

Appendix 6.2: Habitats and Vegetation Survey Report

EDF Energy Renewables Ltd

Appendix 6.2: Habitats & National Vegetation Classification Report Dunside Wind Farm

Final report

Prepared by LUC

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EDF Energy Renewables Ltd

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Classification Report
Dunside Wind Farm**

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Chapter 1

Introduction

- 1.1** This appendix details the methods and results of the habitats and vegetation surveys undertaken to inform an Ecological Impact Assessment (EclA) of the proposed Dunside Wind Farm (hereafter referred to as the 'Proposed Development').
- 1.2** This appendix has been written to support **Chapter 6: Ecology** of the Environmental Impact Assessment Report (EIA Report) and should be read in conjunction with this chapter and **Chapter 8: Hydrology, Hydrogeology, Geology and Peat** and **Chapter 7: Ornithology**.
- 1.3** This appendix supports the EclA in addition to the following EIA Report Appendices:
- **Appendix 6.1:** Desk Study and Legal Context.
 - **Appendix 6.3:** Protected Species Survey Report.
 - **Appendix 6.4:** Bat Survey Report.
 - **Appendix 6.5:** Badger Survey Report (Confidential).
 - **Appendix 6.6:** Outline Restoration and Enhancement Plan (OREP).
 - **Appendix 6.7:** Shadow Habitat Regulations Assessment.
 - **Appendix 6.8:** Peat Condition Assessment.
 - **Appendix 8.2:** Peat Survey Report.
 - **Appendix 8.6:** Groundwater Dependent Terrestrial Ecosystem Assessment.
- 1.4** This appendix is supported by the following figures:
- **EIA Report Figure 6.1:** Ecology Study Area.
 - **EIA Report Figure 6.3** Phase 1 Habitat Survey Plan.
 - **EIA Report Figure 6.4:** National Vegetation Classification Survey Plan.
 - **EIA Report Figure 6.5:** Areas of Guidance-stated Potential Groundwater Dependency (GWDTE).
- 1.5** Representative site photography is provided in **Appendix A**, and Target Notes are provided in **Appendix B**, of this appendix.

Scope

- 1.6** LUC was appointed by EDF Energy Renewables Ltd to complete a suite of ecological surveys, including habitats and vegetation surveys, to inform an EIA of the Proposed Development.
- 1.7** In March 2022 LUC submitted a Scoping Report (on behalf of the Applicant) as a means of agreeing the full scope of surveys relevant to the EIA. This included undertaking Phase 1 habitat and National Vegetation Classification surveys within the Study Area between June 2022 and September 2022.
- 1.8** Protected species and ornithology are outwith the scope of this report. Protected species are included in **Appendix 6.3 – 6.6** and ornithology is assessed in **Chapter 7: Ornithology** of the EIA Report.

Site Overview

- 1.9** The Site is located within the Lammermuir Hills, within the administrative boundary of Scottish Borders Council. The northern Site boundary is also the boundary between the Scottish Borders and East Lothian. The Site is approximately 6 km

north of the settlement of Westruther and 7 km to the west of the settlement of Longformacus (to the nearest indicative turbine location).

1.10 The Site consists of a varied topographic setting of heavily managed moorland dominated by heather, with numerous river valleys, steep sloping hillsides and gently sloping hilltop areas which predominately drain into the Dye Water catchment (a tributary of the River Tweed). The Dye Water flows to the east through the centre of the Site and joins the Whiteadder Water downstream of the Site. Notable hills within the Site include: Meikle Law (468 m AOD) in the north-west; Byreclough Ridge (440 m AOD) in the north, Dunside Hill (437 m AOD) in the south-east, and Wedder Lairs (486 m AOD) in the west. The main land uses are sheep grazing and moorland managed for grouse shooting with the adjacent land to the north-west used for renewable energy production (the operational Fallago Rig Wind Farm).

1.11 The majority of the habitats within the Site have been influenced to varying extents by grazing pressure, recent and historical burning and artificial drainage. The Proposed Development is described in greater detail within **Chapter 3: Development Description** within the EIA Report.

Terminology and Survey Areas

1.12 The following terminology will be used throughout this Technical Appendix:

■ Site

- All land within the red line boundary (as shown in **EIA Report Figure 6.1**).

■ Proposed Development

- The whole physical process involved in the construction, operation and decommissioning of a Wind Farm at the Dunside Site (i.e. not associated with a particular piece of land).
- Comprises a wind farm of up to 15 turbines and associated infrastructure. A detailed description of the Proposed Development is included **Chapter 3**).

■ Developable Area

- The area where the turbines are proposed to be sited (including all associated infrastructure).

■ Study Area

- The Study Area for habitats and vegetation was defined as the red line boundary plus a buffer of up to 250 m, in line with good practice guidelines. The Study Area is illustrated in **EIA Report Figure 6.1**.

Chapter 2

Methodology

2.1 This section provides details of the methodology adopted to collect baseline data on habitats and vegetative communities within the Study Areas.

Baseline Data Collection

Desk Study

2.2 A desk study was undertaken to obtain historical ecological information relating to the Study Area and the surrounding habitats to identify designated sites and any known sensitive habitats. An account of the methodologies adopted, findings, and the legislative provisions afforded to protected habitats is provided in **Appendix 6.1: Desk Study and Legal Context**.

Field Study

2.3 There were two components to the field surveys comprising the Phase 1 habitat survey and the more detailed National Vegetation Classification (NVC) which also included identification of potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs). The methods are outlined in detail below and follow best practice guidance produced by the Chartered Institute of Ecology and Environmental Management (CIEEM) ¹ and the British Standards Institute².

2.4 The data collected from the surveys was recorded and mapped using ArcGIS software (notably the Field Maps app), using GPS-enabled Samsung tablets.

Phase 1 Habitat Survey

2.5 A Phase 1 habitat survey was undertaken, following standard methods³, in the summer of 2022 by experienced ecologists. The Phase 1 habitat survey method provides a means of rapidly classifying broad habitat types in any given terrestrial survey area.

2.6 During the survey, field surveyors walked all accessible parts of the Study Area to map broad habitat types and their boundaries. Sufficient species identification was undertaken to accurately classify habitat types, using the DAFOR scale⁴ where necessary. Field notes were taken to identify key areas of interest, the key points are provided **Appendix B: Target Notes**.

