

SHEIRDRIM RENEWABLE ENERGY DEVELOPMENT

Technical Appendix 8.1: Phase 1 Habitat and National Vegetation Classification Survey Report

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1.0 Introduction

ScottishPower Renewables (SPR) is investigating the development of Sheirdrim Renewable Energy Development, between Whitehouse and Clachan on the A83 in, in North Kintyre, Argyll and Bute. SLR Consulting Limited (SLR) was commissioned by SPR in May 2019 to undertake a range of non-avian ecological surveys at the site including a Phase 1 and National Vegetation Classification survey.

1.1 Background

In April 2019, SPR submitted an Environmental Impact Assessment (EIA) scoping report and a request for a scoping opinion from the Scottish Government Energy and Consents Unit (ECU) in respect of the proposed Sheirdrim Renewable Energy Development, in line with Regulation 12 of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

The EIA scoping report¹ detailed the proposed approach to the ecological surveys and assessment to be undertaken to inform the EIA. As part of this, the scoping report stated that a Phase 1 Habitat Survey would be undertaken with more detailed National Vegetation Classification (NVC) surveys undertaken where habitats of conservation interest were recorded. No objections to the approach proposed were received from relevant stakeholders as part of the scoping process.

1.2 Site Description

The application boundaries are shown on **Figure 8.1.1.1**, it should be noted that the survey area comprised a larger site area which was being considered at the time of surveying in May 2019, plus a buffer of 250 m (subject to access). As such, the survey area also includes some areas which are greater than 250 m from the current application boundary. The 1,248 ha survey area, centred on NGR 181302 657098 and shown in **Figure 8.1.1.1**, is located at the northern end of the Kintyre Peninsula, and wholly within the Argyll and Bute Council administrative area. The western part of the site comprises commercial plantation forestry and existing forestry tracks around Sheirdrim Hill (186 m AOD). Bog and marshy grassland dominate the eastern and south eastern extent of the site, a large area in the northern and eastern part of the site has been modified by drainage. The south eastern and eastern boundary of the Site is demarked by the Kintyre Way.

Topography generally rises to the south from circa 70 m AOD at the Site entrance to circa 270 m AOD in the south east, particularly around Cruach nam Fiadh. There are two lochs within the Site (Loch Chorra-riabhaich and Loch Lurach) and several others in the immediate vicinity, including Loch Freasdail (north east), Loch Cruinn (north east), and Loch Ciaran (south west). Other large hills to the south include Cnoc Creagach (215 m AOD), Cnoc an t-Seallaidh Bhig (248 m AOD), Cruach Achaidh Ghlais (244 m AOD) and Cruach Tamalabh (242 m AOD).

1.3 Scope of Survey

As set out in the EIA scoping report, the scope of the Phase 1 Habitat Survey was to cover all habitats located within the application boundary, up to and including a 250 m buffer, in accordance with best practice survey guidelines. The survey was to aim to broadly map natural and semi-natural habitats with particular emphasis on identifying habitats of conservation interest (such as Scottish Biodiversity List (SBL) habitats, European priority

habitats, and potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs)².

The EIA scoping report went on to say that where habitats of conservation interest are recorded, further, more detail National Vegetation Classification (NVC) surveys were to be undertaken to provide an understanding of floral composition and characteristic of habitats. Target notes, species lists and photographs were to be taken to provide a visual context and to aid the analysis and assessment.

This report presents the findings of the Phase 1 habitat survey and NVC survey which were undertaken between May and June 2019. The assessment of impacts resulting from the proposed Development and the development of mitigation measures, if required, are beyond the scope of this report and are covered separately within the ecology chapter of the EIA Report.

2.0 Methodology

2.1 Survey Area

The boundaries of the survey area are shown on **Figures 8.1.1.1-8.1.1.5 and 8.1.2.1-8.1.2.5**. The survey included the application boundary being considered at the time of the survey in May 2019 plus a 250 m buffer, subject to access. This encompasses the area of the proposed turbines, associated infrastructure and the proposed solar arrays plus a buffer of at least 250 m (access permitting).

2.2 Survey Methodology

2.2.1 Desk Study

Prior to going to the Site, aerial photographs of the survey area³ were examined. Homogenous stands and mosaics of vegetation were identified and mapped onto the aerial photographs. The stands were then drawn as polygons on field maps; which could be ground truthed and surveyed quantitatively to record the species present once in the field.

2.2.2 Phase 1 Habitat Survey

The Phase 1 habitat survey was undertaken concurrently with the NVC survey. The methodology used was based on the standard JNCC methodology⁴. Target notes were made to describe in simple terms the habitats present and any features of interest. Target note locations are shown in **Figure 8.1.1.1-8.1.1.5** along with the Phase 1 habitat types. Target note descriptions are provided in table form in **Appendix 01**. A plant species list is provided in **Appendix 02**.

2.2.3 NVC Field Methodology

The more detailed NVC survey which focused, as agreed via the scoping report, on assessing habitats of conservation interest, was undertaken using the NVC system (Rodwell, 1991 *et seq*⁵, five volumes) and in accordance with NVC survey guidelines⁶. The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats, with the aim that surveys are carried out to a consistent level of detail and

¹ ScottishPower Renewables (2019). *Sheirdrim Renewable Energy Development EIA Scoping Report*, April 2019.

² SEPA (2014). *Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*. Land Use Planning System SEPA Guidance Note 31 (LUPS – GN31). Version 1 Issued 07 October 2014.

³ Imagery purchased with a licence from Emap were used, with a resolution of 1m and other freely available aerial images were also consulted

⁴ Joint Nature Conservation Committee (JNCC) (2010) *Handbook for Phase 1 Habitat Survey. A technique for environmental audit*. Revised reprint. JNCC. Peterborough

⁵ Rodwell J.S (Editor) (1991 *et seq.*) *British Plant Communities*. Cambridge University Press.

⁶ Rodwell, J. S. 2006 *National Vegetation Classification: Users' Handbook*. JNCC.

accuracy.

