

Appendix 6-2 AECOM - Annex I Habitat Report



Scart Mountain Wind Farm

Habitat Report

FuturEnergy Ireland

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Quality information

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1. Introduction

1.1 Background

AECOM was appointed by FuturEnergy Ireland Development Designated Activity Company ('FuturEnergy Ireland') to carry out a survey of Annex I habitats¹ and their condition, and mapping of non-Annex I habitat in accordance with the Fossitt habitat survey system (Fossitt, 2000), at the proposed locations of Scart Mountain Wind Farm, Co. Waterford.

The proposed locations (the 'Sites') of Scart Mountain Wind Farm that were subject to survey are the hill known as Knocknanask (the main part of the proposed wind farm), and the upper part of the adjacent hill known as Knocknasheega. The latter is located within an area of Coillte forestry. Article 17 information held by the National Parks and Wildlife Service (NPWS) includes Annex I habitat polygons at these locations.

1.2 Summary description of the Sites

Figure 1, showing a map of the Annex I and non-Annex I habitats at Knocknanask and Knocknasheega, and target note locations, is provided in Appendix 1. Target notes are provided in Appendix 2, and condition monitoring data in Appendix 3.

The survey area for Knocknanask encompassed the majority of the hill of Knocknanask, excluding forestry and to the extent agreed with FuturEnergy Ireland, as shown on Figure 1. The Knocknanask survey area is essentially open moorland rising from approximately 300 m to 480 m above sea level. The upper-most part of the hill supports degraded peat bog, but the larger part is wet heath in poor condition, with smaller areas of other habitats such as dry heath and bracken *Pteridium aquilinum*. Knocknanask has been subject to historic peat extraction and, in recent times, burning. It is also subject to sheep grazing. There are historic man-made tracks running up all sides of the hill to the upper parts, presumably created during historic peat extraction.

The Knocknasheega area is mainly Coillte conifer plantation forestry, with open patches of dry heath and bracken, and locally wet heath. It is not subject to livestock grazing but deer grazing occurs which is locally heavy.

1.3 NPWS Article 17 data

The NPWS Article 17 data for Knocknanask correctly identifies the extent of open ground, but is incorrect in the assigned Annex I habitat – the majority is assigned to H4030 Dry heath, whereas the field survey described in this Report found the majority to be H4010 Wet heath with a significant area of H7130 Blanket bog and only small areas of H4030 Dry heath, as described in Section 3. The NPWS Article 17 data also indicate a small area of H4060 Alpine and sub-alpine heath at the south-east edge of the Site, however this habitat was not found at Knocknanask.

For Knocknasheega, the NPWS Article 17 data is broadly correct in identifying the presence of H4030 Dry heath, although field survey found that there is also some H4010 Wet heath. However, it appears to be inaccurate in precise location and extent of open areas amongst the Coillte forestry. The extent of open areas and their constituent habitats are as shown in Figure 1. Given the apparent inaccuracy of the NPWS Article 17 polygons at Knocknasheega, the intervening Coillte forestry was also mapped to make absolutely clear the extent and location of the Annex I and other open habitats.

¹ Habitats in this Report preceded by an alphanumeric code in the format 'Hxxxx' are Annex I habitats. These are habitats of Community interest listed in Annex I of the EC Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna). In summary, habitats of Community interest are those that: a) are in danger of disappearance in their natural range, b) have a small natural range, or c) present outstanding examples.

2. Methodology

2.1 Field survey

The habitat survey was carried out on foot in the period 11 to 16 May 2023 by an AECOM habitat specialist with extensive experience of upland as well as lowland habitats. The weather during the survey was almost entirely dry and sunny, and did not hinder the survey.

Annex I habitats, and Fossitt habitats where not Annex I, were mapped with the aid of aerial photography and a tablet running ESRI FieldMaps. The aerial imagery assisted with identification and separation of vegetation patches. Target notes for habitat features were recorded using ESRI FieldMaps.

Vegetation stands considered to be homogenous were assigned Annex I or non-Annex I Fossitt habitat types. The Annex I habitats are those listed in Annex I of the EC Habitats Directive, with guidance on interpretation provided in European Commission (2013). The Fossitt habitat types are those described in Fossitt (2000). Vegetation types can occur in patches too small to map amongst more extensive communities, or in complexes that cannot be feasibly mapped within a reasonable timescale, and in these cases mosaic polygons were used, or target notes for extremely small habitats (e.g. some spring / soakway vegetation).

Condition of Annex I habitat for H7130 Blanket bog, H4010 wet heath and H4030 dry heath was recorded by making observations at various points during the habitat mapping and recording the relevant condition criteria in a tablet using a semi-automated spreadsheet. The condition criteria were as described in Perrin *et al.* (2014). A single small instance of H7140 Alkaline fen (a basic flush) was sufficiently small that the condition criteria were applied to the whole feature.

2.2 Digitising

Field data recorded in ESRI FieldMaps were subsequently imported into ESRI ArcMap. The habitat maps provided in Figure 1 were finalised using ESRI ArcMap, with reference to the field mapping, tablet target notes and aerial photography.

The GIS habitat polygons were assigned attributes for Fossitt habitat type, Annex I habitat type and Annex I condition, as well as a comment field used as considered appropriate to give descriptive information. The GIS habitat dataset was produced as a feature class within a file geodatabase, which automatically provides unique identifier, polygon area and polygon perimeter attributes. A check was carried out for errors such as small gaps and slivers, missing attributes or non-standard / incorrect attributes.

2.3 Nomenclature

This Report gives the scientific name of vascular plants on first mention of a species, following Stace (2019), and thereafter common names only (except in the Appendices where scientific names are used for brevity). English names of bryophytes and lichens are not well known therefore only scientific names have been used for these in all cases, following Atherton *et al.* (2010) for bryophytes, and Hodgetts (1992) for *Cladonia* spp. lichens.

2.4 Limitations

It is not possible to walk over every square metre of a site, especially on an upland site with steep terrain. The surveyor employed professional experience to judge where their path through the vegetation would best be laid to identify changes of vegetation, using aerial photography combined with factors such as angle of slope, aspect, texture and hue of vegetation, and occurrences of features such as peat cuttings, all of which can indicate changes of vegetation type. This is normal for such habitat surveys and is not considered to significantly limit the findings. However, it should be noted that it is not likely that every single occurrence of notable species has been recorded, and it is possible that some very small unmappable habitats (such as springs / soakways) that are easily hidden by other vegetation may have gone undetected.