2.7 The output of the survey comprises habitat accounts, field maps and associated photography and target notes (where required). The extent of the Study Area is presented on **EIA Report Figure 6.1** and the Phase 1 Habitat Survey map is included in **EIA Report Figure 6.3**.

National Vegetation Classification (NVC)

2.8 NVC surveys provide further detailed information about the plant communities present within the broad habitats identified by the Phase 1 habitat survey. Where potential habitats of conservation concern were identified, an NVC survey was conducted. This information was used to identify habitats which can be indicative of groundwater dependency (GWDTE)⁵.

¹ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal and Marine. Winchester: Chartered Institute for Ecology and Environmental Management and CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. 2nd Edition. Winchester: Chartered Institute for Ecology and Environmental Management.

² BSI (2013) BS 42020:2013: Biodiversity – code of practice for planning and development. Bristol: British Standards Institution.

³ JNCC (2010) Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit. JNCC, Peterborough

⁴ DAFOR scale: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare.

⁵ SEPA (2017) Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

2.9 NVC surveys were undertaken in summer 2022 of all habitats identified as potentially being of conservation interest during the survey⁶. NVC surveys were completed following best practice guidelines⁷ to map habitats based on the characteristics of the vegetation. Structure, condition and species composition were recorded including detailed notes on the species present and abundance within stands of vegetation.

2.10 The Domin scale of cover/abundance (**Table 2.1**) was used following best practice guidelines⁷. Data collected in the field was assessed and NVC communities (and where possible sub-communities) were assigned to each habitat. Results of the NVC survey are presented on **EIA Report Figure 6.4**.

Table 2.1: Domin scale of cover/abundance

Cover	Domin
91-100%	10
76-90%	9
51-75%	8
34-50%	7
26-33%	6
11-25%	5
4-10%	4
<4% (many individuals)	3
<4% (several individuals)	2
<4% (few individuals)	1

Ground Water Dependent Terrestrial Ecosystems (GWDTEs)

2.11 GWDTEs are defined by SEPA⁸ and are considered important indicators of sensitive groundwater movement. NVC communities listed in the SEPA guidance are those which, if present, are considered to indicate that a wetland is likely to be either highly or moderately groundwater dependent depending on the hydrogeological setting.

2.12 Where these communities were identified, and they were not obviously surface or rainwater fed (e.g. marshy grassland and wet heath on watershed and ombrogenous bog systems), they were subject to detailed botanical survey. **Table 2.2** sets out a decision-making tool that was used to establish the level of groundwater dependency of each community.

2.13 Assessment of potential effects on GWDTEs are discussed in **Chapter 8: Hydrology, Hydrogeology, Geology and Peat** of the EIA Report.

Table 2.2: GWDTE Decision Tool⁹

Criteria	Yes	No
A. Is the GWDTE vegetation evidently influenced by groundwater?		

⁶ Defined as Annex 1 habitats, Scottish Biodiversity List habitats, habitats included in the Mid Lothian Local Biodiversity Action Plans, and habitats considered to indicate potential GWDTE

⁷ Rodwell, J.S. (2006) NVC Users' Handbook. JNCC, Peterborough.

⁸ SEPA (2017) Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

⁹ Botanaeco (2018) GWDTE Decision Tool. Available at: <https://botanaeco.co.uk/gwdte> [Accessed January 2023].

Criteria	Yes	No
(i.e. base-enriched (M10, M11, M37 and/or M38) and/or discharging from an evident point source such as a spring head (M31, M32, M33).		
If the answer to A is 'Yes' then field assessment ends at this stage and the GWDTE is treated as 'high', as per the guidance. If 'No', continue to B.		
B. Is the GWDTE polygon associated with an evident surface water feature? i.e., is the vegetation located within one of the following topographic locations:		
Watershed/ridge		
Watercourse		
Floodplain		
Ponding location, pond, loch etc (localised depression)		
Surface water conveyance (drain, gully, rill, etc.)		
If the answer to B is 'Yes' then the GWDTE polygon is no more than 'moderate' and very likely to be 'low'. Additional floristic and environmental data should be collected, including photographs to allow for further, desk-based determination of the groundwater dependency. If 'No', continue to C.		
C. Is the GWDTE polygon associated with an ombrogenous system? i.e. with blanket bog or wet heath habitat. This is especially relevant to M6 and M25:		
Presence/persistence of distinctive bog habitat, species and/or associations.		
Deep peat not confined to depressions/valleys (>0.5 m visible in drains or hagged areas).		
If the answer to C is 'Yes' then the GWDTE is no more than 'moderate' and very likely to be 'low'. Additional floristic and environmental data should be collected, including photographs to allow for further, desk-based determination of the groundwater dependency.		

Peatland Condition Assessment

2.14 The NatureScot Peatland Condition Assessment ¹⁰ was employed in the field to determine the condition of the peatland habitat. This classifies the peatland into four classes:

1. Near-Natural;
2. Modified;
3. Drained; and
4. Actively Eroding.

2.15 Field-based assessment of a series of key indicators facilitates assignment of one of these classes to an area of peatland. These indicators include features such as the sphagnum cover and vegetation condition; evidence of fire (frequency & intensity); bare peat; and scrub/tree invasion. These indicators were noted in the field, to determine the condition class. The detailed methods and outcomes of the Peat Condition Assessment are provided in Appendix 6.8.

¹⁰ NatureScot (2017) Peatland Condition Assessment. [online] Available at: <https://www.nature.scot/sites/default/files/2017-10/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf> [Accessed January 2023].

Nomenclature

2.16 Standardised vernacular names are followed by the scientific name upon first use (italicised within the text) are used for vascular plants (graminoids, herbs and shrubs). Scientific names only are used for the moss, liverwort and lichen species because although vernacular names are now in existence, they are not in general usage.

Competency

2.17 All habitat and vegetation surveys were undertaken within appropriate seasonal windows in 2022, by academically and professionally qualified LUC ecologists. The data has been assessed by ecologists with extensive experience of interpreting habitat datasets.

Constraints and Limitations

2.18 All ecological surveys represent a snap-shot in time. Habitats and species assemblages are dynamic and change over time in response to a range of variables. Data presented in this Technical Appendix should not be considered a long-term interpretation of ecological data and should not be relied upon as such.

2.19 Surveys were completed during the optimal survey season for habitat and vegetation studies (April to September), and as such, the data gathered is considered robust for the purposes of informing the EIA Report.