The polygons mapped during the desk study were ground truthed and the boundaries of the polygons altered as necessary in the field. The NVC communities were attributed to each polygon using surveyor experience and by matching field data against published floristic keys and tables (Rodwell, 1991 *et seq*). Stands were classified at community level. Where sub-communities were readily identifiable, these have also been documented but have generally not been mapped.

In general, the NVC community types present within the survey area were readily identifiable to an experienced NVC surveyor. Quadrat sampling was used to quantify species composition where considered necessary to clarify the community present. Where quadrat sampling was used, the following methodology was adopted:

Initial sampling of each vegetation type was carried out as recommended in the NVC users' handbook, by sampling at random in stands of vegetation 'judged by eye to be floristically and structurally homogeneous'. Where it was difficult to establish the vegetation type, more than one sample was taken to achieve a larger data set.

The size of quadrat used was 2 x 2 m. Each quadrat position was recorded as a twelve-figure grid reference using a GPS enabled tablet or as Universal Transverse Mercator (UTM) for the GPS unit used. Within each quadrat, all vascular plants and bryophytes of frequent occurrence (and some less frequent but readily recognisable) were identified and an estimate of cover value of each made, using the DOMIN scale of cover as shown below:

DOMIN scale:

- 10 - 91–100%
- 9 - 76–90%
- 8 - 51–75%
- 7 - 34–50%
- 6 - 26–33%
- 5 - 11–25%
- 4 - 4–10%
- 3 - Many individuals
- 2 - Several individuals
- 1 - Few individuals

Due to the topology of the land in some parts of the survey area, some polygons represent complex mosaics of the NVC communities attributed to that respective polygon.

2.2.4 NVC Reporting

This report has been compiled so that the Phase 1 habitat categories are included alongside the corresponding NVC community types; that is, NVC community types have been grouped under the Phase 1 habitat type that they most closely represent. **Appendix 03** contains the NVC survey sheets which provide the quadrat locations and survey data, with **Figure 8.1.2.1-8.1.2.5** illustrating the NVC communities present and quadrat locations.

Current SEPA guidance^{Error! Bookmark not defined.} provides a table showing which NVC communities indicate that a wetland is likely to be either highly or moderately groundwater dependent, depending on the hydrogeological setting. The evaluations of likely groundwater dependency, based on SEPA guidance, have been set out in this report and communities which are likely to be either highly or moderately groundwater dependent are shown in

Figure 8.1.3.1.

2.3 Survey Dates

The vegetation surveys were mainly undertaken between 20 - 23rd May 2019 with further information collected between 18 - 19th June 2019.

2.4 Survey Personnel

Dr Andrea Wilcockson CEnv, MCIEEM, Principal Ecologist, undertook the Phase 1 and NVC surveys in May 2019 with Nicola Faulks CEng, MCIEEM, Principal Ecologist, undertaking the additional surveys in June 2019. Dr Wilcockson is an ecologist with more than twenty years' professional botanical experience who has previously worked on windfarm sites in Scotland. Nicola is an ecologist with more than thirteen years' professional botanical experience who has worked on a number of upland windfarm sites in Scotland. Surveys were assisted by Ben Heath and Daniel Hulmes Grad CIEEM. All surveyors are employees of SLR.

2.5 Nomenclature

Botanical nomenclature in this report follows that of Stace (2010⁷) for vascular plants and Atherton *et al.* (2010⁸) for bryophytes. For clarity, due to the use of different English names for some plant species, only scientific (Latin) names have been used within the main body of the report. For ease of reference English names are provided in **Appendix 02**.

2.6 Limitations

The conditions and time of year in which the surveys were undertaken were considered to be suitable for undertaking Phase 1 and NVC surveys, however it should be noted that such surveys are only a snap shot and cannot preclude other species being present during a different part of the season. This is not considered to be a serious limitation due to the experience of the botanical surveyors and the types of habitats being surveyed.

Access into small areas of the buffer zone in the south west and north of the survey area was restricted. However, aerial imagery would indicate that these areas are either forestry or used as agricultural fields and they have therefore been mapped accordingly on the Phase 1 habitat map (**Figure 8.1.1.1-8.1.1.5**). It is therefore considered that access to these areas would not change the overall findings of this report and is therefore not a limitation. In addition, access was not given to two occupied residential properties within the survey area. This is also not considered to be a limitation to the findings of this report.

3.0 Results

3.1 Summary of Habitats

The north western part of the survey area and along the access track towards the south east contains coniferous plantation woodland, this is a mixture of areas of mature coniferous plantation, recently felled coniferous woodland and some areas of newly planted coniferous plantation (although this latter category is restricted to one area on the northern application boundary). In addition, there is further mature coniferous plantation and newly planted coniferous plantation within the buffer zone to the south of the survey area. Another area of coniferous plantation and recently felled coniferous plantation is present in the buffer zone to the north of the

⁷ Stace, C. 2010 *New Flora of the British Isles*. 3rd Edition. Cambridge University Press.

⁸ Atherton, J., Bosanquet, S. & Lawley, M. 2010 *Mosses and Liverworts of Britain and Ireland: A Field Guide*. British Bryological Society.

application boundary.

The area around Scotmill and Achaglass to the south west of the Site supports a variety of habitats which have been subject to modification. Modification has come through grazing, especially around Scotmill where sheep grazing was occurring at the time of the survey. In this area some of the habitats also showed evidence of modification through the application of lime (see description of MG6 *Lolium perenne-Cynosurus cristatus* grassland), which has begun to revert towards U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland due to the abundance of *Rumex acetosa* as lime is now not being applied, but remains closer in affinity to MG6 grassland. In addition, there is U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland here where the grass species are indicators of a reverted farm system. This area would have been historically ploughed and limed. It was potentially a MG6 mesotrophic grassland, which is reverting back to an acid U4 grassland, although with a poor species diversity. Also, in the same area there was evidence of historic peat cutting.