The boundaries between habitats in more natural situations can be gradual rather than sharp. This is particularly the case for blanket bog and wet heath at this Site, where, given the scarcity of bog indicator species, peat depth is often the key separator between bog and heath. The surveyor made a best professional judgement as to where the boundary should be placed in such circumstances, using features such as depth of exposed peat faces and exposure of sub-peat rocks to assist in this judgement.

The season of survey (May 2023) was appropriate for upland habitat survey. However, cross-leaved heath *Erica tetralix* was not yet in flower – when in flower, the pale pink terminal flower clusters are very obvious at a distance, but when not in flower and also apparently sparse or rare, as at Knocknanask, it could occasionally go undetected. This is not likely to have been a common occurrence, however, because the surveyor is considerably experienced and competent in identifying this species vegetatively or from dead flowerheads, and the conclusions of this Report are considered to remain robust.

3. Knocknanask habitats

3.1 H7130 Blanket bogs (non-priority)

3.1.1 Description

When it is intact (i.e. considered to be peat-forming, generally taken as meaning containing frequent bog *Sphagnum* species or hare's-tail cottongrass *Eriophorum vaginatum*), H7130 Blanket bog is a priority Annex I habitat² (indicated by an asterisk suffix in EC documentation). However, blanket bog at Knocknanask is not considered intact because of the great scarcity of *Sphagnum* species and hare's-tail cottongrass, as discussed below. Therefore, whilst it still constitutes H7130 Blanket bog, it is non-priority H7130.

Blanket bog occupies the summit area of Knocknanask, with an outlier to the south, as shown on Figure 1, and occupying shallower slopes. Apart from one miniscule outlying patch (discussed further below) it is heavily degraded, largely by historic peat cutting which has removed a great deal of the peat. The peat was removed in strips leaving generally smaller areas of intervening deeper peat, although locally uncut peat occurs in wider patches. Peat depth in the uncut strips and patches appears to be substantial, around 0.5 m or more, despite the fact that it has probably often shrunk to a degree through drying. Peat depth in the excavated areas is undoubtedly shallow in many places, with rocks presumed to be part of the underlying substrate occasionally visible. However, in peat bogs that have not been cut-over, but as a result of erosion exhibit peat hags of deep peat with gaps of shallow peat, it would be normal to consider the whole area as degraded blanket bog. Similarly, and even though average peat depth across the summit blanket bog at Knocknanask is probably below 0.5 m, the regular presence of strips or patches of deeper uncut peat indicates that the summit area should be classed as degraded blanket bog. This is also supported by the very scarce occurrence of hare's-tail cottongrass.

The bulk of the vascular vegetation in the degraded bog comprises heather *Calluna vulgaris*, often with deergrass *Trichophorum germanicum* which is sometimes co-dominant. Deergrass can be natural in more oceanic bogs, but its abundance may also result from grazing pressure (and possibly historic burning). As noted above, hare's-tail cottongrass is present but scarce and commonly absent. In addition to heather, ericoids include occasional bell heather *Erica cinerea*, cross-leaved heath and bilberry *Vaccinium myrtillus*. Purple moor-grass *Molinia purpurea* and wavy hair-grass *Avenella flexuosa* occur occasionally at low cover, and more rarely small amounts of green-ribbed sedge *Carex binervis* can be found.

Sphagnum moss species are very scarce in the degraded blanket bog. The most frequently-encountered is *Sphagnum capillifolium*, but even this species (which is normally common in blanket bog as well as other damp moorland habitats such as wet heath) is rare overall. *Sphagnum papillosum*, which is often common in intact bog, was only observed once (at Target Note 11). *Sphagnum cuspidatum* was noted twice only in the bog, at two very small pools (at Target Notes 15 and 19, and accompanied by bulbous rush *Juncus bulbosus* and common sedge *Carex nigra*, and at Target Note 15 also by a little *Sphagnum capillifolium* and hare's-tail cottongrass). By far the most abundant bryophyte is *Hypnum jutlandicum*, a species typical of drier bog and heath, and often the only bryophyte present. There is occasional *Campylopus introflexus*, a non-native species that colonises bare peat and is a negative indicator. *Racomitrium lanuginosum*, which can be common in some bog, is very rare. Lichen is rare to occasional, and was invariably *Cladonia portentosa*, a common species of both bog and heath.

3.1.2 Condition

As described above, and excepting a miniscule outlier discussed below, the bog at Knocknanask is heavily degraded. Of the sixteen condition assessment stops made in the degraded bog, none passed the first criterion of at least seven positive indicator species, mostly by a considerable margin. A primary factor contributing to this was too much heather (and sometimes too much deergrass as well, although that is not a specified criterion), with ten of the stops failing on excessive heather cover. Positive indicator species most commonly comprised heather and deergrass, sometimes only these two. Where supplemented by other positive indicators, the most frequent were bilberry or cross-leaved heath, occasionally milkwort *Polygala serpyllifolia*, and rarely the moss *Racomitrium lanuginosum* or hare's-tail cottongrass. Other than heather and deergrass, the other positive indicators were present often exhibited very low cover. Although bryophyte cover was acceptable at all stops, this masks the fact that it almost entirely comprised *Hypnum jutlandicum* with no *Sphagnum* at any stop (and with *Sphagnum* as discussed above very scarce overall). Owing to the abundance throughout of historic peat cuttings,

² Priority Annex I habitats are defined in the Habitats Directive as "natural habitat types in danger of disappearance, which are present in the [Member States] and for the conservation of which the Community has particular responsibility in view of the proportion of their natural range which falls within [that] territory".

and the overall dryness of the degraded bog, the criterion for 'less than 10% drainage' (stated to include drainage from cutting) is considered to have also failed at all stops.

For these reasons, with serious condition criterion failures at every stop, and given also the extent of removed peat, the degraded bog is considered to be in **Very Poor** condition. In consideration of conservation status as per Perrin *et al.* (2014), and given the serious condition failures, 'structure and functions' for the degraded blanket bog must be considered Unfavourable Bad, and this leads (irrespective of 'extent' and 'future prospects') to a conservation status of **Unfavourable Bad**. However, future prospects itself is also considered Unfavourable Bad because burning at Knocknanask appears to be a fairly regular occurrence and it cannot be guaranteed that this would not affect parts of the degraded bog within the time period for this criterion (twelve years).

