low, particularly on the saddle between	M17 habitat here consists of conspicuous hare's-tail cottongrass and frequent cross-leaved heath over carpets of acute-leaved, papillose, feathery, cow-soft bog mosses. Purple moor-grass is occasional to frequent throughout. This community occurs in the most waterlogged areas of peat on level and gently sloping ground and in wet depressions close to or at the surface. Zones of this community are also present	The vegetation here corresponds more to the M17a subcommunity, which covers large swathes of the area, mostly on the flattest and wettest parts, on deep peat. It sometimes forms a mosaic with M19, M15 and M25 bog and heath communities. It is exposed to moderate levels of grazing and in some areas is experiencing some hagging. The community can be very wet and with noticeable surface water. It is dominated

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
	Ben Aketil and the Ben Aketil Wind Farm. This sub-community has distinctive hummocks of woolly fringe-moss and a blanket of bog-mosses such as papillose bog-moss and acute-leaved bog-moss. Bog pools of M2 and M3 dot the surface of the bog. The waterlogged peat immediately east of the main burn in Gleann Eoghainn consists of a mosaic of M17b and the wet sub-community M17a, with a more continuous blanket of bog-mosses including occasional mats of Magellanic bog-moss. A third, variant sub-community, referred to here as M17v, occurs within large stretches of the centre of the revised core survey area. It is dominated to varying degrees by heather, hare's-tail cottongrass and purple moor-grass. M17v may be a transition from more typical M17b to a drier community of M19 *Calluna vulgaris – Eriophorum vaginatum* or M20 *Eriophorum vaginatum* blanket mire. The community is probably derived from the drying of peat by burning, drainage and grazing. Large areas of M17 mire show evidence of recent muirburns (e.g. **Target Note 5** [see the 2016 Report; **Confidential Appendix 7.7**]) which have dried the bog-moss blanket and removed much of the vegetation.	where historic peat cutting has created depressions in the peat. Frequent hummocks of pleurocarpous mosses occur across areas of M17 with occasional western earwort; (**Target Note 19** [see the 2016 Report; **Confidential Appendix 7.7**]). Other oceanic liverworts occurring occasionally include purple spoonwort and Taylor's flapwort. Great sundew and Magellanic bog-moss occur occasionally.	by deergrass, along with hare's tail cotton grass and cross-leaved heath, with locally abundant bog asphodel. Bog mosses are also abundant, with a range of species including acute-leaved, compact, papillose, feathery and soft bog-mosses.

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
M18 *Erica tetralix - sphagnum papillosum* raised and blanket mire	A small area of the bog at the western extremity of the area is colonised by the M18 *Erica tetralix – Sphagnum papillosum* mire. The mire has a similar species composition to M17 although Magellanic bog-moss becomes more prevalent than papillose bog-moss and the ground is generally waterlogged. M18 mires are often found on wet depressions within larger blanket bog communities (Averis *et al.,* 2004).	Not present	Not present
M19 *Calluna vulgaris – Eriophorum vaginatum* mire	The M19 mire community occurs throughout the survey areas. It is dominated by heather and dry hummocks of hare's-tail cottongrass and pleurocarpous mosses, particularly glittering wood-moss, with wetter runnels of bog-moss between. M19 occurs on drier peats than M17 mire and may be a result of repeated burning of the bog and heavy grazing. Such modifications of the bog, particularly due to repeated burning, can eventually produce a poorer habitat of M20 *Eriophorum vaginatum* mire, although removing grazing and preventing burning can restore such habitats (Averis *et al.,* 2004).		This is a widespread plant community on the site and is found over large swathes of flat to gently sloping ground where there is deep peat. There is some grazing pressure by cattle and sheep and some large areas have been burned in the past resulting in a diminished common heather component. The heather is recovering but has not yet reached the stature of the original cover. Separate quadrats were carried out in the burned areas and reflect any differences, however in both cases, sub-communities corresponded well with M19a. The vegetation is co-dominated by common heather and hare's-tail cotton grass, with a mix of some deergrass, purple moor grass and cross-leaved heath. Mosses are abundant beneath the heather, mostly of hypnoid species (glittering wood-moss, red stemmed feather moss, heath plait-moss and bog-mosses (acute-leaved bog-moss, papillose bog-moss). Other plants include tormentil and

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
			bog asphodel.
M23 *Juncus effusus/acutiflorus - Galium palustre* rush pasture	The M23 community is dominated almost completely by soft-rush (M23b sub-community) and occurs around Gleann Eoghainn along the main tributaries of the Caroy River, as well as along the Aketil Burn.	Two areas of M23 soft-rush dominated marshy grassland occur adjacent to the potential access route within agriculturally improved fields. Herbaceous flora typical of M23 occurs here including marsh thistle, marsh willowherb, common marsh-bedstraw and marsh violet. This vegetation also occurs along narrow burns in north, typically in a mosaic with M6 vegetation and along stretches of the Caroy River.	Not present
M25 *Molinia caerulea-Potentilla erecta* mire.	A small component of the heavily modified bog mosaic in the central area consists of M25a *Molinia caerulea – Potentilla erecta* mire, *Erica tetralix* sub-community. Like M19, it may have been derived through grazing, burning and some drainage. The M25 mire here is not too impoverished and retains a coverage of bog-mosses.	M25 is present to the west of the Caroy River, where it is dominated by purple moor-grass with frequent tormentil and occasional wavy hair-grass, star sedge, carnation sedge, common cottongrass, heath rush, deergrass and cross-leaved heath. This community is derived from heavy grazing and grades into areas more characteristic of flushed semi-improved acid grassland. The vegetation consists of frequent small sedges, including common sedge and green-ribbed sedge with a grass-dominated sward with bent grasses, Yorkshire-fog, wavy hair-grass, crested dog's-tail, mat-grass, creeping buttercup, tormentil and occasional tussocks of soft-rush and compact rush.	The M25 within the Study Area is heavily dominated by purple moor grass with the occasional patch of bog myrtle. Hypnoid mosses and tormentil are occasional. The community occurs on deep peat and transitions to other bog communities including M17 and M19.
M27 – *Filipendula ulmaria – Angelica*	Not present	Areas of M27 are dominated by meadowsweet, often with occasional to	Not present

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
sylvestris mire		frequent smaller stands of soft-rush and occasional tussocks of tufted hair-grass. Herbaceous flora includes common sorrel, marsh willowherb and common marsh-bedstraw. Some areas also include occasional to locally frequent marsh-marigold, wild angelica and marsh cinquefoil. Other commonly occurring species include lesser spearwort, marsh violet, ragged-robin, forget-me-not species, common knapweed, common valerian and water avens.	
M28 *Iris pseudacorus* – *Filipendula ulmaria* mire	Not present	Not present	A small example of this flag iris dominated community occurs on some marshy ground within an area of U4b acid grassland in the west of the site. The area is used for cattle grazing.
M32 *Philonotis fontana* – *Saxifraga stellaris* spring	Small springs of *Philonotis fontana* occur at the head of some of the eastern tributaries of the upper reaches of the Caroy River, mainly along the fence line running north-south across the heath (Target Notes 15 and 16, Table A6.3 [of the 2016 Report; see **Confidential Appendix 7.7**]).	Not present	Not present
M37 *Palustriella commutata-Festuca rubra* spring	Not present	Not present	This flush community is found under similar conditions to the M6a flushes, however unlike M6 it is related to base-rich springs and flushes. It is heavily dominated with curled hook-moss, often occurring with soft, sharp-flowered and