In the north eastern buffer and on the north eastern boundary, north of the woodland, areas of M23 rush pasture are present which have been modified due to grazing. At the time of survey these areas were being grazed by cattle and sheep. The sward in these areas was very short (less than 5cm), except where soft rush (*Juncus effusus*) was present which generally had not been grazed, with no thatch indicating that this area has been grazed for a number of years.

The main part of the survey area to the south and east has been modified substantially by drainage through the cutting of a number of drainage ditches across large areas. This has been the likely cause of the poor species diversity in the habitats in these areas with purple moor grass (*Molinia caerulea*) being widely dominant. In the north eastern part of this area the habitat, although modified by drainage ditches to some degree, has vegetation which has closer affinities to the M15/M17 wet heath/blanket mire community rather than the modified M25 mire community which is present across most of the southern part of the survey area.

The M15/M17 wet heath/blanket mire in the central western area of the Site during the site visit appeared to be relatively unmodified in comparison with the rest of the Site. There was no evidence of it having been heavily grazed and few ditches were present in this area.

It is recognised that M25 *Molinia caerulea-Potentilla erecta* mire is by its nature associated with modified habitats however at the Site, there is a difference in the extent of the modifications and the impacts this appears to be having on the vegetation between those areas marked as M25 mire and M25 mire modified i.e.: the areas marked as M25 *Molinia caerulea-Potentilla erecta* mire modified have a poorer species diversity, support fewer herb species, are more dominated by purple moor grass than those illustrated as being M25 mire. This separation has been made to indicate which areas of habitat are of higher quality and potentially more capable of being restored to blanket mire if desired.

3.2 Summary of Habitat Types

Table 3-1 lists all Phase 1 habitat types and NVC communities recorded within the survey area boundary, including habitats or communities which represent a mosaic of different habitat or community types. Section 3.2 goes on to provide more detail on the composition and location of each NVC community type grouped by Phase 1 habitat category. The Phase 1 habitat map of the whole survey area is provided on **Figure 8.1.1.1** with **Figures 8.1.1.2 – 8.1.1.5** illustrating the same information in more detail. The target notes are shown on each Figure with details from the target notes provided in **Appendix 01**. The NVC map of the whole survey area is provided on **Figure 8.1.2.1** with **Figures 8.1.2.2 – 8.1.2.5** illustrating the same information in more detail. The quadrat numbers are also shown on the Figures with the details for each quadrat provided in **Appendix 03**.

Table 3-1
Phase 1 Habitats (in bold) and NVC Communities recorded within the Survey Area

Community or Habitat Code	Community or Habitat Name	Area (Ha)
E1.6.1	Blanket Bog	280.640
M15	<i>Scripus cespitosus-Erica tetralix</i> Wet Heath Community	52.237
M17	<i>Scirpus cespitosus – Eriophorum vaginatum</i> Blanket Mire Community	14.730
M15/M17	Wet Heath/Blanket Mire Mosaic Community	142.929
E1.7	Wet Modified Bog	484.457
M15/M17 modified	Modified Wet Heath/Blanket Mire Mosaic Community	69.690
M25**	<i>Molinia caerulea-Potentilla erecta</i> Mire Community	122.357
M25 Modified	Modified Mire Community	361.951
B5	Marsh/Marshy Grassland	121.018
M23	<i>Juncus effusus/Juncus acutiflorus-Galium palustre</i> Rush Pasture Community	120.289
MG10	<i>Holcus lanatus-Juncus effusus</i> Rush Pasture Community	3.140
B2.2	Neutral Grassland - Semi-improved	4.052
MG6	<i>Lolium perenne-Cynosurus cristatus</i> Grassland Community	0.796
B1.1	Unimproved Acid Grassland	7.198
U4***	<i>Festuca ovina-Agrostis capillaris-Galium saxatile</i> Grassland Community	2.629
U6	<i>Juncus squarrosus-Festuca ovina</i> grassland Community	4.569
B6	Poor Semi-improved Grassland	0.258
C1.1	Tall Herb and Fern Continuous – Bracken	15.769
U20	<i>Pteridium aquilium-Galium saxatile</i> Community	15.511
F1	Swamp	0.201
S4	<i>Phragmites australis</i> Swamp and Reedbed Community	0.201
A1.1.2	Coniferous Woodland Plantation (including newly planted Coniferous Woodland Plantation)	158.532
A4.2	Recently-felled Coniferous Woodland	164.711
G1	Open Water – Standing Water	7.968
G2	Open Water – Running Water	6.09km****
J4	Bare Ground	3.492
J3.6	Building	0.006

Community or Habitat Code	Community or Habitat Name	Area (Ha)
J5	Hardstanding	0.001

*M15 can be associated with the Phase 1 habitats wet heath, blanket bog or wet modified bog but has been assigned to blanket bog here due to it generally being found in association with peat depth generally being greater than 50 cm (or in areas in which peat depth varies locally with some greater than 50 cm and some less than 50 cm but with the variations occurring at a scale which is too small to map) and the relatively unmodified nature of the habitat.

**M25 can be associated with the Phase 1 habitats marshy grassland or wet modified bog depending on peat depth. Based on the peat mapping data M25 has been assigned to Wet Modified Bog under the Phase 1 classification. Whilst this classification is considered likely to be correct across much of the site it is possible that some areas would be reclassified as marshy grassland based on peat depth.

***U4 has been classified here as unimproved which it predominately was. However, some areas within the survey area have been subject to improvement through drainage and manure input.

**** linear habitat so area not included, but length has been.

For information on mosaic communities please refer to the descriptions of the individual components of each mosaic e.g. for M15/M17 please read the detailed habitat descriptions for the relevant communities.

3.3 Detailed Habitat Descriptions

3.3.1 Bare Ground

The bare ground present within the survey area is present as the access track which passes through the coniferous plantation from the A83.

3.3.2 Conifer Plantation

The areas marked as plantation support dense coniferous plantation (Sitka spruce) of variable age with an absence of ground flora also present are vegetated rides. In places on the edge of the plantation scattered trees such as rowan (*Sorbus aucuparia*) are present.