2.20 Given the topographically challenging nature of the site, local variations in vegetation communities, and seasonal constraints, detailed mapping of all sub-communities would be particularly challenging and time-consuming. As such, NVC data was often mapped to community level only unless there was a specific reason to record the sub-community. This is not considered to be a significant constraint to the assessment because habitats of conservation interest¹¹ are commonly identified on the basis of their NVC communities and are largely unchanged by additional information on sub-communities.

2.21 While care has been taken to collect and review habitat data, it is not possible to account for any changes that may occur in the intervening period between data collection and submission of the EIA Report.

¹¹ Defined as Annex 1 habitats, Scottish Biodiversity List habitats, habitats included in the Mid Lothian Local Biodiversity Action Plans, and habitats considered to indicate potential GWDTE

Chapter 3

Baseline

Desk Study

3.1 A desk study was undertaken to inform habitat and vegetation survey. An account of the method adopted, and findings, is provided in Appendix 6.1 which also sets out the legislative provisions afforded to habitats, notably habitats of conservation concern¹².

3.2 One statutory designated site, the River Tweed Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI), is present within the Site boundary, crossing the Site in two locations; on the main access from the public road which crosses the Wedderlie Burn, and the Dye Water which flows through the centre of the Site parallel to the access to Fallago Rig Wind Farm.

3.3 Two non-statutory sites for nature conservation were located within the Site: Byrecluch Burn, Stot Cleugh Local Biodiversity Site (LBS) and Corby Scar and Upper Watch Water LBS. In addition, there were ten statutory designated sites (<10 km) and 15 non-statutory designated sites (<5 km) relevant to terrestrial ecology present within the Study Area. EIA Report Figure 6.2 illustrates the location of these designates areas in relation to the Site.

Field Study

Study Area

3.4 The Study Area for habitat and vegetation surveys included the redline boundary of the Site and a buffer of up to 250 m where there was potential for GWDTE habitats to be present, this is illustrated in **EIA Report Figure 6.1**. A total of 23 Phase 1 habitats were recorded within the Study Area and within these a total of 16 NVC communities are described in detailed below. Phase 1 habitats and NVC communities are described separately due to the complexity of the Site. A summary of the Phase 1 habitats and their associated NVC communities is provided in **Table 3.1**.

3.5 The Phase 1 habitat and NVC community descriptions below are supported by and should be read in conjunction with **EIA Report Figure 6.3** and **Figure 6.4**.

Phase 1: Habitats

A1.1.1 Broadleaved woodland (semi-natural)

3.6 This habitat was recorded in one area in the east of the Study Area. It occurred as a narrow strip of woodland running parallel with a stream within a steep sided gully. The canopy comprised semi-mature and mature silver birch *Betula pendula*, rowan *Sorbus aucuparia* and willow sp. *Salix* sp. The understory consisted of abundant bracken *Pteridium aquilinum* and soft rush *Juncus effuses*. Wavy hair grass *Avenella flexuosa* and sweet vernal-grass *Anthoxanthum odoratum* were occasionally recorded.

A1.1.2 Broadleaved woodland (plantation)

3.7 Broadleaved plantation was restricted to two small parcels within the east and south-east boundary of the Study Area. The canopy consisted of mature and semi-mature sycamore *Acer pseudoplatanus*, oak *Quercus* sp., alder *Alnus glutinosa*, hawthorn *Crataegus monogyna*, silver birch, rowan and willow sp. The understory contained abundant sweet vernal grass, Yorkshire fog *Holcus lanatus* and occasional tufted hair-grass *Deschampsia cespitosa*. A variety of forb species were also recorded that

¹² NatureScot (no date) A guide to understanding the Scottish Ancient Woodland Inventory (AWI). Available at: <https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi> [Accessed December 2022]

included frequent tormentil *Potentilla erecta*, meadowsweet *Filipendula ulmaria*, marsh thistle *Cirsium palustre*, as well as occasional rosebay willowherb *Chamaenerion angustifolium* and foxglove *Digitalis purpurea*.

A1.2.2 Coniferous woodland (plantation)

3.8 A small parcel of fenced conifer plantation was recorded east from the centre of the Study Area. Sitka spruce *Picea sitchensis* was dominant and the understory consisted of bare soil.

A3.3 Mixed scattered trees

3.9 This habitat was recorded once in the east of the Study Area, occurring as a mosaic with marshy grassland. Rowan, silver birch, sitka and lime *Tilia x europaea* were abundant. The understory consisted of marshy grassland with a similar species composition described below.

B1.1 and B1.2 Acid grassland (unimproved and semi-improved)

3.10 Acid grassland was recorded throughout the Study Area, often occurring as a mosaic with bracken, marshy grassland and dry dwarf shrub heath. Species composition varied throughout the Study Area, however, sweet vernal-grass and wavy hair-grass were typically abundant. Tufted hair-grass and sheep's fescue *Festuca ovina* were occasionally recorded. Occasionally, common sedge *Carex nigra*, star sedge *Carex enchinata* and tormentil were also recorded. Heath bedstraw *Galium saxatile* was frequently recorded forming mats below the sward of grasses.

B2.2 Neutral grassland (semi-improved)

3.11 This grassland was rare and restricted to the east of the Study Area. It occurred as grazing pasture for sheep, as well as in a gentle sloped gully as a mosaic with bracken and marshy grassland. Abundant Yorkshire fog, sweet vernal-grass and common sorrel *Rumex acetosa* formed tall green swards. Occasional tufted hair-grass, creeping buttercup *Rununculus repens*, herb-robert *Geranium robertianum*, ribwort plantain *Plantago lanceolata*, red clover *Trifolium pratense* and rare sneezewort *Achillea ptarmica*.

B4 Improved grassland

3.12 Improved grassland was primarily recorded in the east of the Study Area and associated with grasslands under intense sheep grazing pressure. Perennial ryegrass *Lolium perenne* was abundant, with occasional Yorkshire fog *Holcus lanatus*, sweet vernal-grass and common bent *Agrostis canina* recorded. Furthermore, common nettle *Galium aparine*, spear thistle *Cirsium vulgare*, broadleaved dock *Rumex obtusifolius*, creeping buttercup *Rununculus repens*, white clover *Trifolium repens* were rarely recorded.

B5 Marshy grassland

3.13 This habitat was widespread across the Study Area, occurring in valleys, gullies, ditches, hillside flushes, along the edges of streams and on wet level ground at the base of hills. These grasslands were dominated with more than 25% cover of either soft rush *Juncus effuses* or sharp-flowered rush *Juncus acutiflorus*. Occasional Yorkshire fog, sweet vernal-grass, marsh thistle and creeping buttercup were also recorded.