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
			bulbous rushes and small sedges including glaucous sedge and carnation sedge.
MG5 *Cynosurus cristatus - Centaurea nigra* grassland	Not present	This occurs as small patches along the floodplain of the Caroy River. It is dominated by grasses such as crested dogs-tail, Yorkshire-fog and red fescue with a rich diversity of frequently occurring herbs including eyebright, devil's-bit scabious, ragged-robin, meadow buttercup, sneezewort, common knapweed, common valerian, water avens, meadow vetchling, cat's-ear, selfheal, pineappleweed, wild angelica, red clover, marsh willowherb, common ragwort, bitter-vetch, common spotted-orchid, and hop trefoil.	Not present
MG6 *Lolium perenne – Cynosurus cristatus* grassland	Not present	The MG6 grasslands are agriculturally improved grasslands with a very low diversity of grasses or forbs. Grasses dominate the sward with frequent perennial rye-grass, crested dog's-tail and Yorkshire-fog. Frequently occurring forbs, include daisy, white clover, creeping thistle, marsh thistle, and the mosses glittering wood-moss and springy turf-moss, are occasionally present but not in the same abundance as found in U4 acid grassland types.	Agriculturally improved grasslands dominated by perennial rye-grass are relatively extensive in the southern portion of the Study Area, around the proposed access route north of Feorlig.
MG9 *Holcus lanatus – Deschampsia cespitosa* grassland	Not present	MG9 occurs on margins and slopes above the Caroy River and above the strandline at the river mouth. These communities typically have tall swards of false oat-grass and frequent Yorkshire-fog; some also have	Not present

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
		frequent to locally abundant wild angelica.	
U4 – *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland	Not present	Short, tightly grazed grasslands are present along margins of narrow burns and low grassy knolls on higher ground. This vegetation is also present on moderate to steeply sloping ground to the east of the existing access track and farm buildings in the south. These grasslands are largely characteristic of the U4b *Holcus lanatus – Trifolium repens* sub-community which is typical of the more agriculturally improved form of U4 grassland.	This community is found widely across the site but is quite limited in scale. It occurs on shallow well drained soil mostly in the proximity of burns and exposed hillock tops and often adjacent to H10 and M6 communities. The community is largely subject to heavy grazing from livestock, keeping the vegetation very short. Vegetation corresponds to the U4a sub-community and is dominated by grasses, particularly sheep's fescue, common bent, sweet vernal grass and mat grass with frequent springy turf-moss and red-stemmed feather moss, along with a variety of herbs including heath bedstraw, tormentil, ribwort plantain and yarrow. A small area of U4 grassland in the far south east, subject to less grazing pressure, differs from the U4 standard sub-communities with the presence of abundant viviparous fescue, along with some common heather and heath rush.
U5 *Nardus stricta – Galium saxatile* grassland (suggested community)	U5 upland acid grassland occurs as a small component of the grassland/heath mosaic and along the more freely flowing burns.	Not present	This community is found in a few small areas on the slopes of Ben Aketil and is sheep grazed. It occurs on shallow, well-drained soil in amongst M15 heath. The community is dominated by mat grass tussocks with some common bent, sheep's fescue, viviparous fescue and sweet vernal grass. Herbs include tormentil, and there are some sedges including glaucous, carnation and star sedge.
U6 *Juncus squarrosus - Festuca ovina*	Not present	Not present	This community was found in one small, limited area in the south adjacent to bog and

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
grassland,			flush communities and is heavily grazed by cattle and sheep. It grows on shallow, slightly damp peat, between 20 to 30cm deep. The community is largely dominated by heath rush, with sheep's fescue, common bent and some ericoids including diminutive common heather and bilberry. Herbs include frequent tormentil and heath bedstraw. Mosses include common haircap and acute-leaved bog-moss, which indicate the U6a sub-community.
U20 *Pteridium aquilinum – Galium saxatile* community	Not present	Small areas dominated by bracken are present on moderate slopes adjacent to the Caroy River and the Aketil Burn.	Small stands of tall bracken occurring in the extreme south west, forming a mosaic with U4 acid grassland.
W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland	A scattering of mature trees line the Rageary Burn, mostly wych elm (*Ulmus glabra*), silver birch, rowan and goat willow. This habitat corresponds most closely to W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland. It should be noted that the lower section of the Rageary Burn, in the south-west of the revised core survey area, has been fenced-off from grazing as the W7 ground flora here supports a northerly population of wild strawberry.	Not present	Not present
W9 *Fraxinus excelsior – Sorbus aucuparia – Mercurialis perennis* woodland	Not present	Not present	This semi-natural woodland occurs in a few steep sided gullies that cut east to west across the centre of the site. The woodland community is largely dominated with hazel and rowan with a lesser amount of grey willow, eared willow and downy birch. There

NVC community	Revised core survey area 2016	Potential access route survey area 2016	New survey areas 2021
			is a mixed understory similar to H10 heath and U4 acid grassland but with abundant hard and broad buckler ferns.
W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland	Silver birch and goat willow scrub, with some affinities to W11 woodland, is present along the slopes lining the Rageary Burn, above the more mature W7 woodland.	Not present	Not present
W23 *Ulex europaeus – Rubus fruticosus* scrub	Not present	Small areas dominated by common gorse with a sparse and species-poor ground flora.	A very small area growing on a steep roadside embankment in the south. Common gorse on stony well drained soil, ungrazed.

Table 7.1.4: Summary of vegetation communities and protection status.

NVC community	Principal corresponding Habitats Directive Annex I type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=High, 2=moderate, 3=low
CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland	6230 Species rich *Nardus* grassland	Upland calcareous grassland	3
H10 *Calluna vulgaris – Erica cinerea* heath	4030 European dry heaths	Upland Heathland	3
H10a *Calluna vulgaris – Erica cinerea* heath, typical sub-community	4030 European dry heaths	Upland Heathland	3
H21 *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath	4030 European dry heaths (High conservation value due to rarity in Europe and notable bryophyte flora)	Upland Heathland	3
M2 Sphagnum cuspidatum bog pool community	7130 Active blanket bog	Blanket Bog	3