Peat extraction at Knocknanask has probably not taken place for some time. A local history information board at the nearby Mount Melleray Abbey suggests that people last worked on Knocknanask in the 1960s. If so, there has probably been no peat extraction for at least 50 years. However, there is no sign of recovery of the degraded blanket bog vegetation – *Sphagnum* species and hare's-tail cottongrass remain very scarce, and only one instance of a 'good' bog *Sphagnum* species (*Sphagnum papillosum*) was seen. Possible factors that may have prevented appreciable recovery include grazing pressure, weather exposure, general climatic conditions and possibly burning (although signs of recent burning in the bog were only detected at the smaller separated southern patch shown on Figure 1, and if burning has taken place in the wider bog it would have been in the more distant past).

3.2 H7130 Blanket bogs (priority)

3.2.1 Description

Only one extremely small patch of isolated blanket bog is considered to be intact and to therefore constitute priority H7130 Blanket bog. This is located at Target Note 2 on Figure 1, in the south-eastern part of Knocknanask. This is a very small gently sloping patch of bog with purple moor-grass the most abundant species, but also containing abundant hare's-tail cottongrass, and accompanied by frequent heather, bilberry, deergrass, cross-leaved heath, *Sphagnum papillosum* and *Sphagnum capillifolium*, and rarely *Sphagnum cuspidatum*. It is the abundant hare's-tail cottongrass and frequent *Sphagnum papillosum* that in particular suggest classification as intact bog, albeit somewhat atypical in the abundance of purple moor-grass.

3.2.2 Condition

This patch of bog is very small and was assessed in its entirety. It is considered to pass all condition criteria and is therefore in **Good** condition. However, in accordance with Perrin *et al.* (2014) conservation status is considered **Unfavourable Inadequate** because, despite the current good condition and likely no change in area, future prospects cannot be guaranteed as favourable given that burning at Knocknanask appears to be a fairly regular occurrence and could adversely affect this vegetation patch over the time period for this criterion (twelve years).

3.3 H4010 Northern Atlantic wet heaths with *Erica tetralix*

3.3.1 Description

Most of the wet heath at Knocknanask falls into three zones:

- Zone 1 – on the eastern slopes, the wet heath is mostly dominated by purple moor-grass (often overwhelmingly so), although there are areas with co-dominant heather. Cross-leaved heath is occasional and never abundant, and there is often a little bilberry and/or bell heather, the latter occasionally abundant. The moss layer is generally poor and commonly only *Hypnum jutlandicum*, although *Sphagnum capillifolium* is occasional at low to moderate cover. Deergrass is generally not prominent in this zone. Clear signs of recent burning are very localised, however the rather poor flora and occasional presence of *Campylopus introflexus* suggest that there may have been burning in the past;
- Zone 2 – on the north-western slopes, and towards the western periphery, heather and purple moor-grass are commonly co-dominant in the wet heath, and sometimes heather is dominant in transition to dry heath particularly on more sloping ground. Cross-leaved heath is rare. Previous recent burning is clearly evident in some places (particularly towards the south-west), and there are areas of dry heath. Degradation in the form of cypress *Cupressus* sp. encroachment is also evident in the western periphery; and,
- Zone 3 – between the degraded bog and the dry heath (and the mosaic of dry heath / wet heath) to the south-west and south, the wet heath is mostly very heavily degraded by recent burning (with some impact

likely from grazing as well) and has also been subject, at least in some places, to peat extraction. In this zone, deergrass is typically abundant (to an unfavourable degree), almost certainly as a result of the recent burning and probably exacerbated by grazing pressure. Purple moor-grass is usually present and sometimes abundant, although owing to the recent burning not usually dense. Ericoids are typically very short and mainly comprise heather and bell heather, with cross-leaved heath being very rare. The moss flora is poor with little to no sphagnum and in places no pleurocarpous moss either – where present, pleurocarpous moss is generally represented by *Hypnum jutlandicum* only, and *Campylopus introflexus* (a coloniser of bare peat as was likely caused by the recent burning) can often be found.

EU guidance on Annex I habitats (European Commission, 2013) is extremely brief for H4010 Wet heath – the only species mentioned is cross-leaved heath, and it is stated that the corresponding United Kingdom (UK) National Vegetation Classification (NVC) types are M14, M15, M16 and H5. Thus, in the UK, vegetation of these types is considered to be Annex I H4010 Wet heath generally, and absence of cross-leaved heath would typically be a sign of poor condition (although in the driest forms of wet heath, rarity of cross-leaved heath could be natural). This approach has been taken for the wet heath at Knocknanask, where cross-leaved heath is very scarce in most of the wet heath – it was most commonly found in the northern part of Zone 1 (which appears to have been less interfered with, at least in recent times), rarely in Zone 2 and very rarely in Zone 3 (no doubt because of the recent burning).

As mentioned above, peat extraction has taken place historically in parts of Zone 3. However, unlike in the degraded blanket bog, peat appears to be consistently too thin, without significant strips of deeper peat, to consider classing parts of Zone 3 as degraded bog. However, as noted in the Limitations section above (and alluded to as a general difficulty in Perrin *et al.* (2014)), this separation is not always clear or sharp, and the boundary shown represents best professional judgement.

Some of the wet heath on more sloping ground is of the driest type, with purple moor-grass common amongst the heather but little other indication of wet heath. In some places at Knocknanask, this type of wet heath grades into dry heath where purple moor-grass is sparse (it is not usually completely absent at this Site).

3.3.2 Condition

Out of 27 condition assessment stops in the wet heath, only two passed all criteria, and these only narrowly. In nineteen cases there was no cross-leaved heath within 20 m. Whilst all but two stops passed the lower threshold for ericoid cover, there was conversely too much ericoid cover at twelve stops (comprising only heather, bell heather and sometimes bilberry). Although not specified criteria, where ericoid cover was favourable the cover of purple moor-grass (particularly in Zone 1) and deergrass (in Zone 3) was often too high. Cover of *Sphagnum*, pleurocarpous moss or lichen failed for twelve stops, and although this criterion was technically favourable at fifteen stops this hides the fact that the bryophyte flora was commonly poor with *Hypnum jutlandicum* often the only pleurocarpous species and *Campylopus introflexus* (especially in Zone 3, and intermittently elsewhere) a negative indicator. Where burning has taken place, on some occasions this included slopes of greater than 1 in 3 steepness, which are considered under Perrin *et al.* (2014) to be sensitive areas where there should be no burning. Aside from the two stops where all criteria narrowly passed, two, three and sometimes more criteria failed.

For these reasons, all the wet heath is considered to be in **Poor** condition, with Zone 3 by far the worst owing to the recent burning. In consideration of conservation status as per Perrin *et al.* (2014), and given the clear poor condition, 'structure and functions' for the wet heath is considered Unfavourable Bad, and this leads (irrespective of 'extent' and 'future prospects') to a conservation status of **Unfavourable Bad**. However, future prospects itself is also considered Unfavourable Bad because burning at Knocknanask appears to be a fairly regular occurrence and is likely to occur again in the wet heath within the time period for this criterion (twelve years).