3.3.3 Newly Planted Conifer Plantation

There are also areas of newly planted coniferous plantation, generally in areas of previously cleared coniferous plantation.

3.3.4 Recently Felled Coniferous Plantation

There are also areas of clear felled plantation, where tree stumps remain. Depending on the time since the area was clear felled, botanical species have begun to develop including grass species.

3.3.5 Open Water

Throughout the survey area are a number of Lochs and Lochans, these are predominately within the area of bog and heath to the south and east of the site. Survey of aquatic plant species within the lakes is not considered necessary to inform the EIA and was not attempted.

3.3.6 Running Water

The areas of running water have an absence of vegetation within the water course itself, with the banks typical of burns in the area, either being areas of peat or rock. The bank tops support a range of vegetation types depending on their location.

3.3.7 Poor Semi-improved Grassland

A small area of poor semi-improved grassland is present in the north west of the survey area with the buffer area adjacent to the A83. Full access to the field was not possible but the field was grazed by sheep at the time of surveying.

3.3.8 Blanket Bog

M15 *Scripus cespitosus*-*Erica tetralix* Wet Heath

There are several parts of the survey area which support M15 vegetation, there are two areas close to the north of the site between the edge of the woodland and Loch Lurach. There is a larger area south east of Larachmor Burn and the Kintyre Way within the 250 m buffer, outside the site boundary. There are also a number of areas of M15 within close proximity to the Clachan Burn in the south west of the survey area.

To the south west of the survey area the M15 community occurs in mosaic with M17 mire and effectively replaces the M17 on the steeper slopes, where peat depths are shallower. These areas comprise the main species which form this community: *Calluna vulgaris*, *Erica tetralix*, *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Potentilla erecta* and *Narthecium ossifragum*.

It is considered likely that the sub-community best represented here is the M15b typical sub-community, which has a thick sward of *Calluna vulgaris* and *Erica tetralix*. However, as always, this type of community is not overwhelmingly continuous: small areas of M6 flush community are present where water flushes up through the peat or small runnels are formed; U4/U5/U6 grass communities are present where the peat thins and breaks over steeper ground; and M23 marshy grassland communities are present adjacent to stream banks or where less acidic flush lines are present.

Elsewhere in the survey area, the vegetation has few constants with *Molinia caerulea*, *Calluna vulgaris* and *Erica tetralix* occurring with high frequencies. *Molinia* is generally constant and can be abundant in some locations, in wetter areas *Eriophorum angustifolium* occurs frequently. In the drier areas, shrubby species such as *Vaccinium myrtillus* and *Potentilla erecta* can be common. Whilst *Sphagnum* species are present, they are not as extensive as in M17. As per the community description within Rodwell *et al.*⁵ this habitat is generally associated with thinner or better drained areas of peat. Within the survey area the presence of extensive areas of drainage has also extended this habitat into areas of deeper peat and allowed the expansion of *M. caerulea*.

M17 *Scirpus cespitosus* – *Eriophorum vaginatum* Blanket Mire

This mire habitat was potentially once the most common type of peatland community found within the survey area, however due to modification for drainage, the M17 is now restricted in extent, and has likely changed to *Molinia caerulea* dominated M25 community across large areas. The M17 is present on the flatter deeper peat areas, and the lower gradient slopes. As the slopes gently steepen, the M17 develops into a wet heath M15 community.

The category M17 has three sub-communities associated with it. Across the survey area, where the M17 blanket mire is present, it covers a range of sub-community types from the wetter more *Sphagna* rich sub-communities to the drier *Cladonia* sub-community (noted in the small area near Scotmill where historical peat cutting had

taken place). The most common sub-community present is the M17a *Drosera rotundifolia-sphagnum* community. *Sphagnum capillifolium* was frequently found in carpets, and so too was *Drosera rotundifolia*, especially in the wetter areas. In many areas *Myrica gale* was present, often creating quite a notable canopy cover. This is the case in the habitat close to Scotmill.

Across the main part of the site the M17 blanket mire is relatively uniform without extensive hummocks and hollows and bog pools are relatively rare. Species present include abundant *Eriophorum vaginatum*, *Molinia caerulea*, *Calluna vulgaris* and *Erica tetralix*. *Eriophorum angustifolium* is present but at a lower frequency than in the M15 *Scripus cespitosus-Erica tetralix* wet heath community and *Potentilla erecta* is constant. The frequent presence of *E.vaginatum* and *Trichophorum cespitosum* assists in separating this community from the M15 *Scripus cespitosus-Erica tetralix* wet heath community where they are less frequent. Additionally *Sphagnum* was present and in some locations was abundant, with *Sphagnum papillosum* being found frequently and at high abundance in some locations.

Across the main part of the Site the M17 blanket mire community, where present, occurs in a mosaic with M15, M15 being present on the slightly elevated and/or more rocky areas with shallower peat. The variations between the communities were on too small a scale to map, therefore the habitat has been mapped as a mosaic. These areas were relatively unmodified with only a small number of drains and no signs of heavy grazing.

The areas which have been subject to greater modification by drainage, with several ditches being clearly present on the ground and on aerial imagery, which has altered the species present, have been mapped as M15/M17 wet heath/blanket mire mosaic community modified and are discussed below, further information for the reasons for a category of modified are provided in Section 3.1.

3.3.9 Wet Modified Bog

M15/M17 Wet Heath/Blanket Mire Mosaic Community Modified

The eastern part of the survey area has been subject to modification, in parts this is much greater due to the increased number of drains cut within the peat and this has caused some changes to the vegetation present. In these areas whilst the vegetation has components which are attributable to the communities M15/M17 but *Molina* in places is more dominant, however the community has more affinity to a M15/M17 mosaic than a M25 *Molinia caerulea-Potentilla erecta* mire. Further details for the reason for defining these areas as modified are given in Section 3.1.