NVC community	Principal corresponding Habitats Directive Annex I type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=High, 2=moderate, 3=low
M3 – *Eriophorum angustifolium* bog pool community	7130 Active blanket bog	Blanket Bog	3
M4 *Carex rostrata – Sphagnum fallax* mire	7140 Transition mires and quaking bogs	Blanket Bog	3
M6 – *Carex echinata – Sphagnum fallax /denticulatum* mire	-	Upland flushes, fens and swamps	1
M6a *Carex echinata – Sphagnum fallax / denticulatum* mire, *Carex echinata* sub-community	-	Upland flushes, fens and swamps	1
M6c *Carex echinata – Sphagnum fallax / denticulatum* mire, Juncus effusus sub-community	-	Upland flushes, fens and swamps	1
M6d *Carex echinata – Sphagnum fallax / denticulatum* mire, *Juncus acutiflorus* sub-community	-	Upland flushes, fens and swamps	1
M9 *Carex rostrata - Calliergon cuspidatum/ giganteum* mire	7230 Alkaline fens	Upland flushes, fens and swamps	1
M10 *Carex dioica-Pinguicula vulgaris* mire	7230 Alkaline fens	Upland flushes, fens and swamps	1
M15 *Trichophorum germanicum – Erica tetralix* wet heath	4010 Northern Atlantic wet heaths with *Erica tetralix*	Upland Heathland	2
M15a *Trichophorum germanicum – Erica tetralix* wet heath, *Carex panacea* sub-community	4010 Northern Atlantic wet heaths with *Erica tetralix*	Upland Heathland	2
M15b *Trichophorum germanicum – Erica tetralix* wet heath, typical sub-community	4010 Northern Atlantic wet heaths with *Erica tetralix* (Where on deep peat >0.5m, this habitat represents degraded blanket bog, restoration to H7130 Blanket bog	Upland Heathland	2 (3 where deep peat)

NVC community	Principal corresponding Habitats Directive Annex I type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=High, 2=moderate, 3=low
	may be possible)		
M15c *Trichophorum germanicum – Erica tetralix* wet heath, *Cladonia* subcommunity	4010 Northern Atlantic wet heaths with *Erica tetralix* (Where on deep peat >0.5m, this habitat represents degraded blanket bog, restoration to H7130 Blanket bog may be possible)	Upland Heathland	2 (3 where deep peat)
M17 *Trichophorum germanicum – Eriophorum vaginatum* mire	7130 Active blanket bog	Blanket Bog	3
M17a *Trichophorum germanicum – Eriophorum vaginatum* mire, *Drosera rotundifolia – Sphagnum spp* sub-community	7130 Active blanket bog	Blanket Bog	3
M17b *Trichophorum germanicum – Eriophorum vaginatum* mire, *Empetrum nigrum ssp. nigrum* sub-community	7130 Active blanket bog	Blanket Bog	3
M18 *Erica tetralix -sphagnum papillosum* raised and blanket mire	H7130 Active blanket bog	Blanket bog	3
M19 *Calluna vulgaris – Eriophorum vaginatum* mire	H7130 Active blanket bog	Blanket Bog	3
M19a *Calluna vulgaris – Eriophorum vaginatum* mire, *Erica tetralix* sub-community	H7130 Active blanket bog	Blanket Bog	3
M23 *Juncus effusus/acutiflorus - Galium palustre* rush pasture	-	-	1
M25 *Molinia caerulea-Potentilla erecta* mire.	7130 Blanket bog (only where on deep peat)	Blanket bog (only where on deep peat)	2 3 where on deep peat
M25a *Molinia caerulea-Potentilla erecta* mire, *Erica tetralix* sub-community	7130 Blanket bog (only where on deep peat)	Blanket bog (only where on deep peat	2 3 where on deep peat
M27 – *Filipendula ulmaria – Angelica sylvestris* mire *	-	-	2

NVC community	Principal corresponding Habitats Directive Annex I type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=High, 2=moderate, 3=low
M28 *Iris pseudacorus – Filipendula ulmaria* mire*	-	-	3
M32 *Philonotis fontana – Saxifraga stellaris* spring	-	Upland flushes, fens and swamps	1
M37 *Palustriella commutata-Festuca rubra* spring	7220 Petrifying springs with tufa formation (*Cratoneurion*)	Upland flushes, fens and swamps	1
MG5 *Cynosurus cristatus-Centaurea nigra* grassland*	-	-	3
MG6 *Lolium perenne – Cynosurus cristatus* grassland	-	-	3
MG9 *Holcus lanatus – Deschampsia cespitosa* grassland	-	-	2
MG10 *Holcus lanatus-Juncus effusus* rush-pasture	-	-	2
U4 – *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland*	-	-	3
U4a *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community*	-	-	3
U4b *Festuca ovina - Agrostis capillaris - Galium saxatile* grassland, *Holcus lanatus -Trifolium repens* sub-community*	-	-	3
U4f – *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland, *Festuca vivipara* community*	-	-	3
U5 *Nardus stricta – Galium saxatile* grassland	-	*Nardus stricta-Galium saxatile* grassland	3
U6a *Juncus squarrosus-Festuca ovina* grassland,	-	*Juncus squarrosus-Festuca ovina*	2

NVC community	Principal corresponding Habitats Directive Annex I type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=High, 2=moderate, 3=low
Sphagnum spp. sub-community		grassland	
U20 *Pteridium aquilinum – Galium saxatile* community	-	-	3
W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland	91E0 Alder woodland on flood plains.	Wet Woodland	1
W9 *Fraxinus excelsior – Sorbus aucuparia – Mercurialis perennis* woodland	-	Upland mixed ashwoods	3
W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland	91A0 Old sessile oak woods. (*Quercus* dominated stands, *Betula* dominated stands with *Quercus*)	Upland oakwood Upland birchwood	3
W23 *Ulex europaeus –Rubus fruticosus* scrub	-	-	3

*No protection status in an upland setting but may correspond with habitats on the SBL in a lowland setting

1 The most recent version of the Highland Biodiversity Action Plan to provide a list of priority habitats, the latest version Highland Biodiversity Action Plan 2015 – 2020 does not provide a list and only refers to habitats where they relate to specific projects.

2 As listed in Appendix 4 of SEPA (2014) LUPS Guidance Note 31. The categorisation of potential GWDTEs is preliminary and is based on vegetation communities present, and therefore confirmation of GWDTE status requires subsequent formal hydrological assessment.

3.6 Total Habitat Losses

Table 7.1.5 All estimated direct and indirect/temporary habitat losses as a result of the construction of the Proposed Development

Phase 1 code	Description	NVC community	Direct loss	Indirect Loss within 2m	Indirect Loss within 10m
A1.2.2	Coniferous plantation	NO NVC	0.45	0.04	0.17
B1.1	Unimproved acid grassland	U6	0.15	0.10	0.51
B1.2	Semi-improved acid grassland	U4	0.11	0.08	0.44