C1.1 C1.2 Bracken (continuous and scattered)

3.14 Extensive strands of bracken *Pteridium aquilinum* were recorded in gullies and valleys. Bracken was often recorded in a mosaic with marshy grassland, acid grassland and dry dwarf shrub heath (see above and below). Other species recorded within stands of bracken included sweet vernal-grass, Yorkshire fog, common bent, heath bedstraw and tormentil.

D1 Dry dwarf shrub heath

3.15 Dry heath was the most common and widespread habitat across the Study Area, occurring on hill slopes and plateaus. It primarily comprised of an extensive monoculture of dense, even-aged heather *Calluna vulgaris*, however, species richness varied. Some stands had been recently burned and could only be distinguished by the charcoaled heather stems and bare

ground, while some areas had greater species diversity and included heather of varying ages, bilberry *Vaccinium myrtillus*, bell heather *Erica cinera*, wavy hair-grass and tormentil.

D2 Wet dwarf shrub heath

3.16 Wet heath was rare and recorded as small (<0.01 ha) fragmented patches in the east of the Study Area, occurring as a mosaic with dry heath and wet modified bog (**Target note 4**). Deergrass *Trichophorum cespitosum* and purple moor-grass *Molinia caerulea* were abundant. Occasional heather and cross-leaved heather *Erica tetralix* were also recorded.

D5 Dry heath/acid grassland

3.17 This habitat was primarily recorded in the centre and south-east of the Study Area. It comprised a mixture of dry heath and acid grassland habitat (described above). This habitat was frequently recorded where sheep grazing and burning had created complex mosaics.

E1.8 Dry modified bog

3.18 Dry modified bog was common across the Study Area, with extensive patches recorded in the south of the Study Area on plateaus. Heather and hare's tail cottongrass *Eriophorum vaginatum* either co-dominated or hare's tail cottongrass was completely dominant in this habitat. Wavy hair-grass was frequent, with tormentil recorded occasionally. *Sphagnum fallax* and *S. papillosum* were rare and occurred in small patches.

E2.1 Acid flush

3.19 This habitat was recorded across the Study Area, occurring in shallow gullies and as hillside flushes. Due to it often occurring as narrow strips on hillsides, it was too small to map and has been target noted (**Appendix B**). Flowered rush formed dominant swards with *Sphagnum fallax*, *S. paluste* and *Polytrichum commune* forming a dense carpet below the rushes.

E2.3 Bryophyte dominated spring

3.20 Springs were rare across the Study Area, varying in size from a few metres squared to <0.5 m². They often occurred on moderate to gentle slopes and were dominated by mosses such as *Philonotis fontana*, *Palustriella commutata* and *P. falcata*.

E6 Bare Peat

3.21 Bare peat was recorded throughout the Study Area associated with modified bog and drying bog pools. Areas of actively eroding hags and deeply eroded channels were noted.

G1 Standing water

3.22 A large pond adjacent to the Dye Water was located in the centre of the Study Area. (**Target note 42**). Soft rush dominated the perimeter of the pond.

G2 Running water

3.23 The Dye Water was the main watercourse running through the centre of the Study Area. There are numerous smaller watercourses throughout the Study Area, originating from hillsides that act as tributaries to the Dye Water.

HS Hard Standing

3.24 Hard standing represented a small proportion of the Study Area and consisted of a main access track composed of concrete and gravel running adjacent to the Dye Water. Several gravel paths lead off to the north and south of the main access track, however these were often too small to map.

J3.6 Buildings

3.25 Residential and farm buildings were recorded within the east of the Study Area.

J4 Bare ground

3.26 Bare ground was common across the Study Area, however it was often too small to map. It often comprised of eroded embankments adjacent to the main access tracks, as well as step sided gullies and valleys.

RA Restricted Access

3.27 Areas immediately surrounding residential and farmhouse buildings were not surveyed and recorded as access was restricted. Areas recorded as restricted access were considered to be of low ecological value and lay out with the Developable Area.

NVC Communities

3.28 The NVC communities described below are supported by, and should be read in conjunction with, **EIA Report Figure 6.4** and images in **Appendix A**.

W11 *Quercus petraea-Betula pubescens-Oxalis acetosella*

3.29 This habitat was recorded once in the east of the Study Area. It occurred as a narrow strip of woodland running parallel with a stream within a steep sided gully. The canopy comprised semi-mature and mature silver birch, rowan and willow sp. The understory consisted of dominant bracken with patches of occasional grazed wavy hair grass and sweet vernal-grass where the bracken was discontinuous. Marsh thistle, creeping buttercup, common nettle and foxglove were also occasionally recorded.

3.30 Several bryophytes were recorded growing on various substrates within this habitat. These included *Rhytidiadelphus loreus*, *R. triquetrus*, *Pleurozium schreberi*, *Hylocomium splendens*, *Thuidium tamariscinum*, *Hypnum andoi* and *Dicranum scoparium*.

U2 *Deschampsia flexuosa* grassland

3.31 U2 was primarily recorded in the south-east of the Study Area. It often occurred as a mosaic with dry heath (H9) or bracken (U20) (described below) on gentle hill slopes, plateaus, and valley sides. This grassland is characterised by the dominance of wavy hair-grass.

3.32 Two sub-communities were identified:

- a. The U2a *Festuca ovina-Agrostis capillaris* sub-community was characterised by the presence of occasional common bent and sweet vernal-grass, as well as patches of bracken scattered throughout this community.
- b. The U2b *Vaccinium myrtillus* sub-community was the most common U2 community recorded and was identified by the presence of occasional patches of heather and bilberry.

U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland

3.33 This unimproved acid grassland community was recorded as small matrices throughout the Study Area, often occurring on well-drained hill slopes, knolls and gullies. The community was often recorded in mosaics with marshy grassland and dry heath.

3.34 One sub-communities were identified:

- The sub-community: U4a recorded was typical of this sub-community in that it did not have any distinguishing features. Abundant species included sheep's fescue and sweet vernal-grass. Tormentil and heath bedstraw were frequent., with mat grass *Narus stricta* occasionally recorded. Thick mats of mosses were commonly recorded in this habitat and typically included *Rhytidiadelphus loreus*, *R. squarrosus*, *Hylocomium splendens*, *Pleurozium shreberi* and small clumps of *Dicranum scoparium*.