3.4 H4030 European dry heaths

3.4.1 Description

Dry heath is more localised than the wet heath at Knocknanask. It is most abundant towards the southern and south-western edges, often in mosaic with or including large patches of dense bracken. In some areas it occurs in mosaic with drier forms of wet heath (see Figure 1), where the differentiation is largely the abundance of purple moor-grass amongst the heather. Dry heath also occurs on the steepest slopes just south-east of the summit plateau.

Heather is usually dominant in the dry heath, but both bell heather and bilberry are often present too, usually at lower cover. There is sometimes sparse purple moor-grass. The bryophyte flora is rather poor and generally comprises only *Hypnum jutlandicum* – possibly this results from previous burning, which is clearly evident in several places, leading to areas of short heather. Other areas have not been burnt for some time and now support tall 'leggy' heather. Locally, such as at the north edge of the Site on more shady ground and in mosaic with wet heath, some dry heath includes *Sphagnum capillifolium*. Other species are rather few but include, for example, hard fern *Blechnum spicant*,

3.4.2 Condition

Five out of nine dry heath condition assessment stops failed one or two of the criteria, mostly two. In these cases, the requirement for all phases of heather to be present failed – this reflects a tendency for the heather to be uniform. Three of the stops also failed the criterion for more than two bryophytes / non-crustose lichens, reflecting the tendency for the bryophyte flora to be poor with *H. jutlandicum* often the sole pleurocarpous moss. The impoverished bryophyte flora in these cases is probably a result of heavy burning into the bryophyte layer (those stops that passed all criteria and included several pleurocarpous mosses tended to be small examples of dry heath amongst wet heath towards the periphery of Knocknanask where burning may not have taken place). In the southern part of Knocknanask, there was also a failure on amount of bracken cover – in this area, dense bracken stands are common and they grade into the dry heath in places. Whilst four of nine dry heath condition assessment stops passed all criteria, these were small peripheral fragments of dry heath in mosaic with wet heath.

For these reasons, the dry heath is considered to be in **Poor** condition overall. It is important to note that the condition assessment stops that failed are representative of the larger areas of dry heath in the southern part of Knocknanask. Consequently, the majority of the area of dry heath is considered to be in Poor condition. In consideration of conservation status as per Perrin *et al.* (2014), and given the condition, 'structure and functions' for the dry heath is considered Unfavourable Bad, and this leads (irrespective of 'extent' and 'future prospects') to a conservation status of **Unfavourable Bad**. However, future prospects itself is also considered Unfavourable Bad because burning at Knocknanask appears to be a fairly regular occurrence, appears likely to have been severe in the main areas of dry heath (the likely cause of an impoverished bryophyte flora), and is likely to occur again in the dry heath within the time period for this criterion (twelve years).

3.5 H7230 Alkaline fens

3.5.1 Description

This Annex I habitat was found only once, as an unmappably-small alkaline soakway / flush. The upper and lower ends of it are indicated by Target Notes 4 and 5 on Figure 1. At the upper end, it is initially neutral with opposite-leaved golden-saxifrage *Chrysosplenium oppositifolium* dominant, accompanied by frequent blinks *Montia sibirica*, common sorrel *Rumex acetosa* and pleurocarpous moss. Downslope, the flushed areas widens and the outer parts are acidic (with typical acid flush species such as *Sphagnum palustre*, soft rush *Juncus effusus* and common sedge *Carex nigra*), but the central part is basic. The basic section (i.e. the alkaline fen) is dominated by *Sphagnum inundatum*, but there is frequent dioecious sedge *Carex dioica* and locally *Scorpidium revolvens*, both of which are clear indicators of basic conditions; bog pimpernel *Anagallis tenella* is also present.

3.5.2 Condition

The condition of the alkaline flush vegetation, being very small (about 20 m long, and very narrow), was assessed as a whole. Using the condition criteria and indicator species lists for H7230 as given in Perrin *et al.* (2014), this alkaline flush passes all criteria except those for number and cover of positive vascular plant indicators. Of the rather few vascular positive indicators listed for 'small-sedge flush', only carnation sedge *Carex panicea* was observed, and this criterion requires at least two species. Cover of *Scorpidium revolvens* (included as one of the brown moss indicators) does not alone reach the stipulated minimum 20% cover for all positive indicators together.

However, it is odd that dioecious sedge is not included in the vascular indicator list for small-sedge flush. Dioecious sedge is included in the much longer list for 'Schoenus flush and *Carex rostrata* fen'. In the UK, it is included in the list of indicators for M10 (which this flush would be classified as a form of under the NVC system), in Common Standards Monitoring (CSM) guidance published by the Joint Nature Conservation Committee (JNCC, 2009) for assessing designated sites in the UK. Indeed, dioecious sedge is one of the key vascular species in this type of basic flush. On the basis of professional judgement, therefore, dioecious sedge is considered a suitable positive indicator, and this basic flush is considered to pass the criterion for at least two

vascular positive indicators. Although it is difficult to judge cover of physically very narrow species such as dioecious sedge, it is widespread in the basic flush and together with *Scorpidium revolvens* the criterion for minimum 20% cover for all positive indicators together is also considered to have been met.

On the basis of the above, this very small example of H7230 Alkaline fen is in **Good** condition. In consideration of conservation status as per Perrin *et al.* (2014), and given the Good condition, 'structure and functions' is considered Favourable. The extent, small though it is, is probably stable. Although burning could in the future take place close to this habitat, its very wet nature suggests that it would probably not be suffer significant damage itself. Consequently, the overall conservation status for this small alkaline fen is considered **Favourable**.

3.6 Non-Annex I habitats

Non-Annex I habitats at Knocknanask comprise bracken, a very limited amount of acid grassland and a few unmappably-small neutral and acid springs / soakways.

3.6.1 Dense bracken

Dense bracken (Fossitt code HD1) is common on the lower slopes to the south and south-west, occurring as very dense substantial stands and also as very small patches scattered amongst heath. The edges of the bracken stands are often sharp but sometimes grade into the adjacent heath, and the bracken stands mostly support abundant bilberry under the bracken.

3.6.2 Acid grassland

Acid grassland (Fossitt code GS3 Dry humid acid grassland) occurs as miniscule patches amongst the heath towards the western periphery of Knocknanask. They indicate localised concentrations of sheep grazing. Typical common species are present such as common bent *Agrostis capillaris*, sweet vernal-grass *Anthoxanthum odoratum*, heath bedstraw *Galium saxatile*, tormentil *Potentilla erecta* and sheep's sorrel *Rumex acetosella*, and the moss *Rhytidiadelphus squarrosus* is often abundant.