M25 *Molinia caerulea-Potentilla erecta* Mire

This community has been able to develop where heavy grazing and/or extensive drainage has modified the habitats by reducing the water table level on what was once likely to have been M17 valley mire. *Molinia caerulea* is the most abundant species with the general flora associated with this community being species-poor. Rushes are commonly found including *Juncus effusus*. Other species include *Cirsium palustre* and *Holcus lanatus*.

The most extensive tract of this community type has been assigned to an area of relatively deep peat (generally greater than 50 cm) in the centre, east and south of the survey area, which is criss-crossed by a large number of drainage ditches. The ditches have reduced the water table level, on what was likely once an M17 valley mire. The area is now dominated by *Molinia caerulea*, but underneath the leaf litter, abundant *Sphagna* can be found (*S. capillifolium*, *S. palustre* and *S. papillosum*), in conjunction with other mire species such as *Myrica gale*, *Eriophorum vaginatum*, *Erica tetralix* and *Narthecium ossifragum*. Although too small to map as a separate community, the drainage ditches and streams which bisect the M25 are often relatively species-rich, with a range of species including *Cirsium palustre*, *Digitalis purpurea*, *Succisia pratensis*, *Dactylorhiza aculate* and *Galium palustre*.

Overall the M25 community present here is most akin to the M25a *Erica tetralix* community, which is the heathier form, and the most common of the three sub-communities⁵.

M25 *Molinia caerulea-Potentilla erecta* Mire Modified

The central and southern part of the study area still supports the M25 community but is more modified than the other areas of the M25 present within the survey area. The modification has been caused by a greater degree of drainage being present, it is dominated by *Molinia caerulea* and *Potentilla erecta* but *M. caerulea* is the most dominant species within the area. Further details for the reason for defining these areas as modified are given in Section 3.1.

3.3.10 Marsh/Marshy Grassland

M23 *Juncus effusus/Juncus acutiflorus-Galium palustre* Rush Pasture

In the wider survey area this community was associated with watercourses and flushes and/or the transitional margin between the plantation woodland and the heath/mire of the wider survey area. The M23 habitat is also present in some of the wider rides of the plantation woodland which still support some of their original species. The community to the north of the survey area has developed on habitat modified by grazing (sheep and cattle), with the grass sward being kept short by grazing. The vegetation is dominated by patches of *Juncus effusus*, with other areas with abundant *Molinia caerulea*. Moss species can be abundant including *Polytrichum commune*.

This community was found on the steeper, wetter slopes, often adjacent to watercourses. Dominated by both *Juncus effusus* and/or *J. acutiflorus*, some areas were relatively species-rich with *Ranunculus acris*, *Mentha aquatica*, *Succisia pratensis*, *Myosotis palustris* and *Angelica sylvestris* being recorded. Other areas were relatively species-poor, with large amounts of *Ranunculus repens*, *Holcus lanatus* and *Rumex acetosa* growing between the *Juncus acutiflorus* stems. Some of the areas of M23, especially in the western part of the survey area are likely to have derived from converted and limed farmland, which has then been left to revert. The lack of field drainage systems has meant that the water table is high, so *Juncus* species can establish, especially where there is also a lack of mowing or animal grazing.

Both M23 sub-communities are represented within the survey area. The M23a *Juncus acutiflorus* sub-community, which is the richer form, has a range of species including *Lychnis flos-cuculi*, *Succisia pratensis*, *Angelica sylvestris* and *Mentha aquatica* all of which were recorded during the survey. But it is the reverted fields which represent the poor sub-community of M23b the *Juncus effusus* sub-community, where less forbs were recorded, and a greater abundance of *Rumex acetosa*.

MG10 *Holcus lanatus-Juncus effusus* Rush Pasture

This community is present close to the Scotmill, which was once a crofter's cottage/farmstead. The fields adjacent to the cottage are more mesotrophic in nature, with species such as *Juncus effusus*, *Holcus lanatus*, *Poa annua*, *Poa trivialis* and *Ranunculus repens*. It is considered most likely that the habitats here represent the typical sub-community, as it has no distinguishing features to match it with the other two sub-communities described in the NVC system.

3.3.11 Neutral Grassland – Semi-Improved

MG6 *Lolium perenne-Cynosurus cristatus* Grassland

A small area of this community was identified close to the old cottage, as identified above. The areas supporting this community have characteristics of U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland but essentially are closer to MG6 grassland which has developed due to the use of lime. As the area has been left

unfarmed it has begun to revert. As a result, it has characteristics of U1 *Festuca ovina*-*Agrostis capillaris*-*Rumex acetosella* grassland due to the abundance of *Rumex acetosa* but has been classified as MG6 due to its overall species composition. Other species in high abundance include *Holcus mollis* and *Deschampsia flexuosa*, in some locations the rush species *Juncus acutiflorus* is dominant.

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

This community was identified in the west of the survey area, at the highest point of the site, on the slopes above Clachan Burn. The community which is the best fit here is the U6c *Vaccinium myrtillus* sub-community, this is due to the abundance of mosses such as *Rhytidiadelphus loreus*, *Hypnum jutlandicum* and *Pleurozium schreberi* that were present, forming small hummocks. Sprigs of *Vaccinium myrtillus* poked out of the top of these. In flower at the time of survey was also a cover of *Deschampsia flexuosa*, giving this community a grassy feel. *Molinia caerulea* was present too, though not as dense as in the M25 community, and in some areas absent. *Juncus effusus* was also present.

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

The U4 grassland community is present in areas where thinner less peaty soils are present close to Achaglass in the west of the survey area near to the Clachan Burn which has been historically farmed. The patchy U4 grasslands, which lie adjacent to the *Pteridium* patches (see below), are dominated by grasses such as *Agrostis capillaris*, *Anthoxanthum odoratum*, *Deschampsia flexuosa* and *Festuca ovina*. The herb content is quite varied with *Potentilla erecta*, *Galium saxatile*, *Conopodium majus* and *Prunella vulgaris*. In some areas, *Alchillea millefolium* became quite dominant and in others, the moss *Pleurozium schreberi* was present below the forbs.