U5 *Nardus stricta-Galium saxatile* grassland

3.35 This grassland resembles the U4 described above but with mat grass as the most abundant grass, giving the vegetation a more tussocky structure than U4. U5 was rare in the Study Area and formed scattered patches among U4 and H9 (described below) on well-drained, gently sloping ground in the south-east of the Study Area. No sub-communities were recorded.

U20 *Pteridium aquilinum*- *Galium saxatile* community

3.36 This bracken community was common throughout the Study Area, particularly in gullies and valleys, and often occurred as a mosaic with acid grassland and dry heath.

3.37 Two sub-communities were recorded often occurring adjacent to each other:

- The sub-community U20a *Anthoxanthum odoratum* sub-community had a grassy sward characterised by frequent sweet vernal-grass, Yorkshire fog, common bent and heath bedstraw and occasional tormentil. The mosses *Rhytidiadelphus squarrosus*, *Hypnum jutlandicum* and *Pseudoscleropodium purum* were also recorded frequently.
- The sub-community U20c species poor sub-community had dense, tall bracken dominating and piercing through bracken leaf litter from the previous year; the dense canopy of the bracken limited the growth of any other species beneath. This community was less common compared to U20a.

H9 *Calluna vulgaris* - *Deschampsia flexuosa* heath

3.38 H9 was the most common habitat recorded throughout the Study Area, covering large, open expanses across gently sloping hills and plateaus. This habitat varies in appearance depending on how recently it has been burned, which is highlighted in the variation between sub-communities.

3.39 Three sub-communities were recorded:

- *Vaccinium myrtillus*-*Cladonia* species sub-community H9b was widespread in small patches across the Study Area, adjacent to other H9 sub-communities. H9b is in the early stages of recovery from fire, where bilberry is abundant, with occasional young shoots of heather. The mosses *Campylopus flexuosus* and *C. Introflexus*, were recorded growing on bare peat.
- The Species-poor sub-community H9c is dominated by evenly aged heather which created a dense canopy. Bilberry and wavy hair-grass were rare. This was the most common form of H9 recorded.
- The *Molinia caerulea* sub-community H9e has little to distinguish it except occasional tufts of purple moor-grass, charcoaled stems of heather and a burnt peat surface.

H12 *Calluna vulgaris*-*Vaccinium myrtillus* heath

3.40 H12 was uncommon but recorded throughout the Study Area. It occurred on gentle to moderate slopes, often as a mosaic with H9. Heather was the dominant species recorded, with frequent bilberry and rare bell heather adding variety to an otherwise uniform canopy of heather.

3.41 One sub-community was identified:

3.42 The sub-community H12a *Calluna vulgaris* is typically species-poor with heather being the dominant ericoid. Wavy hair-grass, hard fern *Blechnum spicant* and tormentil were occasionally recorded in this habitat where the canopy of heather was discontinuous.

MG6 *Lolium perenne*- *Cynosurus cristatus* grassland

3.43 This was a heavily sheep grazed, mesotrophic grassland which was restricted to the east of the Study Area. Perennial ryegrass was abundant, with occasional sweet vernal-grass, crested dog's tail *Cynosurus cristatus* and white clover. No sub-communities were identified.

MG10 *Holcus lanatus* – *Junucs effuses* rush-pasture

3.44 MG10 was rare and restricted to the east of the Study Area, in a mosaic with MG6. This is a damp grassland where abundant tussocks of soft rush stood out among species-poor swards of frequent Yorkshire fog, occasional common bent and white clover. The mosses *Kindbergia praelonga* and *Rhytidiadelphus squarrosus* were recorded frequently among the grasses. No sub-communities were recorded.

M6 *Carex echinata-Sphagnum fallax/denticulatum* mire

3.45 This soligenous mire was rare but identified throughout the Study Area; often recorded within as hillside flushes and within gullies. It was often too small to map and therefore target noted. M6 is characterised by star sedge, soft rush and sharp flowered-rush over an extensive carpet of *Sphagnum fallax*.

3.46 One sub-community was identified:

- The sub-community M6c *Juncus effusus* sub-community had a similar list of species previously mentioned, however, soft rush was dominant. Star sedge and bottle sedge were occasional, with rare tormentil and common cottongrass. Small clumps of *Polytrichum commune* were also recorded occasionally.

M15 *Trichophorum cespitosum-Erica tetralix* wet heath

3.47 Wet heath was rare and recorded as fragmented patches in the east of the Study Area, occurring as a mosaic with dry heath and dry modified bog (**Target note 4**). Deergrass and purple moor-grass were abundant. Occasional heather and cross-leaved were also recorded.

3.48 Taking into account the evidence of historical and recent burning throughout the Study Area, it is likely that the majority of this habitat has been converted to dry heath, with only small patches remaining.

M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire

3.49 The M19 blanket mire community was uncommon in the Study Area and occurred as fragmented patches with M20 (described below). Heather and hare's-tail cottongrass were equally dominant in this community. Occasional species were dotted throughout this mire and included common cottongrass *Eriophorum angustifolium*, purple moor-grass and bilberry. Crowberry *Empetrum nigrum* was rarely recorded, as well as *Sphagnum papillosum* and *Sphagnum capillifolium*, which formed fragmented patches <1 m².

3.50 Feather mosses were frequently recorded and including *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*.

3.51 No sub-communities were identified.

M20 *Eriophorum vaginatum* blanket and raised mire

3.52 This was the most common bog community recorded throughout the Study Area, occurring on gently sloping hills and plateaus. In the south of the Study Area this habitat formed extensive areas, however in the north of the Study Area it occurred as patches in a mosaic with dry heath. Large tussocks of hare's tail cotton grass dominated this mire with abundant wavy hair-grass. *Sphagnum fallax* was occasionally recorded forming patches between the hare's tail tussocks. Crowberry and crossed leaved heather *Erica tetralix* were rare.

M23 *Juncus effusus/Juncus acutiflorus-Galium palustre* rush-pasture

3.53 This marshy grassland community was recorded throughout the Study Area and was common in the east. M23 was recorded along the edges of watercourses, drains, gullies, valley floors and gently sloping hillsides. It was often recorded in a mosaic with acid grassland or dry heath. The vegetation was dominated by soft rush; also recorded were occasional purple moor-grass, marsh thistle, lesser spearwort *Ranunculus flammula* and rare Yorkshire fog. The moss *Calliergonella cuspidata* was also recorded in some strands.