3.6.3 Acid or neutral springs / soakways

The neutral and acid springs / soakways (Fossitt code FP2) were observed amongst wet heath at Target Notes 1, 3 and 27 (neutral spring / soakways) and Target Notes 26 and 28 (acid springs / soakways).

The neutral springs / soakways are dominated by opposite-leaved golden-saxifrage, often with abundant blinks, and with several occasional to frequent vascular associates such as Yorkshire-fog *Holcus lanatus*, common sorrel, cuckoo-flower *Cardamine pratensis* and common sedge. The bryophyte flora is variable but includes *Calliergonella cuspidata*, *Philonotis fontana*, *Scapania undulata* and occasionally a small amount of *Sphagnum* spp. (e.g. *Sphagnum palustre*).

The two acid springs / soakways are less diverse, with either *Sphagnum cuspidatum* or *Sphagnum palustre/fallax* dominant, and a limited range of associates such as soft rush, common sedge, purple moor-grass, velvet bent *Agrostis canina* and common cottongrass *Eriophorum angustifolium*, and the large moss *Polytrichum commune*.

4. Knocknasheega habitats

As agreed, the remit for Knocknasheega was to check which open habitats are present on the upper part of the hill (in view of the reported Annex I habitats in the NPWS Article 17 data), with no condition monitoring stops. However, descriptive information is given below, and non-Annex I habitats have been mapped and shown on Figure 1 in order to make clear the extent of Annex I and other open habitats amongst the forestry (in particular because, as noted above, the NPWS Article 17 polygons appear inaccurate in extent and precise location).

4.1 H4010 North Atlantic wet heaths with *Erica tetralix*

Wet heath occurs only on the outer eastern slopes of the Knocknasheega survey area, where shown on Figure 1. It shows similarities to the wet heath at Knocknanask. The dominant species are purple moor-grass and heather. It is on substantially sloping ground and hence not particularly wet, and is rather species-poor with cross-leaved heath appearing to be very rare.

4.2 H4030 European dry heaths

Dry heath dominates the clearings amongst the forestry. Heather and bilberry tend to dominate, with frequent bell heather. The heather is mostly mature. Acid grasses are generally scattered thinly, but in places form a micro-mosaic with the ericoids, in particular where there appears to be locally-concentrated deer grazing (deer were glimpsed briefly several times and appeared to be fallow deer *Dama dama*). In some clearings, stands of dense bracken occur in mosaic with the dry heath. Moss cover amongst the heather is generally high with several species common throughout (in contrast to most of the dry heath at Knocknanask) including *Rhytidiadelphus loreus*, *Hylocomium splendens* and *Pleurozium schreberi*. Scattered pines *Pinus* sp. occur within the dry heath, and pine colonisation has probably led to an increase in pine woodland at the expense of dry heath.

The northern-most clearing of dry heath is different in that the ground is quite stony with thin peat, and with heather and bell heather co-dominant and little bilberry. The heather here is frequently 'leggy' and some is senescent. There is a very little *Sphagnum tenellum* and *Sphagnum capillifolium*. *Cladonia portentosa* is frequent, but the moss component is limited and mainly comprises *Hypnum jutlandicum*. This area is very well-trodden by deer with some resulting peat erosion and rock exposure.

4.3 Non-Annex I habitats

Dense bracken (Fossitt code HD1) occurs in several places, and is very extensive on the south-east slope.

One small patch of acid grassland (Fossitt code GS3 Dry humid acid grassland) was noted on the lower eastern slope, as shown on Figure 1. It indicates localised heavier grazing (presumably by deer) and is similar to that described for Knocknanask above, and is of no note.

Forestry plantation (Fossitt code WD4) occupies the majority of the Knocknasheega survey area. Within the survey area, it comprises pine, whereas on the lower slopes of the hill beyond the survey area it is Sitka spruce *Picea sitchensis*. In many places the pine plantation supports a ground flora with abundant ericoids, in particular bilberry. For unknown reasons (seemingly not related to wetness) one block of the pine plantation in the north-east is almost entirely dead, and now comprises developing dry heath dominated by bilberry with frequent heather, and with dead pines throughout, many fallen (this is indicated separately on Figure 1). It is clear from these observations that: a) the pine plantation is mainly on former Annex I dry heath, and b) removal of pine plantation would result in re-establishment of Annex I dry heath. It is possible that the extent of dry heath has decreased over time through pine colonisation, and this may explain some of the differences between the current habitat map shown in Figure 1 and the NPWS Article 17 polygons. However, it is difficult to judge which pines may have originated from self-sowing and which are planted (they are all at least semi-mature), therefore no distinction between true plantation (WD4 Conifer plantation) and what might technically be naturally-generated woodland (WD3 Conifer woodland) has been attempted. In any case, the flora is consistent beneath the pine, the pine is not native to Ireland, and the dry heath is of more ecological importance.

5. Comment on potential habitat condition within a potential wind farm

5.1 Knocknanask

Burning is one of the key degradation factors at Knocknanask, particularly in wet heath but also dry heath, and burning may also have affected and certainly poses a future threat to the already-degraded blanket bog. As discussed above, 'future prospects' for all these habitats is considered Unfavourable Bad, since burning has taken place recently and, if current management continues, is likely to take place again, threatening further harm to wet heath and potentially bog. Although burning of wet heath (and bog) may be legally permitted, it is often problematic in reducing ericoid cover and diversity, reducing the cover of or damaging *Sphagnum*, reducing diversity of the flora in general, encouraging the spread of species that can favour disturbance at the expense of other species (likely the case at Knocknanask for deegrass, *Campylopus introflexus* and possibly purple moor-grass), and potentially degrading peat deposits. With cessation of burning, the threat of further degradation by burning at Knocknanask would be immediately removed and, assuming an appropriate grazing regime is also implemented, condition of a substantial area of wet heath (particularly in Zone 3) would be expected to gradually improve.

Regarding grazing regime, it would be beneficial, if possible, to implement cattle grazing at Knocknanask, to discourage over-dominance of purple moor-grass (dense purple moor-grass is not something that sheep are likely to have a significant effect on). The grazing regime would ideally be at an appropriate level to permit the best rehabilitation of burnt wet heath (particularly in Zone 3).