Other areas which have been mapped as U4 are those which appear to be part of a reverted farm system. Historically as land has been ploughed and limed, more agriculturally productive farmland may be created. But over time, as the land has been left unmanaged, they have started to revert. As a result, the U4 which occupies the old field enclosures on the western boundary of the survey area, was potentially MG6 a mesotrophic grassland, which is reverting back to an acid U4 grassland. The species diversity here was less, but it is still an acid grassland, carrying many of the indicator species of the unimproved U4 elsewhere in the survey area. The dominant species here were *Holcus lanatus*, *Rumex acetosa*, *Deschampsia flexuosa* and *Potentilla erecta*. Essentially the species composition was also quite similar to the U1 *Festuca ovina* – *Agrostis capillaris* – *Rumex acetosella* grassland, however it is considered more likely to be U4 than U1, due to the absence of species such as *Pilosella officinarum* and *Senecio jacobaea*.

3.3.12 Tall Herb and Fern Continuous – Bracken

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

This habitat is widespread across the area close to Achaglass in the west of the survey area, which has been historically farmed. This community is present on the thinner stonier soils. Where the *Pteridium* doesn't grow, the community is generally assessed to be U4 grassland, but where there is dense cover of bracken for most of the summer, the community is classified as U20. During the surveys, evidence of *Hyacinthoides non-scripta* was also found, as is often the case in Scotland where it isn't always associated with woodland.

3.3.13 Swamp

S4 – *Phragmites australis* swamp and reedbed community

There is one area of this community present at one of the lochans within the plantation woodland. It was present around the margins of the waterbody at the transition between the open water of the lochan and the surrounding mire habitat. It is a relatively species-poor habitat dominated by *Phragmites australis* at the water's edge. As the habitats transition from water and the ground transitions from being permanently submerged in water towards to surrounding plantation woodland which is slightly elevated, other species become increasingly dominant including *Hydrocotyle vulgaris*, *Eriophorum angustifolium* and *Cardamine pratensis*. Further from the edge of the waterbody species which prefer less water-logged conditions increase including *Calluna vulgaris*, *Vaccinium myrtillus* and *Holcus lanatus*.

4.0 Discussion and Conclusions

The 1,248 ha survey area supports over 323 ha of coniferous plantation or recently felled coniferous plantation. These areas were not subject to NVC survey.

The NVC survey results show that the remainder of the survey area is predominantly covered with peatland habitats, including blanket mire, and wet modified bog, swamp and marshy grassland communities. In addition, there are smaller areas of semi-improved neutral grassland, unimproved acid grassland and bracken present. **Table 4.1** sets out a summary of the NVC communities present and the most closely associated Phase 1 habitat code.

A number of heath and bog habitats are listed on Annex 1 of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora). The habitats listed in Annex 1 of the Directive are natural habitat types whose conservation requires the designation of Special Areas of Conservation and are generally regarded as being of European importance. Those communities representing Annex 1 habitats are indicated in **Table 4.1** with further information provided in **Table 4.2**. With regard to peatland habitats which have been more heavily modified, e.g. the areas mapped as modified M15/M17 and modified M25, a precautionary approach has been taken and these have been included in the table as Annex 1 habitats. Three of the community types identified represent Annex 1 habitats. The Scottish Biodiversity List⁹ (SBL) is a list of animals, plants and habitats which Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The purpose of the list is to identify species and habitats which are the highest priority for conservation in Scotland. Habitats listed on the SBL are also highlighted in **Table 4.1**.

Table 4.1 also highlights the likely groundwater dependence of each community, based on current SEPA guidance². M23 has high potential to be dependent on groundwater and three communities, M15, M25, MG10 and U6 have moderate potential. Their locations are shown on **Figure 8.1.3.1**¹⁰. The remainder of habitats are classified by SEPA as having low or no groundwater dependence.

It must be stressed that the NVC survey is only able to identify communities which are potentially groundwater dependent and in practice some of the areas shown in **Figure 8.1.3.1** may not actually represent GWDTEs. Current SEPA guidance states that, "if any GWDTEs are located within a radius of (i) 100 m from roads, tracks and trenches or (ii) 250 m from borrow pits and foundations the likely impact of these features will require further assessment". Further assessment of potential GWDTEs is presented in the Hydrology, Hydrogeology, Geology

⁹ SBL (2013) Scottish Biodiversity List [online] Available at: <http://www.biodiversityscotland.gov.uk> [Accessed 15 December 2015]

¹⁰ A precautionary approach has been adopted whereby mosaics containing one or more communities likely to be groundwater dependent are also shown on **Figure 8.1.3.1**.

and Soils chapter (Chapter 10) of the EIA Report.