Phase 1 code	Description	NVC community	Direct loss	Indirect Loss within 2m	Indirect Loss within 10m
B1.2/B5	Semi-improved acid grassland/Marshy grassland	U4/M6	0.17	0.12	0.62
B1.2/C1	Semi-improved acid grassland/Bracken	U4/M6/U20			0.02
B2.1/B5/E1.6.1/ D2	Neutral unimproved grassland/Marshy grassland/Blanket bog/Wet heath	U4/M6/M19/M15	0.19	0.14	0.70
B2.2	Semi-improved neutral grassland	MG9			0.01
B2.2	Semi-improved neutral grassland	NO NVC	0.02	0.02	0.06
B4	Improved grassland	MG6	0.23	0.16	0.67
B4/B5	Improved grassland/Marshy grassland	MG6/M6/M28	0.05	0.05	0.31
B5	Marshy grassland	M23	0.07	0.05	0.16
D2	Wet heath	M15	0.08	0.06	0.30
D6	Wet heath/acid grassland mosaic	M15			0.01
D6	Wet heath/acid grassland	M15/U4	0.02	0.01	0.05
D6	Wet heath/acid grassland mosaic/marshy grassland	U4/M23/M15	0.16	0.12	0.68
E1.6.1	Blanket bog	M17/(M15/ M2/3/6)	0.51	0.14	0.69
E1.6.1	Blanket bog	M17/M15	0.60	0.20	1.00
E1.6.1	Blanket bog	M17/M19/ M15	0.02	0.01	0.07
E1.6.1	Blanket bog	M17/M19/ M15/ M25(5%)	0.69	0.24	1.17
E1.6.1	Blanket bog	M17/M25/ (M15)	2.02	0.65	3.08
E1.6.1	Blanket bog	M17/M25/ M15	0.16	0.04	0.22

Phase 1 code	Description	NVC community	Direct loss	Indirect Loss within 2m	Indirect Loss within 10m
E1.6.1	Blanket bog	M19	0.68	0.24	1.10
E1.6.1	Blanket bog/wet heath	M19/(M15)	0.29	0.07	0.33
E1.6.1	Blanket bog	M19/M15	0.13	0.09	0.44
E1.6.1 (Assumed)	Southern Access Route – area not surveyed		0.47	0.35	1.73
E1.6.1/ E1.7	Blanket bog/Wet modified bog	M19/M15			0.04
E1.7	Wet modified bog	M15	0.18	0.11	0.59
E1.7	Wet modified bog	M15/M10	0.60	0.16	0.74
E1.7	Wet modified bog	M15/M17	0.05	0.04	0.20
E1.7	Wet modified bog	M15/M19	1.48	0.82	3.98
E1.7	Wet modified bog	M15/M19/ (M6)	0.06	0.05	0.25
E1.7	Wet modified bog	M17 burnt	0.63	0.19	0.89
E1.7	Wet modified bog	M17&M15 burnt/(M19)	0.59	0.17	0.94
E1.7	Wet modified bog	M19	3.06	0.33	1.45
E1.7/C1	Wet modified bog/Continuous bracken	M25/U20			0.02
E1.7/D2/B5/B1.2	Wet modified bog/Wet heath/Marshy grassland/Semi-improved acid grassland	M19/M15/U4/M6/M37	0.62	0.21	0.97
E2.1	Acid/neutral flush	M6	0.32	0.05	0.24
E2.1	Acid/neutral flush	M6/(M9)/M4)	0.02	0.02	0.08
E2.1	Acid/neutral flush	M6/M15	0.05	0.03	0.17

Phase 1 code	Description	NVC community	Direct loss	Indirect Loss within 2m	Indirect Loss within 10m
E2.1	Acid/neutral flush	M6/M15/M9/M10	0.01	0.01	0.05
E3.1	Fen - Valley Mire	M9/M10	0.01	0.01	0.04
E3.1	Fen - Valley Mire	M9/M6	0.01	0.01	0.05
G2	Running water	NO NVC	0.01		0.02
J1.2	Amenity grassland	NO NVC			0.01
J5	Track	NO NVC	0.18	0.13	0.59

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ANNEX 1 - SCIENTIFIC PLANT NAMES

Table A1.1 provides common and scientific names of plant species included in this Technical Appendix.

Common Name	Scientific Name
Acute-leaved bog-moss	*Sphagnum capillifolium*
Alder	*Alnus glutinosa*
Annual meadowgrass	*Poa annua*
Ash	*Fraxinus excelsior*
Aspen	*Populus tremula*
Bell heather	*Erica cinerea*
Bent grasses	*Agrostis spp.*
Bilberry	*Vaccinium myrtillus*
Birch	*Betula* spp.
Bird's-foot trefoil	*Lotus corniculatus*
Blunt-leaved Bog-moss	*Sphagnum palustre*
Bog asphodel	*Narthecium ossifragum*
Bog bead-moss	*Aulacomnium palustre*
Bog bean	*Menyanthes trifoliata*
Bog myrtle	*Myrica gale*
Bog-mosses	*Sphagnum* spp.
Bottle sedge	*Carex rostrata*
Bracken	*Pteridium aquilinum*
Bramble	*Rubus fruticosus agg.*
Broad buckler fern	*Dryopteris dilatata*
Broom fork-moss	*Dicranum scoparium*
Bulbous rush	*Juncus bulbosus*
Carnation sedge	*Carex panicea*
Cleavers	*Galium aparine*
Common bent	*Agrostis capillaris*

Common Name	Scientific Name
Common chickweed	*Stellaria media*
Common cottongrass	*Eriophorum angustifolium*
Common gorse	*Ulex europaeus*
Common haircap moss	*Polytrichum commune*
Common heather	*Calluna vulgaris*
Common hogweed	*Heracleum sphondylium*
Common mouse-ear	*Cerastium fontanum*
Common nettle	*Urtica dioica*
Common sedge	*Carex nigra*
Common sorrel	*Rumex acetosa*
Common yellow-sedge	*Carex demissa*
Compact bog-moss	*Sphagnum compactum*
Cow-horn bog-moss	*Sphagnum denticulatum*
Creeping bent	*Agrostis stolonifera*
Creeping buttercup	*Ranunculus repens*
Creeping thistle	*Cirsium arvense*
Crested dog's-tail	*Cynosurus cristatus*
Cross-leaved heath	*Erica tetralix*
Crowberry	*Empetrum nigrum*
Cup lichens	*Cladonia* spp.
Curled hookmoss	*Palustriella commutata*
Daisy	*Bellis perennis*
Deergrass	*Trichophorum germanicum*
Devil's-bit scabious	*Succisa pratensis*
Dioecious sedge	*Carex dioica*
Downy birch	*Betula pubescents*
Downy birch	*Betula pubescens*

Common Name	Scientific Name
Eared willow	*Salix aurita*
Eyebright	*Euphrasia* sp.
False oat grass	*Arrhenatherum elatius*
Feathery bog-moss	*Sphagnum cuspidatum*
Flag iris	*Iris pseudacorus*
Flat-topped Bog-moss	*Sphagnum fallax*
Flea sedge	*Carex pulicaris*
Fountain apple-moss	*Philonotis fontana*
Glaucous sedge	*Carex flacca*
Glittering wood-moss	*Hylocomium splendens*
Golden-head moss	*Breutelia chrysocoma*
Gorse	*Ulex europaeus*
Great woodrush	*Luzula sylvatica*
Greater fork-moss	*Dicranum majus*
Green-ribbed sedge	*Carex binervis*
Grey willow	*Salix cinerea*
Hard fern	*Blechnum spicant*
Hare's-tail cottongrass	*Eriophorum vaginatum*
Hazel	*Corylus avellana*
Heath bedstraw	*Galium saxatile*
Heath plait-moss	*Hypnum jutlandicum*
Heath rush	*Juncus squarrosus*
Heath-grass	*Danthonia decumbens*
Hooked scorpion-moss	*Scorpidium scorpioides*
Large white-moss	*Leucobryum glaucum*
Lemon-scented fern	*Oreopteris limbosperma*
Lesser spearwort	*Ranunculus flammula*