5.2 Knocknasheega

As noted in Section 4.3, the pine plantation at Knocknasheega is largely on former Annex I dry heath, there is an ericoid flora under much of the pine plantation, and removal of pine plantation would likely result in re-establishment of dry heath. That this would be very likely to occur is effectively demonstrated by the block of dead pine plantation, in which dry heath dominated by bilberry with frequent heather is now developing. Consequently, removal of pine plantation in the clearance zone around potential wind turbines can be expected to result in an increase in Annex I dry heath that should exceed loss to the construction footprint. Given that this is occurring now in the block of dead pine plantation, it is likely that this would happen with minimal intervention aside from ideally removing as much brash as possible. In order to reduce ground disturbance (and possible colonisation by undesirable species) during any pine clearance, it would be preferable to remove existing pine trees by cutting as close as possible to ground level, rather than attempting to remove the root structures.

6. References

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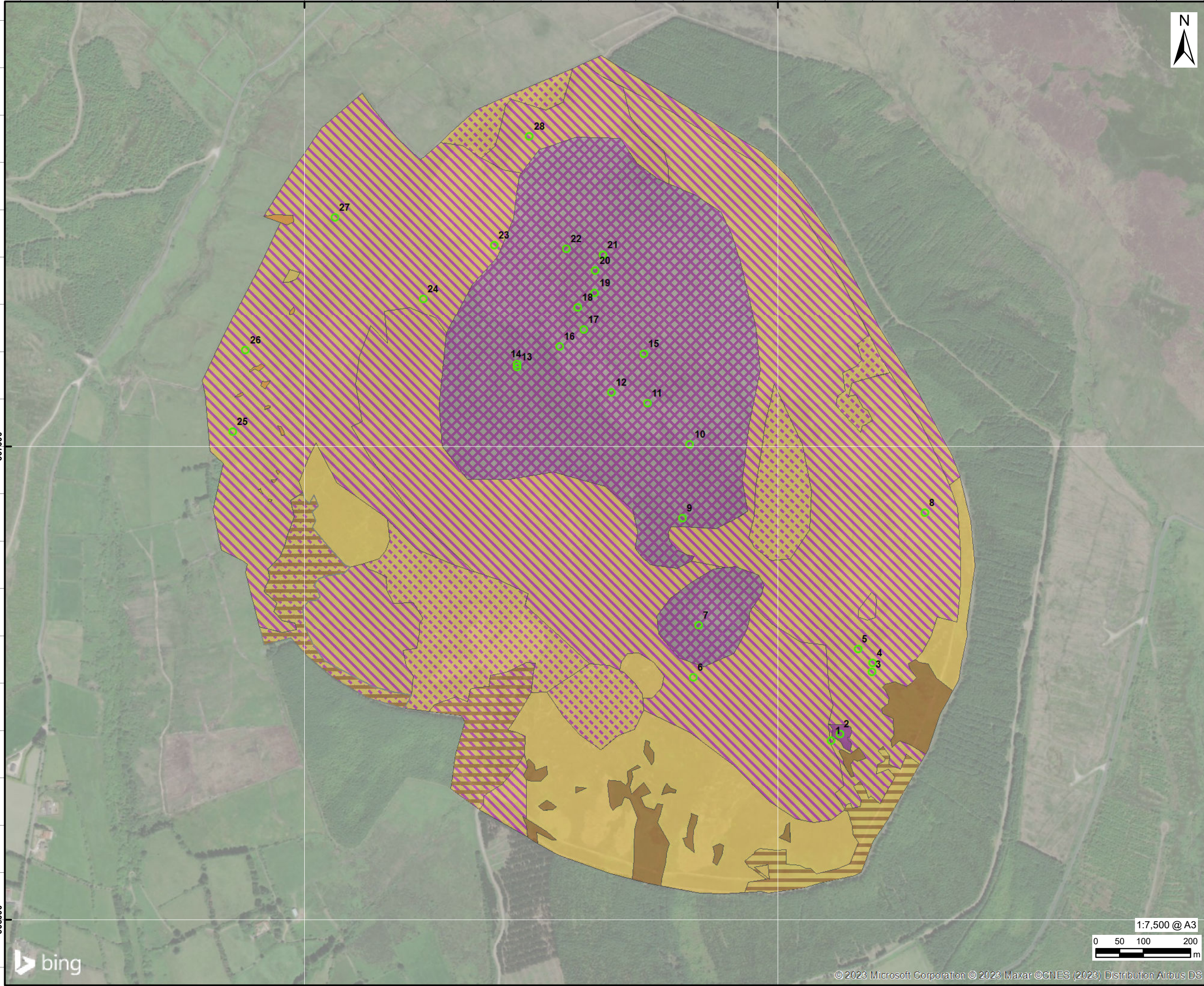
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Appendix 1 – Figure



AECOM

PROJECT

Scart Mountain Wind Farm

CLIENT

FuturEnergy Ireland

CONSULTANT

AECOM Ireland Limited
4th Floor Adelphi Plaza
George's Street Upper
Dun Laoghaire, A96 T927
www.aecom.com

LEGEND

- Target note
- H7130 priority; active blanket bog
- H7130 non-priority; inactive degraded blanket bog
- H4010 wet heath
- H4010 wet heath (in mosaic with bracken)
- H4030 dry heath
- H4030 dry heath (in mosaic with bracken)
- H4030 dry heath and H4010 wet heath (in mosaic with bracken)
- H4030 dry heath and H4010 wet heath (mosaic)
- non-Annex I, GS3 acid grassland
- non-Annex I, HD1 dense bracken

NOTES

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ISSUE PURPOSE

FINAL

PROJECT NUMBER

60706008 / 1.1

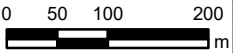
FIGURE TITLE

Knocknanask habitat map

FIGURE NUMBER

Figure 1 Sheet 1

1:7,500 @ A3





AECOM

PROJECT

Scart Mountain Wind Farm

CLIENT

FuturEnergy Ireland

CONSULTANT

AECOM Ireland Limited
4th Floor Adelphi Plaza
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Dun Laoghaire, A96 T927
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LEGEND

-  H4010 wet heath
-  H4010 wet heath (in mosaic with bracken)
-  H4030 dry heath
-  H4030 dry heath (in mosaic with bracken)
-  Developing H4030 dry heath with dead planted pines
-  non-Annex I, GS3 acid grassland
-  non-Annex I, HD1 bracken
-  non-Annex I, WD4 conifer plantation

NOTES

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ISSUE PURPOSE

FINAL

PROJECT NUMBER

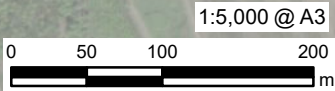
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FIGURE TITLE

Knocknasheega habitat map

FIGURE NUMBER

Figure 1 Sheet 2



Appendix 2 – Target notes

The locations of the target notes in this table are shown on Figure 1, labelled with the reference numbers from the first column.