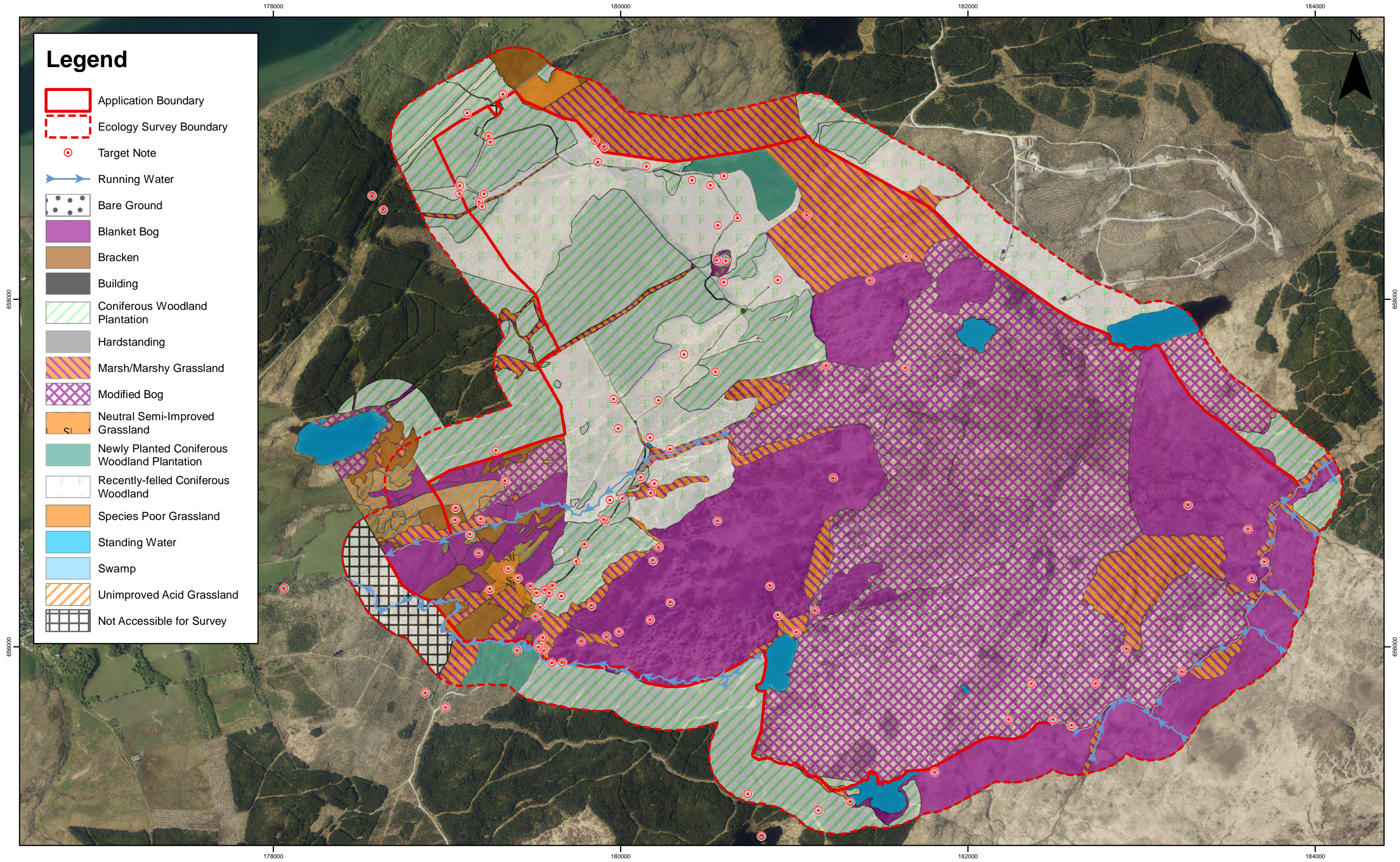
Table 4-1
NVC Communities recorded, aligned with Phase 1 habitat classification, likely Groundwater Dependency and Conservation Status

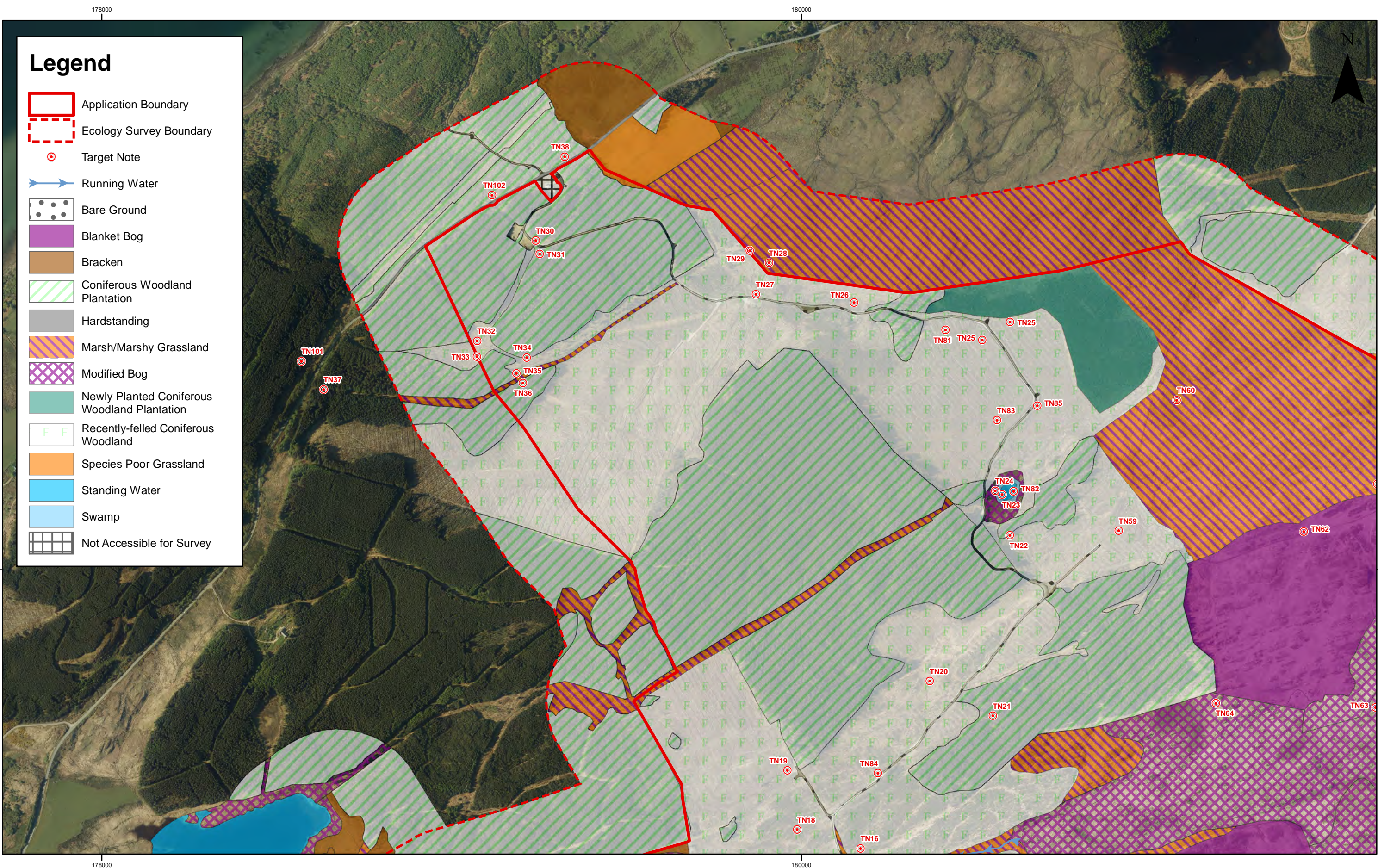
NVC Community Number	NVC Community Name	Phase 1 Habitat Category	Likely Groundwater Dependency	Conservation Status
M15	<i>Scirpus cespitosus-Erica tetralix</i> wet heath	E1.6.1	Moderate	Annex 1 SBL
M17	<i>Scirpus cespitosus-Eriophorum vaginatum</i> blanket mire	E1.6.1	-	Annex 1 SBL
M25	<i>Molinia caerulea-Potentilla erecta</i> mire	E1.7	Moderate	Annex 1 SBL
M23	<i>Juncus effusus-Juncus acutiflorus-Galium palustre</i> rush pasture	B5	High	SBL
MG10	<i>Holcus lanatus-Juncus effusus</i> rush pasture	B5	Moderate	SBL
MG6	<i>Lolium perenne – Cynosurus cristatus</i> grassland	B2.2	-	-
U4	<i>Festuca ovina-Agrostis capillaris-Galium saxatile</i> grassland	B1.1	-	-
U6	<i>Juncus squarrosus-Festuca ovina</i> grassland	B1.1	Moderate	SBL
U20	<i>Pteridium aquilium-Galium saxatile</i> community	C1.1	-	-
S4	Swamp and reed beds	F1	-	-