Common Name	Scientific Name
Lodgepole pine	*Pinus contorta*
Long-leaved pouncewort	*Aphanolejeunea microscopica*
Lustrous bog-moss	*Sphagnum sub-nitens*
Magellanic bog-moss	*Sphagnum magellanicum*
Marsh bedstraw	*Galium palustre*
Marsh cinquefoil	*Comarum palustre*
Marsh forklet-moss	*Dichodontium palustre*
Marsh thistle	*Cirsium palustre*
Marsh violet	*Viola palustre*
Marsh willowherb	*Epilobium palustre*
Mat grass	*Nardus stricta*
Meadow buttercup	*Ranunculus acris*
Meadow grasses	*Poa spp.*
Meadowsweet	*Filipendula ulmaria*
Oak	*Quercus sp.*
Papillose bog-moss	*Sphagnum papillosum*
Perennial ryegrass	*Lolium perenne*
Pignut	*Conopodium majus*
Pineappleweed	*Matricaria discoidea*
Pointed spear-moss	*Calliergonella cuspidata*
Primrose	*Primula vulgaris*
Purple moor-grass	*Molinia caerulea*
Purple spoonwort	*Pleurozia purpurea*
Ragged robin	*Silene flos-cuculi*
Red fescue	*Festuca rubra*
Red-stemmed feathermoss	*Pleurozium schreberi*
Reindeer lichen	*Cladonia portentosa*

Common Name	Scientific Name
Ribwort plantain	*Plantago lanceolata*
Round-leaved sundew	*Drosera rotundifolia*
Rowan	*Sorbus aucuparia*
Scarlet wax cap fungus	*Hygrocybe coccinea*
Sea aster	*Aster tripolium*
Sea plantain	*Plantago maritima*
Self-heal	*Prunella vulgaris*
Sharp-flowered rush	*Juncus acutiflorus*
Sheep's fescue	*Festuca ovina*
Silver birch	*Betula pendula*
Silverweed	*Potentilla anserina*
Sitka spruce	*Picea sitchensis*
Slender St John's-wort	*Hypericum pulchrum*
Smooth cat's-ear	*Hypochaeris glabra*
Soft Bog-moss	*Sphagnum tenellum*
Soft rush	*Juncus effusus*
Spear-leaved orache	*Atriplex prostrata*
Springy turf-moss	*Rhytidiadelphus squarrosus*
Star sedge	*Carex echinata*
Stonecrop	*Sedum sp.*
Sweet vernal-grass	*Anthoxanthum odoratum*
Sycamore	*Acer pseudoplatanus*
Taylor's flapwort	*Mylia taylorii*
Thrift	*Armeria maritima*
Tormentil	*Potentilla erecta*
Tufted hairgrass	*Deschampsia cespitosa*
Viviparous sheep's fescue	*Festuca vivipara*

Common Name	Scientific Name
Wavy hair-grass	*Avenella flexuosa*
Western earwort	*Scapania gracilis*
White clover	*Trifolium repens*
Wild angelica	*Angelica sylvestris*
Wild thyme	*Thymus polytrichus*
Willow	*Salix spp.*
Wood-sorrel	*Oxalis acetosella*
Woolly fringe moss	*Racomitrium lanuginosum*
Yarrow	*Achillea millefolium*
Yellow pimpernel	*Lysimachia nemorum*
Yorkshire fog	*Holcus lanatus*

ANNEX 2 - PHASE 1 HABITAT SURVEY TARGET NOTES

Target Notes presented in **Table A2.1** should be read with reference to **Figure 7.2**, and photographic plates presented in **Annex 3**.

Table A2.1: Phase 1 habitat survey Target Notes.

Target Note	**Grid reference**	**Description (date of survey TN relates to)**	**Photograph Number – see Annex 4** **(For pre-2021 photographs, see the 2016 Report; Confidential Appendix 7.7)**
TN1	NG 31843 47205	Disturbed ground on both sides of rough track dominated by annual meadow-grass and soft-rush. (2014)	-
TN2	NG 31830 47128	Previous muirburn; heather-dominant with regrowth c.5 cm. (2014)	-
TN3	NG 31762 47168	Land slips and excavation showing a peat depth of c.0.5 m. (2014)	-
TN4	NG 31692 47386	Old muirburn, monoculture of heather regrowth. (2014)	-
TN5	NG 30955 48271	Old muirburn. (2014)	-
TN6	NG 30701 48746	Newly made turbine access track. (2014)	-
TN7	NG 31303 46914	Bryophyte dominated spring and burnt heather. (2015)	-

Target Note	Grid reference	Description (date of survey TN relates to)	Photograph Number – see Annex 4 (For pre-2021 photographs, see the 2016 Report; Confidential Appendix 7.7)
TN8	NG 30224 48542	Bryophyte dominated springs along fence line. (2015)	-
TN9	NG 30407 44221	Scarlet waxcap recorded in area of grazed grassland amongst wet heath/acid grassland mosaic. (2016)	-
TN10	NG 31206 48420	Channel of M9 and M6c. (2015)	-
TN11	NG 31005 48288	Channel of M9 and M6c. (2015)	-
TN12	NG 30846 47960	M6a and M6c along burn. (2015)	-
TN13	NG 30851 47584	Small area of M9 and M10. (2015)	-
TN14	NG 32264 45705	Old muirburn. (2015)	-
TN15	NG 30529 47732	M32a spring. (2015)	-
TN16	c.NG 30200 48600	Small number of M32a springs. (2015)	-

Target Note	Grid reference	Description (date of survey TN relates to)	Photograph Number – see Annex 4 (For pre-2021 photographs, see the 2016 Report; Confidential Appendix 7.7)
TN17	NG 30988 45461	M2 bog pool dominated by *Sphagnum cuspidatum* and occasional *Sphagnum papillosum*, round-leaved sundew and common cottongrass. Surrounded by hummocks of *Racomitrium lanuginosum*. (2016)	-
TN18	NG 31192 45765	M2 bog pool dominated with *Sphagnum cuspidatum* and including great sundew. (2016)	-
TN19	NG 31162 45764	Area of bog with frequent M2 bog pools (dominated with *Sphagnum cuspidatum* and including great sundew) and hummocks of mosses including the oceanic liverwort *Scapania gracilis* and occasional to frequent cover of other oceanic liverworts including *Mylia taylorii* and *Pleurozia purpurea*. (2016)	-
TN20	NG 30584 44892	Potential access route traverses area of bog and local area of M4 flush where bottle sedge is frequent over *Sphagnum palustre* at the base of a slope. Bottle sedge is also frequent in the adjacent bog where the moss *Polytrichum commune* (common haircap) is locally abundant. (2016)	-
TN21	NG 32448 47828	Burn; 1.5m wide, 0.25m deep, flowing clearly and strongly over a bed of gravel and small boulders. Water peat stained. Banks a mix of *Juncus effusus* and *squarrosus* dominated marshy and acid grassland. (2021)	1