Ref	Feature	Target note	X	Y
1	Spring / soakway	Small neutral spring/soakway, <i>Sphagnum capillifolium</i> at the head but otherwise <i>Chrysosplenium oppositifolium</i> dominant; <i>Cardamine pratensis</i> and <i>Holcus lanatus</i> are frequent, and there is occasional <i>Carex nigra</i> .	612112	606380
2	Intact bog patch	A very small gently sloping patch of bog with <i>Molinia</i> dominant but abundant <i>Eriophorum vaginatum</i> , accompanied by frequent <i>Calluna</i> , <i>Vaccinium myrtillus</i> , <i>Trichophorum</i> , <i>Erica tetralix</i> , <i>Sphagnum papillosum</i> and <i>Sphagnum capillifolium</i> , and rarely <i>Sphagnum cuspidatum</i> .	612130	606394
3	Spring / soakway	Small spring/soakway with some sphagnum including <i>Sphagnum palustre</i> , but mainly neutral with <i>Chrysosplenium oppositifolium</i> , <i>Montia fontana</i> , <i>Calliergonella</i> , <i>Philonotis fontana</i> and <i>Scapania undulata</i> .	612198	606524
4	Basic flush	This target note marks the bottom of the flush that includes a basic component as described in target note 5 (c.20 m upslope and north-west).	612200	606543
5	Basic flush	Upper part of flushed area of variable acidity; at the top it is neutral with <i>Chrysosplenium oppositifolium</i> dominant, and associates such as <i>Montia fontana</i> and <i>Rumex acetosa</i> ; this widens downslope where the outer parts are acidic (with e.g. <i>Sphagnum palustre</i> , <i>Juncus effusus</i> and <i>Carex nigra</i>) but the central part (extending about 20 m downslope from this target note, to Target Note 4) is basic (dominated by <i>Sphagnum inundatum</i> , but with <i>Carex dioica</i> widespread and locally <i>Scorpidium revolvens</i> ; <i>Anagallis tenella</i> also present).	612169	606572
6	General note	In this area there are frequent stones visible indicating very thin peat, although the vicinity is a very shallow slope and probably would have been bog historically.	611821	606513
7	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611833	606623
8	Acid flush	Small amount of acid flush vegetation in historic track, with <i>Sphagnum palustre/fallax</i> , <i>Juncus effusus</i> , <i>Polytrichum commune</i> .	612310	606860
9	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611798	606849
10	<i>Sphagnum capillifolium</i>	One of the scarce <i>Sphagnum capillifolium</i> patches on the bog.	611814	607005
11	<i>Sphagnum papillosum</i>	The only <i>Sphagnum papillosum</i> patch seen, also with adjacent <i>Sphagnum capillifolium</i> patch.	611724	607092
12	<i>Sphagnum capillifolium</i>	One of the scarce <i>Sphagnum capillifolium</i> patches on the bog.	611648	607115
13	<i>Sphagnum capillifolium</i>	One of the scarce <i>Sphagnum capillifolium</i> patches on the bog.	611449	607168
14	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> locally frequent here.	611449	607174
15	Bog pool	One of the two small bog pools seen, with <i>Sphagnum cuspidatum</i> dominant, abundant <i>Carex nigra</i> and locally <i>Juncus squarrosus</i> ; around the edges there is also <i>Sphagnum capillifolium</i> , <i>Trichophorum</i> and a little <i>Eriophorum vaginatum</i> ; size about 4 x 5 m.	611716	607196
16	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611539	607211
17	General note	A small patch with particularly thin peat from historic cutting and frequent stones visible, near a cairn.	611590	607247
18	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611577	607294
19	Bog pool	Smaller of the two bog pools seen (the other is described in Target Note 15), with co-dominant <i>Sphagnum cuspidatum</i> and <i>Carex nigra</i> , and locally <i>Juncus bulbosus</i> .	611613	607325
20	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here, also <i>Campylopus introflexus</i> present.	611614	607372

Ref	Feature	Target note	X	Y
21	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611630	607406
22	<i>Eriophorum vaginatum</i>	<i>Eriophorum vaginatum</i> rare here.	611552	607417
23	<i>Campylopus introflexus</i>	<i>Campylopus introflexus</i> particularly common in this vicinity on degraded wet heath that has been previously burnt, with <i>Trichophorum</i> dominant and <i>Calluna</i> only very short.	611401	607426
24	<i>Erica tetralix</i>	<i>Erica tetralix</i> sparsely present here where the wet heath is not recently burnt; to the south in more recently burnt wet heath <i>Erica tetralix</i> was very rarely seen and generally appeared absent.	611251	607313
25	Invasive species	Cypress trees are colonising the lower wet heath in this general area, seeding in from nearby cypress plantation block.	610848	607032
26	Acid flush	Small acid flush with <i>Sphagnum cuspidatum</i> dominant, plus <i>Juncus effusus</i> , <i>Polytrichum commune</i> and <i>Agrostis canina</i> .	610875	607203
27	Spring / soakway	Small spring / soakway, neutral, dominated by <i>Chrysosplenium oppositifolium</i> , with occasional <i>Holcus lanatus</i> and <i>Scapania undulata</i> , and frequent <i>Juncus effusus</i> and <i>Rumex acetosa</i> to the edges.	611064	607484
28	Acid flush	Small amount of acid flush vegetation in historic track, mainly <i>Sphagnum fallax/palustre</i> , small sedges abundant including <i>Carex nigra</i> , <i>Molinia</i> and <i>Juncus squarrosus</i> frequent, <i>Eriophorum angustifolium</i> occasional.	611475	607656

Appendix 3 – Condition monitoring data

Unless otherwise stated, the extent over which the below condition criteria are assessed is indicated as follows:

- plain text = assessed in quadrat area;
- **bold** = assessed over wider surrounding area; and,
- ***bold italic*** = assessed over both of the above extents.