3.54 No sub-communities were recorded.

M25 *Molinia caerulea-Potentilla erecta* mire

3.55 This wet grassland was recorded once in a small area to the south-west of the Study Area, within a mosaic of M20, M19 and U2. It was characterised by the dominance of purple moor-grass.

3.56 One sub-community was identified:

3.57 M25a *Erica tetralix*-sub-community comprised of dense, tussocky growth of purple moor-grass with occasional clumps of heather and cross-leaved heather dotted throughout the habitat. Other species included rare tormentil, *Sphagnum capillifolium* and *Sphagnum fallax*.

M32 *Philonotis fontana* - *Saxifraga stellaris* spring

3.58 Two small seeps/flushes observed emerging from a hillside. The vegetation community appears to be influenced by both ground and surface water.

M37 *Palustriella commutata*-*Festuca rubra* spring

3.59 M37 was recorded twice in the Study Area, in the north-east and south-west, occurring on gentle slopes. It appeared as large, swollen cushions of golden-brown mosses. *Palustriella commutata* was frequent and on occasion replaced by *P. falcata*. *Philonotis fontana* and *Bryum pseudotriquetrum* were frequently recorded.

3.60 Vascular plants were rare in this habitat, however, red fescue, sweet vernal-grass and marsh willowherb *Epilobium palustre* were rarely recorded.

Notable Plant Species

3.61 There are two LBS sites within the Site, Byrecleuch Burn, Stot Cleugh is noted for its nationally scarce plants and Corby Scar and Upper Watch Water is noted for its high diversity grassland species.

Summary

3.62 Table 3.1 summarises the Phase 1 habitats and associated NVC communities and their relative land take within the Study Area.

Table 3.1: Summary of habitat and vegetation types recorded and their conservation interest

Phase 1 Habitat	Associated NVC Communities (Where Appropriate)	Area within Study Area (ha)	Proportion of Study Area (%)	Mechanism for Habitat Conservation Interest
A1.1.1 Broadleaved woodland (semi-natural)	W11 <i>Quercus petraea</i> - <i>Betula pubescens</i> - <i>Oxalis acetosella</i> woodland	3.20	0.16	Scottish Biodiversity List (Upland birchwoods) Local Biodiversity Action Plan (LBAP)
A1.1.2 Broadleaved woodland (plantation)	N/A	3.81	0.19	N/A
A1.2.1 Coniferous woodland (plantation)	N/A	0.41	0.02	N/A
A3 Mixed scattered trees	N/A	1.98	0.10	N/A
B1.1 Acid grassland (unimproved)	U2 <i>Deschampsia flexuosa</i> grassland	30.09	1.50	N/A
B1.2 Acid grassland (semi-improved)	U4 <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland U5 <i>Nardus stricta</i> - <i>Galium saxatile</i> grassland	23.16	1.16	

Phase 1 Habitat	Associated NVC Communities (Where Appropriate)	Area within Study Area (ha)	Proportion of Study Area (%)	Mechanism for Habitat Conservation Interest
B2.2 Neutral grassland (semi-improved)	N/A	8.40	0.42	N/A
B4 Improved grassland	MG6 <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland	60.02	3.00	N/A
B5 Marshy grassland	M23 <i>Juncus effusus</i> / <i>acutiflorus</i> - <i>Galium paluste</i> rush-pasture M25 <i>Molina caerulea</i> - <i>Potentilla erecta</i> mire MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture	94.65	4.72	High potential GWDTE (M23) Moderate potential GWDTE (M25, MG10) SBL (Upland Flushes, Fens and Swamps/blanket bog) LBAP (M23, M25)
C1.1 Bracken (continuous)	U20 <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community	99.50	4.97	N/A
C1.2 Bracken (scattered)		47.27	2.36	
D1 Dry dwarf shrub heath	H9 <i>Calluna vulgaris</i> - <i>Deschampsia flexuosa</i> heath H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	781.95	39.03	Annex 1 Habitat (H4030 European dry heaths) Scottish Biodiversity List (Upland Heathland)
D5 Dry heath/ acid grassland	U2 <i>Deschampsia flexuosa</i> grassland U4 <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland U5 <i>Nardus stricta</i> - <i>Galium saxatile</i> grassland H9 <i>Calluna vulgaris</i> - <i>Deschampsia flexuosa</i> heath H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	417.55	20.84	Annex 1 Habitat (H4030 European dry heaths – H9 and H12) Scottish Biodiversity List (Upland Heathland)
E1.8 Dry modified bog	M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire	385.05	19.22	Annex 1 Habitat (H7130 Blanket bogs) Scottish Biodiversity List (Blanket Bogs)

Phase 1 Habitat	Associated NVC Communities (Where Appropriate)	Area within Study Area (ha)	Proportion of Study Area (%)	Mechanism for Habitat Conservation Interest
	M20 <i>Eriophorum vaginatum</i> blanket and raised mire			
E2.1 Acid/neutral flush	M6 <i>Carex echinata</i> - <i>Sphagnum fallax/denticulatum</i> mire	0.83	0.04	High potential GWDTE
J3.6 Buildings	N/A	1.31	0.07	N/A
J4 Hardstanding	N/A	43.46	2.17	N/A
J4 Bare Ground	N/A	0.73	0.04	N/A
RA Restricted Access	N/A	0.25	0.01	N/A

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

3.63 Seven NVC communities were recorded within the Study Area which, according to SEPA guidance¹³ are potentially groundwater dependent. Table 3.2 presents the NVC communities recorded which potentially indicate groundwater dependency and the standard SEPA guidance regarding the potential groundwater dependency of these communities based on the vegetation alone¹⁴.

Table 3.2: Potential GWDTEs

Potential GWDTE NVC Code	Groundwater Dependency as per SEPA (2017) ¹⁵
M6	High
M23	High
M32	High
M37	High
M15	Moderate
M25	Moderate
MG10	Moderate

¹³ SEPA (2017) Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

¹⁴ The identified GWDTEs have been assessed and are further discussed in Chapter 5: Hydrology, Hydrogeology, Geology and Peat.

¹⁵ SEPA (2017) Land Use Planning System SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

Chapter 4

Discussion

Habitats of Conservation Interest

4.1 A desk study was undertaken to inform habitat and vegetation surveys. An account of the method adopted, and findings, is provided in **Appendix 6.1**, which also sets out the legislative provisions afforded to habitats, notably habitats of conservation interest.