Target Note	Grid reference	Description (date of survey TN relates to)	Photograph Number – see Annex 4 (For pre-2021 photographs, see the 2016 Report; Confidential Appendix 7.7)
TN22	NG 31919 45257	Ben Aketil Burn; 1.5m wide and 0.3m deep flowing clearly and strongly over a bed of gravel, small boulders and bedrock. Water peat stained. Banks a mix of cropped acid grassland and common heather dominated dry heath. (2021)	2
TN23	NG 31321 45287	Wooded gully through which the Ben Aketil Burn flows. 7 to 8m wide and 5 to 10m deep. The gully is packed with native broadleaf woodland, growing from precipitous crags. Trees mostly less than 5m tall and dominated by Hazel but also rowan and downy Birch. Other trees include aspen, eared willow, holly and cotoneaster. (2021)	3
TN24	NG 29961 45080	Area of moor in the south of the site with some scattered, planted broadleaves, mostly mix of willows, birch and alder around 4 to 5m tall. (2021)	4
TN25	NG 30151 45362	Caroy River; 3 to 4m wide and 0.2 to 0.5m deep. Water peat stained and flowing clear and strong over a bed of pebbles, gravels, boulders and bedrock. Banks mostly a mix of acid grassland, soft rush dominated marshy grassland and bog communities. (2021)	5
TN26	NG 30680 45932	Burn; 1m wide and 0.2m deep, water peat stained and slowing clear and strongly over a bed of pebbles and small boulders. Banks are a mix of soft rush dominated marshy grassland and common heather and cottongrass bog. (2021)	6

Target Note	Grid reference	Description (date of survey TN relates to)	Photograph Number – see Annex 4 (For pre-2021 photographs, see the 2016 Report; Confidential Appendix 7.7)
TN27	NG 31202 46872	Another similar wooded gully to that mentioned in target note 23, gully not quite as steep sided and upper slopes and tops covered in purple moor grass dominated bog. Perhaps a greater abundance of downy birch and hazel here. (2021)	7

ANNEX 3 - NVC SURVEY RESULTS

Tables A3.1, **A3.2** and **A3.3** below outline DOMIN scales and scores for NVC survey results.

Table A3.1: Dominance (DOMIN) scale.

Code	Approximate percentage cover in quadrat
10	>90 %
9	75 – 90 %
8	51 – 75 %
7	34 – 50 %
6	26 – 33 %
5	11 – 25 %
4	5 – 10 %
3	<5 %, many individuals
2	<5 %, a few individuals
1	<5 %, one or two individuals

Table A3.2: NVC Tables (2021 survey – for previous surveys see the 2016 Report, Annex A6.3)

NVC Community	**H10a *Calluna vulgaris – Erica cinerea* heath, typical sub-community**					
Grid Coordinates	NG 31423 45272	NG 30642 43895	NG 30635 43925	NG 31319 45250	NG 31461 45303	
Quadrat	Q1	Q2	Q3	Q4	Q5	
Veg height (cm)	40	40	45	45	45	
Peat Depth	15	10	10	20	20	
Species	**Cover**					**Constancy**
Calluna vulgaris	8	7	8	7	8	5
Blechnum spicant	4	5	-	3	-	3
Potentilla erecta	4	5	4	4	4	5
Carex binervis	4	3	-	3	-	3
Pleurozium schreberi	7	5	5	5	5	5
Hylocomium splendens	5	6	4	5	5	5
Hypnum jutlandicum	5	5	5	5	5	5
Molinia caerulea	3	-	-	3	3	3
Erica cinerea	4	5	4	6	5	5
Dryopteris dilatata	-	4	-	-	-	1
Anjelica sylvestris	-	4	4	-	-	2
Galium saxatile	-		4	3	3	3
Sorbus aucuparia	-	-	3	-	-	1
Agrostis capillaris	-	-	-	3	3	2
Succisa pratensis	-	-	-	-	3	1
Festuca ovina	-	-	-	-	3	1

NVC Community	**M6c *Carex echinata – Sphagnum fallax / denticulatum* mire, *Juncus effusus* sub-community**					
Quadrat	Q1	Q2	Q3	Q4	Q5	
OS Grid Coordinates	NG 30444 48959	NG 30184 45314	NG 30697 47358	NG 30590 46873	NG 30596 46560	
Veg height (cm)	60	50	70	60	70	
Peat depth (cm)	75	40	30	40	40	
Species	**Cover**					**Constancy**
Juncus effusus	5	6	6	7	7	5
Sphagnum palustre	4	3	3	-	3	4
Polytrichum commune	8	8	8	4	6	5
Potentilla erecta	4	4	4	4	4	5
Molinia caerulea	3	3	3	-	3	4
Sphagnum fallax	3	4	3	4	4	5
Galium saxatile	3	3	3	3	3	5
Empetrum nigrum	3	-	-	2	-	2
Deschampsia flexuosa	3	3	-	3	3	4
Calluna vulgaris	-	3	-	-	-	1
Pleurozium schreberi	-	4	3	4	4	4
Festuca ovina	-	3	3	-	-	2
Holcus lanatus	-	-	3	3	3	3
Viola palustris	-	-	-	4	3	2
Agrostis stolonifera	-	-	-	3	4	2
Rumex acetosa	-	-	-	3	4	2
Hylocomium splendens	-	-	-	4	3	2

NVC Community	**M15 *Trichophorum germanicum – Erica tetralix* wet heath**					
Quadrat	Q1	Q2	Q3	Q4	Q5	
Grid Coordinates	NG 30374 48905	NG 32482 46560	NG 30670 47042	NG 32656 46338	NG 32595 46035	
Peat depth (cm)	20	30	20	30	35	
Veg height (cm)	10	20	20	30	25	
Species	**Cover**					**Constancy**
Calluna vulgaris	5	5	7	8	5	5
Potentilla erecta	4	5	4	3	4	5
Eriophorum angustifolium	4	4	3	3	3	5
Trichophorum germanicum	5	7	3	3	6	5
Festuca vivipara	3	-	-	-	-	1
Carex panicea	4	-	2	2	3	4
Erica cinerea	3	-	-	-	-	1
Nardus stricta	4	-	4	3	-	3
Festuca ovina	4	-	-	-	-	1
Molinia caerulea	3	3	3	3	3	5
Sphagnum capillifolium	4	3	4	5	4	5
Juncus squarrosus	4	3	3	4	4	5
Narthecium ossifragum	4	3	-	3	4	4
Deschampsia flexuosa	3	-	-	3	-	2
Carex demissa	4	-	2	-	3	3
Carex echinata	-	3	3	3	3	4
Rhytidiadelphus squarrosus	-	3	3	4	3	4
Empetrum nigrum	-	-	4	3	3	3
Pleurozium schreberi	-	-	5	4	3	3
Hylocomium splendens	-	-	5	4	4	3
Erica tetralix	-	-	-	3	3	2