Blanket bog

Condition criterion:	Stop: 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
* At least 7 positive indicator species	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail
At least 10% cover bryophytes/lichen (excluding <i>Sphagnum fallax</i>)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass
<75% cover EACH <i>Calluna</i> , <i>Eriophorum vaginatum</i> , <i>Molinia</i> , <i>Trichophorum germanicum</i> , <i>Schoenus</i> , <i>Eleocharis multicaulis</i>	Pass	Pass	Pass	Fail	Fail	Pass	Fail	Fail	Pass	Pass	Fail	Fail	Fail	Fail	Fail	Fail
<1% cover TOGETHER <i>Agrostis capillaris</i> , <i>Holcus lanatus</i> , <i>Phragmites australis</i> , <i>Pteridium</i> , <i>Ranunculus repens</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<1% cover non-native species	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% cover trees/scrub	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% crushed/broken/pulled-up sphagnum	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<33% ericoid, <i>Empetrum nigrum</i> or <i>Myrica gale</i> shoots browsed	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
No burning into bryophyte/lichen layer or bare peat	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
** No burning of sensitive areas	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

<10% cover disturbed bare ground	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass
<10% drainage by cutting/ditches/tracking/trampling	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail
<5% cover erosion gullies/areas within bog mosaic	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

* Positive vascular indicators = *Eriophorum angustifolium*, *Eriophorum vaginatum*, *Trichophorum germanicum*, *Calluna*, *Erica tetralix*, *Vaccinium myrtillus*, *Empetrum nigrum*, *Myrica*, *Rhynchospora* spp., *Schoenus* spp., *Drosera* spp., *Narthecium*, *Menyanthes*, *Andromeda*, *Carex bigelowii*, *Pedicularis* spp., *Pinguicula* spp., *Polygala* spp.

Positive bryophyte/lichen indicators = *Sphagnum* spp., *Pleurozia*, *Odontoschisma*, *Racomitrium lanuginosum*, *Breutelia*, *Diplophyllum albicans*, *Scapania gracilis*, non-crustose lichens.

** Sensitive areas = slopes >1 in 3, gully sides, areas with abundant bryophytes/lichens or pools etc, <10 m from watercourses, <50 m from drains, >400 m altitude.

Wet heath

Condition criterion:	Stop:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Erica tetralix</i> present in 20 m radius	Fail	Fail	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass
* At least 50% cover positive indicators	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
At least 10% cover <i>Cladonia</i> / <i>Sphagnum</i> / <i>Racomitrium lanuginosum</i> / pleurocarpous moss	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Fail	Pass	Fail
At least 15% cover ericoids / <i>Empetrum nigrum</i>	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<50% cover dwarf shrubs	Fail	Fail	Fail	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass
<1% cover TOGETHER <i>Agrostis capillaris</i> , <i>Holcus lanatus</i> , <i>Phragmites australis</i> , <i>Pteridium</i> , <i>Ranunculus repens</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<1% cover non-native species	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<20% cover trees/scrub	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

<10% cover <i>Pteridium aquilinum</i> / <i>Juncus effusus</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% crushed/broken/pulled-up sphagnum	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<33% ericoid / <i>E. nigrum</i> / <i>Myrica gale</i> shoots browsed	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
No burning into bryophyte/lichen layer or bare peat	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
** No burning of sensitive areas	Pass	Pass	Fail	Pass	Fail	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% cover disturbed bare ground	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% drainage by cutting/ditches/tracking/trampling	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Condition criterion:	Stop:	17	18	19	20	21	22	23	24	25	26	27
<i>Erica tetralix</i> present in 20 m radius	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Pass	Fail
* At least 50% cover positive indicators	Pass	Pass	Fail	Fail	Fail	Pass	Pass	Fail	Pass	Fail	Pass	Pass
At least 10% cover <i>Cladonia</i> / <i>Sphagnum</i> / <i>Racomitrium lanuginosum</i> / pleurocarpous moss	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Pass
At least 15% cover ericoids / <i>Empetrum nigrum</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<50% cover dwarf shrubs	Pass	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Fail
<1% cover TOGETHER <i>Agrostis capillaris</i> , <i>Holcus lanatus</i> , <i>Phragmites australis</i> , <i>Pteridium</i> , <i>Ranunculus repens</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<1% cover non-native species	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

<20% cover trees/scrub	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% cover <i>Pteridium aquilinum</i> / <i>Juncus effusus</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% crushed/broken/pulled-up sphagnum	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<33% ericoid / <i>E. nigrum</i> / <i>Myrica gale</i> shoots browsed	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
No burning into bryophyte/lichen layer or bare peat	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
** No burning of sensitive areas	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% cover disturbed bare ground	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% drainage by cutting/ditches/tracking/trampling	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

* Positive vascular indicators = *Eriophorum angustifolium*, *Trichophorum germanicum*, *Calluna*, *Erica tetralix*, *Myrica*, *Potentilla erecta*, *Carex* spp., *Rhychospora* spp., *Schoenus* spp., *Drosera* spp., *Narthecium*, *Pedicularis* spp., *Polygala* spp., *Salix repens*, *Succisa*.

Positive bryophyte/lichen indicators = *Sphagnum* spp., pleurocarpous mosses, *Pleurozia*, *Breutelia*, *Diplophyllum albicans*, non-crustose lichens.

** Sensitive areas = as for blanket bog above, plus severely wind-clipped vegetation, and soils <5 cm deep.

Dry heath

Condition criterion:	Stop:	1	2	3	4	5	6	7	8	9
>2 bryophytes / non-crustose lichens (excluding <i>Campylopus</i> spp. or <i>Polytrichum</i> spp.)	Pass	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Pass
* At least 2 positive indicators	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
At least 50% cover positive indicators (50-75% if basic heath)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

<50% cover TOGETHER <i>Myrica</i> / <i>Salix repens</i> / <i>Ulex gallii</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<1% cover TOGETHER <i>Cirsium arvense/vulgaris</i> , <i>Ranunculus repens</i> , large <i>Rumex</i> spp., <i>Jacobaea vulgaris</i> or <i>Urtica dioica</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<1% cover non-native species	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<20% cover trees/scrub	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<10% cover <i>Pteridium aquilinum</i> or <i>Juncus effusus</i>	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<50% cover senescent <i>Calluna</i>	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<33% ericoid / <i>Empetrum nigrum</i> shoots browsed	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
** No burning of sensitive areas	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Outside sensitive areas all <i>Calluna</i> phases present throughout + at least 10% cover mature <i>Calluna</i>	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Pass	Pass
<10% cover disturbed bare ground	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

* Positive indicators (all are vascular) = *Calluna*, *Erica cinerea*, *Vaccinium myrtillus*, *Vaccinium vitis-idaea*, *Empetrum nigrum*, *Arctostaphylos* spp., *Ulex gallii*, *Daboecia*.

** Sensitive areas = soil <5 cm deep, slopes >1 in 2, gully sides, areas with abundant bryophytes/lichens (including equivalents of NVC H21/22), areas with clear unevenness in heather, pools/erosion areas, <10 m from watercourses.