4.2 Habitats of conservation interest recorded within the Study Area are detailed in **Table 3.1** and included the following:

- Four Annex 1 habitats: H4030 European dry heaths; H7130 Blanket bogs; H4010 Northern Atlantic wet heaths with *Erica tetralix* and H7220 Hard-water springs depositing lime.
- Six Scottish Biodiversity/LBAP List habitats: Upland Heathland; Blanket Bogs; Upland Flushes, Fens and Swamps; Upland birchwoods; Marshy grassland and Rivers.
- Seven potential GWDTE communities: M6, M15, M23, M25, M32, M37 and MG10.

4.3 European dry heath is the most common Annex 1 habitat type within the Study Area, comprising approximately 59.87% of the Study Area when Phase 1 habitat types are combined (D1 and D5). This habitat dominated the Study Area and occurred on moderate to gently sloping ground, covering extensive areas. Land management practices, particularly burning, have likely resulted in previous areas of wet heath and blanket bog being converted to dry heath.

4.4 Blanket bog and wet heath Annex 1 habitats within the Study Area comprise approximately 19.22% of the Study Area (Phase 1 habitat E1.8 Dry Modified Bog and D2 Wet Dwarf Heath Shrub). This is commonly associated with deeper deposits of peat (>0.5 m). Blanket bog was associated with level ground and gentle slopes, often occurring in a complex mosaic with dry heath and acid grassland, due to burning creating complex mosaics.

4.5 The final Annex 1 habitat type, Hard-water springs depositing lime and Alkaline fens, occurred in small, scattered pockets and therefore account for only a small proportion of the Study Area (approximately 0.04%).

4.6 The SBL habitats are largely superseded by the Annex 1 habitats. The exception to this is the SBL Rivers habitat. There are approximately 8 km of watercourses within the Study Area, many of which qualify as the priority habitat as they are headwaters¹⁶. Water courses on Site also include a small section of the River Tweed which is designated as follows:

- SAC – Designated for *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation.
- SSSI - designated for its trophic river stream, river and vascular plant assemblages.

GWDTE Assessment

4.7 A detailed assessment of GWDTE is provided in **Chapter 8: Hydrology, Hydrogeology, Geology and Peat**. A summary of the ecological considerations in relation to groundwater dependency is provided below.

4.8 The habitats considered to indicate high likelihood of ground water dependency (i.e. M6, M23, M32 and M37) are those where it is generally located close to watercourses (indicating a surface water influence) or associated with hillside flushes and within gullies. Therefore, it is considered that these plant communities have, at-most, low-moderate groundwater dependency.

4.9 Those habitats indicating moderate likelihood of ground water dependency (i.e. M15, M25 and MG10) were recorded within the Study Area as follows:

¹⁶ Defined as a watercourse within 2.5km of its furthest source as marked as a blue line on 1:50,000 Ordnance Survey Landranger maps

- M15 was restricted to fragmented patches to the east in proximity to watercourses, historical burning has resulted in only small patches remaining, therefore it is considered that this plant community has, at-most, Low groundwater dependency.
- M23 recorded throughout the Study Area and was common in the east along the edges of watercourses, drains, gullies, valley floors and gently sloping hillsides. Therefore, it is considered that this plant community has, at-most, Low groundwater dependency.
- M25 once in a small area to the south-west of the Study Area, looks like it's in an area of deeper peat, therefore has potential to have low/ moderate ground water dependence.

Outline Mitigation

4.10 A series of species-specific mitigation measures set out below have been adopted within the development aimed to protect habitats during the construction phase of the development. These measures represent a combination of standard, well-rehearsed techniques and measures specifically designed for the development.

- Avoidance of the designated areas within the Site.
- The development and application of a Construction Environment Management Plan (CEMP), which will set out guidance on compliance with nature conservation legislation and policy. This should include:
 - Production of a Pollution Prevention Plan (PPP) and adherence to Guidelines on Pollution Prevention (GPPs), which will significantly reduce the likelihood and severity of pollution events;
 - Production of Construction Method Statements (CMS);
 - Production of a Water Protection Plan (WPP) and a CAR construction site licence (CSL) will be obtained from SEPA. This will include the application of appropriate buffers around watercourses, which will protect riparian habitat while reducing disturbance and the likelihood of pollution events;
 - Production of a Peat Management Plan to set out a number of good practice measures in relation to minimising disturbance and the management of peat during construction;
 - Where appropriate, measures should be implemented to reduce potential of soil erosion; and
 - Presence of an Environmental Clerk of Works (ECoW) during pre-construction and construction operations to provide ongoing support and monitoring. The ECoW role should be developed in accordance with current good practice guideline.
- An Outline Restoration and Enhancement Plan (OREP) is included in **Appendix 6.6** to provide high level mitigation, compensation and enhancement measures to be adopted by the development.

Appendix A

Images



South-west of Study Area – Image showing complex mosaics as a result of burning. Dry heath (H9b, H9C, H9e) dry modified bog (M20) and patches of bare peat recorded adjacent to each other.



Centre of Study Area, view north – Small patch of H12 dry heath and acid grassland (U2), with bracken (U20), dry heath (H9) and bare ground in background.



North of Study Area – Typical U20 habitat recorded in the numerous gullies adjacent to water courses throughout the Study Area.



North-west of Study Area – Dry modified bog (M19) co-dominated by heather and hares' tail cottongrass.

Appendix A
Images

Appendix 6.2: Habitats & National Vegetation Classification Report
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East of Study Area – Marshy grassland (M23) recorded on gentle slope, dominated by soft rush.



South-west of Study Area - Bryophyte dominated spring (M37) showing a golden-brown carpet of mosses. *Philonotis fontana* and *Palustreilla commuata* were abundant.