NVC Community	M15 *Trichophorum germanicum – Erica tetralix* wet heath					
Carex flacca	-	-	-	-	3	1

NVC Community	M17a *Trichophorum germanicum – Eriophorum vaginatum* mire, *Drosera rotundifolia – Sphagnum spp* sub-community															
Quadrat	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	
Grid Coordinates	NG 32451 45993	NG 32263 48104	NG 31765 45242	NG 31544 45469	NG 30855 46009	NG 31352 46335	NG 31306 46558	NG 32345 45685	NG 32972 46888	NG 33088 47160	NG 33297 47494	NG 32761 47784	NG 31731 45473	NG 31418 45451	NG 31292 45419	
Peat depth (cm)	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	
Veg height (cm)	30	30	35	35	30	25	25	25	25	25	25	30	25	25	25	
Species	**Cover**															**Constancy**
Calluna vulgaris	5	3	3	5	5	4	5	4	3	4	3	3	3	3	3	5
Trichophorum germanicum	6	5	4	4	6	6	5	5	5	5	6	7	6	6	7	5
Narthecium ossifragum	3	4	6	4	5	3	4	4	4	4	4	5	5	5	5	5
Erica tetralix	5	5	4	5	4	5	5	5	4	4	4	4	5	5	5	5
Eriophorum angustifolium	4	3	3	3	3	3	3	4	4	3	4	3	3	3	3	5
Eriophorum vaginatum	4	4	4	5	4	5	5	5	4	5	5	4	4	4	5	5
Potentilla erecta	4	4	3	4	3	3	3	-	-	3	4	3	3	3	3	4
Sphagnum capillifolium	4	4	4	4	4	5	5	5	6	5	4	5	4	5	4	5
Sphagnum papillosum	6	4	5	4	3	4	3	4	5	5	4	4	4	4	4	5
Molinia caerulea	3	3	3	3	3	3	3	3	-	3	3	3	3	3	3	5
Cladonia portentosa	-	3	3	3	-	3	3	-	-	3	-	-	3	3	3	3
Empetrum nigrum	-	-	3	3	-	-	-	-	-	-	-	-	-	-	3	1
Pleurozium schreberi	-	-	3	-	-	-	3	5	3	-	3	3	-	3	3	3
Juncus squarrosus	-	-	-	3	-	-	3	3	-	-	-	2	-	-	3	2
Polygala serpyllifolia	-	-	-	3	3	-	-	3	-	-	3	-	-	3	3	2
Sphagnum compactum	-	-	-	-	4	-	-	3	4	4	4	-	-	-	-	2

NVC Community	M17a *Trichophorum germanicum – Eriophorum vaginatum* mire, *Drosera rotundifolia – Sphagnum spp* sub-community															
Carex panicea	-	-	-	-	-	-	-	3	3	-	2	-	3	-	3	2
Drosera rotundifolia	-	-	-	-	-	-	-	3	3	3	2	-	-	-	-	1
Sphagnum tenellum	-	-	-	-	-	-	-	-	5	-	-	3	3	-	-	1

NVC Community	M19 *Calluna vulgaris – Eriophorum vaginatum* mire										
Quadrat	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
Grid Coordinates	NG 30929 47094	NG 30815 44295	NG 32932 47023	NG 30323 45611	NG 30425 46057	NG 30562 45893	NG 30431 47283	NG 30284 47714	NG 30407 47931	NG 30802 47327	
Peat depth (cm)	100+	100+	100+	100+	100+	100+	100+	100+	100+	100+	
Veg height (cm)	30	30	35	45	45	40	40	35			
Species	**Cover**										**Constancy**
Calluna vulgaris	6	6	6	7	6	7	7	6	7	7	5
Eriophorum vaginatum	7	6	7	5	7	7	6	7	6	7	5
Erica tetralix	5	4	4	4	3	3	4	4	4	4	5
Vaccinium myrtillus	4	3	-	-	4	4	3	-	3	-	3
Deschampsia flexuosa	3	-	3	-	3	3	3	-	-	3	3
Hypnum jutlandicum	5	-	4	5	5	5	5	5	4	5	5
Pleurozium schreberi	5	5	5	5	5	4	5	5	4	5	5
Trichophorum germanicum	3	3	3	5	-	4	3	4	4	3	5
Sphagnum capillifolium	4	4	4	5	4	5	4	5	4	4	5
Molinia caerulea	3	3	-	3	3	-	3	3	3	-	4
Empetrum nigrum	-	4	-	-	3	-	3	-	-	-	2
Juncus squarrosus	-	-	3	4	3	-	3	-	-	4	3
Eriophorum angustifolium	3	3	3	3	3	3	3	3	3	3	5
Racomitrium lanuginosum	-	3	-	-	-	-	-	-	-	3	1

NVC Community	M19 *Calluna vulgaris – Eriophorum vaginatum* mire										
Sphagnum papillosum	-	-	-	3	-	3	-	-	-	4	2
Narthecium ossifragum	-	-	3	3	-	3	3	-	3	3	3
Carex panicea	-	-	3	3	-	-	-	3	-	3	2
Potentilla erecta	-	3	-	-	3	-	-	3	3	3	3
Hylocomium splendens	-	-	-	-	5	3	-	4	5	5	3

NVC Community	M19 *Calluna vulgaris – Eriophorum vaginatum* mire (Burnt)					
Quadrats	Q1	Q2	Q3	Q4	Q5	
Grid Coordinates	NG 30771 44665	NG 30406 45631	NG 30564 46089	NG 30995 46297	NG 30244 47006	
Peat depth (cm)	100+	100+	100+	100+	100+	
Veg height (cm)	30	35	25	25	25	
Species	**Cover**					**Constancy**
Calluna vulgaris	6	6	6	6	6	5
Eriophorum vaginatum	5	6	5	5	6	5
Erica tetralix	5	4	4	4	4	5
Vaccinium myrtillus	-	3	3	-	-	2
Deschampsia flexuosa	-	-	-	3	-	1
Hypnum jutlandicum	4	3	3	4	-	4
Pleurozium schreberi	4	4	4	5	5	5
Trichophorum germanicum	5	3	3	4	4	5
Sphagnum capillifolium	4	4	6	6	5	5
Molinia caerulea	3	3	3	3	-	4
Empetrum nigrum	3	3	3	3	-	4
Juncus squarrosus	-	3	3	-	3	3
Eriophorum angustifolium	4	3	3	3	3	5

NVC Community	M19 *Calluna vulgaris – Eriophorum vaginatum* mire (Burnt)					
Racomitrium lanuginosum	-	-	3	-	3	2
Sphagnum papillosum	-	3	4	4	-	3
Narthecium ossifragum	3	3	3	3	3	5
Carex panicea	-	-	2	3	-	2
Potentilla erecta	-	-	3	2	3	3

NVC Community	M25 *Molinia caerulea – Potentilla erecta* mire: no sub-community assigned.					
OS grid coordinates	NG 32274 48028	NG 31291 45294	NG 32603 47851	NG 32966 47264	NG 31194 45261	
Quadrat	Q1	Q2	Q3	Q4	Q5	
Peat Depth (cm)	100+	60	70	80	100+	
Veg height (cm)	30	50	50	50	50	
Species	**Cover**					**Constancy**
Molinia caerulea	6	8	9	9	9	5
Potentilla erecta	4	4	3	3	3	5
Calluna vulgaris	4	4	4	4	4	5
Erica tetralix	5	3	3	3	3	5
Trichophorum germanicum	4	-	3	-	-	2
Narthecium ossifragum	4	3	-	-	-	2
Polygala serpyllifolia	3	3	-	1	-	3
Pleurozium schreberi	3	3	4	4	4	5
Sphagnum capillifolium	4	3	-	3	-	3
Rhytidiadelphus squarrosus	3	4	-	-	-	2
Eriophorum vaginatum	4	3	-	-	-	2
Eriophorum angustifolium	3	3	-	-	-	2

NVC Community	M25 *Molinia caerulea – Potentilla erecta* mire: no sub-community assigned.					
Carex echinata	-	3	2	-	-	2

NVC Community	U4b *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland, *Holcus lanatus -Trifolium repens* sub-community					
OS grid coordinates	NG 32138 45339	NG 32046 45282	NG 30717 47089	NG 30164 45478	NG 30379 47226	
Quadrat	Q1	Q2	Q3	Q4	Q5	
Veg height (cm)	10	10	15	15	10	
Soil depth (cm)	15	10	10	5	10	
Species	**Cover**					**Constancy**
Nardus stricta	4	-	-	4	-	2
Agrostis capillaris	5	5	5	5	5	5
Festuca ovina	3	4	3	3	3	5
Anthoxanthum odoratum	5	5	5	5	5	5
Carex echinata	4	3	-	3	3	4
Potentilla erecta	4	4	4	4	4	5
Galium saxatile	4	4	4	4	3	5
Rhytidiadelphus squarrosus	4	5	4	4	4	5
Pleurozium schreberi	4	4	4	4	3	5
Trifolium repens	3	4	5	4	5	5
Polytrichum commune	3	-	-	3	-	2
Achillea millefolium	3	4	4	3	4	5
Carex demissa	-	-	2	-	2	2
Rumex acetosa	-	-	-	-	4	1
Plantago lanceolata	-	-	-	-	3	1
Calluna vulgaris	-	-	4	-	4	2

NVC Community	**U4f *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland, *Festuca vivipara community***					
OS grid coordinates	NG 30577 43766	NG 30601 43760	NG 30596 43784	NG 30618 43806	NG 30626 43844	
Quadrat	Q1	Q2	Q3	Q4	Q5	
Veg height (cm)	30	30	30	30	30	
Soil depth (cm)	25	20	15	20	25	
Species	**Cover**					**Constancy**
Festuca vivipara	4	4	5	5	4	5
Festuca ovina	3	3	4	4	3	5
Trichophorum germanicum	4	3	4	4	4	5
Molinia caerulea	4	5	5	5	5	5
Agrostis capillaris	4	5	5	4	5	5
Potentilla erecta	5	5	5	5	5	5
Calluna vulgaris	4	5	4	4	4	5
Pleurozium schreberi	6	5	6	5	5	5
Erica tetralix	4	4	3	4	5	5
Succisa pratensis	3	3	3	3	3	5
Luzula multiflora	3	3	3	3	3	5
Hylocomium splendens	5	4	4	5	4	5
Juncus squarrosus	3	3	3	4	4	5
Carex echinata	3	3	3	3	3	5
Eriophorum angustifolium	3	3	-	2	3	4
Anthoxanthum odoratum	-	4	3	3	3	4
Holcus lanatus	-	-	3	-	-	1
Deschampsia flexuosa	-	-	-	3	3	2
Galium saxatile	-	-	-	3	-	1

NVC Community	**U5 *Nardus stricta – Galium saxatile* grassland: no sub-community assigned**					
OS grid coordinates	NG 32336 45803	NG 32354 45808	NG 32362 45825	NG 32338 45850	NG 32710 46178	
Quadrat	Q1	Q2	Q3	Q4	Q5	
Veg height (cm)	40	35	30	40	35	
Soil depth (cm)	10	15	10	5	10	
Species	**Cover**					**Constancy**
Nardus stricta	8	8	8	8	8	5
Potentilla erecta	4	4	4	4	3	5
Juncus squarrosus	4	4	4	4	3	5
Festuca vivipara	3	3	-	2	-	3
Hylocomium splendens	3	3	3	4	4	5
Carex flacca	3	3	3	-	3	4
Eriophorum angustifolium	3	3	3	3	3	5
Calluna vulgaris	3	-	4	-	-	2
Sphagnum fallax	3	4	-	-	-	2
Festuca ovina	3	3	3	3	3	5
Agrostis capillaris	3	4	3	3	3	5
Anthoxanthum odoratum	3	3	4	3	3	5
Pleurozium schreberi	4	4	3	3	3	5
Carex panicea	3	2	3	-	3	4
Carex echinata	3	3	3	3	3	5

NVC Community	**U6a *Juncus squarrosus-Festuca ovina* grassland, *Sphagnum spp*. sub-community**					
OS Grid coordinates	NG 30243 45089	NG 30240 45178	NG 30241 45216	NG 30241 45143	NG 30247 45260	
Quadrats	Q1	Q2	Q3	Q4	Q5	
Veg height (cm)	30	35	35	30	25	
Soil depth (cm)	25	25	25	25	25	
Species	**Cover**					**Constancy**
Juncus squarrosus	8	8	7	7	7	5
Potentilla erecta	4	3	4	4	3	5
Deschampsia flexuosa	3	3	-	-	-	2
Calluna vulgaris	3	3	4	4	5	5
Vaccinium myrtillus	3	3	3	4	3	5
Pleurozium schreberi	4	3	4	4	4	5
Galium saxatile	3	3	3	3	3	5
Sphagnum capillifolium	4	3	4	3	4	5
Polytrichum commune	3	4	4	4	3	5
Luzula multiflora	3	3	3	3	3	5
Rhytidiadelphus triquetrus	3	3	5	5	5	5
Carex flacca	2	3	-	3	3	4
Festuca ovina	-	3	3	-	-	2
Agrostis capillaris	-	3	4	3	-	3
Hylocomium splendens	-	4	5	5	4	4
Vaccinium vitis-ideae	-	-	-	3	3	2
Empetrum nigrum	-	-	-	4	3	2

ANNEX 4 – PHOTOGRAPHS

Photo	Description
Phase 1 Target Notes	
	**Photo 1** TN21
	**Photo 2** TN22
	**Photo 3** TN23

	**Photo 4** TN24
	**Photo 5** TN25
	**Photo 6** TN26

	**Photo 7** TN27
NVC Communities	
	**Photo 8** H10
	**Photo 9** M6c

	**Photo 10** M15
	**Photo 11** M17a
	**Photo 12** M19

	**Photo 13** M19 (burnt)
	**Photo 14** M25

	**Photo 15** **M37**
	**Photo 16** U4b

	**Photo 17** **U4f**
	**Photo 18** U5
	**Photo 19** U6a