Appendix B

Target notes

Target note number	Phase 1 Habitat Code	Important Feature	Comment/Species Composition/Surveyor Notes
1	E2.3 Brophyte-dominated spring	M37 - High GWDTE potential	large area dominated by indicator mosses of M37
2	E2.3 Brophyte-dominated spring	High GWDTE potential	potential GWDTE, cluster of philonotis fontana, very dry. topography suggests rainwater channelled through area, may be enrichment by surface run off rather than spring
3	E2.3 Brophyte-dominated spring		cratoneuron filcinum, palustriella falcatta, calliergonella cuspidata
4	D2 Wet dwarf shrub heath	M15 - Moderate GWDTE potential	Area of M15 too small to map - molinia, deergrass, Heather, Cross-leaved heath all present
5	E2.1 Acid flush	M6 - High GWDTE potential	rushes, whg, Heath rush, star sedge, c. nigra, pi comm,
6	E2.1 Acid flush	High GWDTE potential	juncus dominated flush - compact w soft. abundant York fog, frequent sweet vernal and crested dogstail, occ common sedge.
7	E2.1 Acid flush	M6 - High GWDTE potential	
8	E2.1 Acid flush	M6 - High GWDTE potential	area of rushes amongst Heather, sweet vernal, star sedge, common sedge
9	E2.1 Acid flush	M6 - High GWDTE potential	whg, haircap moss, HT, sphagnum pap. Marsh thistle, bracken, soft rush, compact rush
10	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, leading down slope towards track/trees

Target note number	Phase 1 Habitat Code	Important Feature	Comment/Species Composition/Surveyor Notes
11	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, leading down slope towards track/trees
12	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, Marsh thistle,
13	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, Marsh thistle,
14	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, Marsh thistle,
15	E2.1 Acid flush	M6 - High GWDTE potential	start of flush with sphagnum, ht, whg, deer grass, c. nigra, and worn banks with bare ground.
16	E2.1 Acid flush	M6 - High GWDTE potential (adjacent to stream unlikely GWDTE)	abundant- soft rush, wavy hair, pi comm, frequent-heath rush, heather, star sedge
17	E2.1 Acid flush	M6/M23 High GWDTE potential (recorded in gully, unlikely GWDTE)	juncus dominant on either side of stream. sweet vernal also abundant. surrounding habitat converges here at bottom of slopes
18	E2.1 Acid flush	M6 - High GWDTE potential	flush area rushes, ht, whg, sweet vernal, pi comm, sphagnum, Heath rush
19	E2.1 Acid flush	M6/M23 - High GWDTE	small juncus dominated flushed patch, compact and soft rush
20	E2.1 Acid flush	M6 - High GWDTE potential	sweet vernal, agrostis, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, leading down slope towards track/trees
21	E2.1 Acid flush	M6- High GWDTE potential	rushes, whg, Heath rush, sphagnum mag, sphagnum

Target note number	Phase 1 Habitat Code	Important Feature	Comment/Species Composition/Surveyor Notes
			pap, horsetail, bottle sedge, star sedge, c. nigra, pi comm, HT
22	E2.1 Acid flush	M6 -High GWDTE potential	There was no comments or habitat notes for this. However, image suggests potential GWDTE.
23	E2.1 Acid flush	M6 - High GWDTE potential	
24	B5 Marshy grassland	M23 - High GWDTE potential	rushes, whg, Heath rush, star sedge, c. nigra, pi comm,
25	B5 Marshy grassland	M23 - High GWDTE potential (recorded in gully unlikely GWDTE)	sweet vernal, whg, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, Marsh thistle, foxglove
26	B5 Marshy grassland	M23 - High GWDTE potential	soft rush compact rush whg, sheep sorrel, Marsh thistle, sharp flowered rush
27	B5 Marshy grassland	M23 - High GWDTE potential	dominated by compact rush and wavy hair grass w frequent Marsh thistle and sweet vernal
28	B5 Marshy grassland	M23 - High GWDTE potential	m7ch the same as flush just north, but with York fog scattered amongst the rushes, molinia appears frequently here and as the flush travels linearly north
29	B5 Marshy grassland	M23 - High GWDTE potential	
30	B5 Marshy grassland	M23 - High GWDTE potential (unlikely as in foot of 2 slopes)	flush running down the foot of two slopes. dominated by soft rush. slopes covered with heather but southerly slope has patches of scree and bare ground - possible slope failure. hypnoid mosses also present
31	B5 Marshy grassland	M23 - High GWDTE potential (unlikely based on aerial)	compact rush cluster leading in to stream
32	B5 Marshy grassland	M23 - High GWDTE potential	small flushed patch of compact rushes

Target note number	Phase 1 Habitat Code	Important Feature	Comment/Species Composition/Surveyor Notes
33	B5 Marshy grassland	M23 - High GWDTE potential	rushes, whg, Heath rush, star sedge, c. nigra, pi comm, sweet vernal, agrostis, matt grass,
34	B5 Marshy grassland	M23 - High GWDTE potential	soft rush, compact rush , whg, sweet vernal, c, nigra,
35	B5 Marshy grassland	M23 - High GWDTE potential	rushes, whg, thg, Heath rush, sphagnum mag, sphagnum pap, horsetail
36	B5 Marshy grassland	M23 - High GWDTE potential	rushes, whg, Heath rush, sphagnum mag, sphagnum pap, horsetail, bottle sedge, star sedge, c. nigra, pi comm, HT
37	B5 Marshy grassland	M23 - High GWDTE potential	possible flush , dense juncus growth
38	B5 Marshy grassland	M23 - High GWDTE potential	sweet vernal, whg, sharp flowered rush, compact rush, soft rush, Heath rush, bottle sedge, star sedge, c. nigra, pi comm, Marsh thistle, foxglove
39	B5 Marshy grassland	M6 - High GWDTE potential (unlikely)	rushes alongside track with pi comm, crowberry, whg, Heath rush, HT, c. nigra,
40	B5 Marshy grassland	M23 - High GWDTE potential	start of flush, high proportion of juncus, with some bottle sedge
41	B5 Marshy grassland	M23 - High GWDTE potential	rushes, whg, Heath rush, star sedge, c. nigra, sweet vernal, Marsh thistle, quaking grass, crested dy, self-heal, matt grass
42	G1 Standing water	Large pond surrounded by Juncus sp.	
43	A3.1 Broadleaved scattered trees	Scattered trees along Dye Water	planted trees inc, beech, birch, rowan,
44	J4 Bare ground	Ditch showing lack of peat substrate	2 m wide ditch exposing soil predominantly clays
45	E4 Peat - bare	Exposed peat - found throughout ESA	undercut areas of banking at top of flush
46	E1.8 Dry modified bog/ D1 Dry dwarf shrub heath	M32 – High GWDTE Potential	Two small seeps/flushes observed coming out of hillside, oily film present on the water. Appears to be

Appendix B
Target notes

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Target note number	Phase 1 Habitat Code	Important Feature	Comment/Species Composition/Surveyor Notes
			both surface water and groundwater influences in this local area.