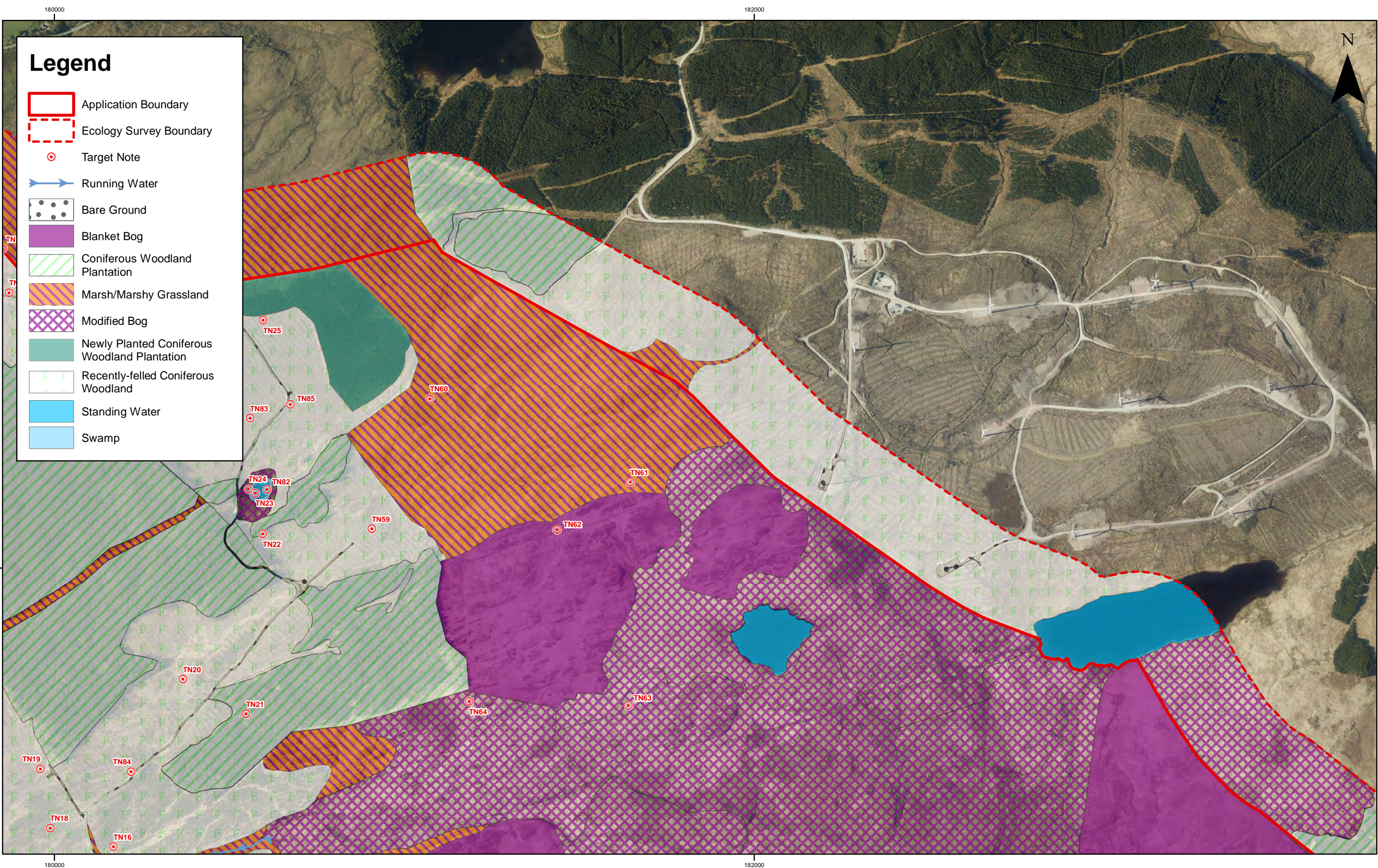
Table 4-2
Annex 1 Habitat Types present within the Survey Area

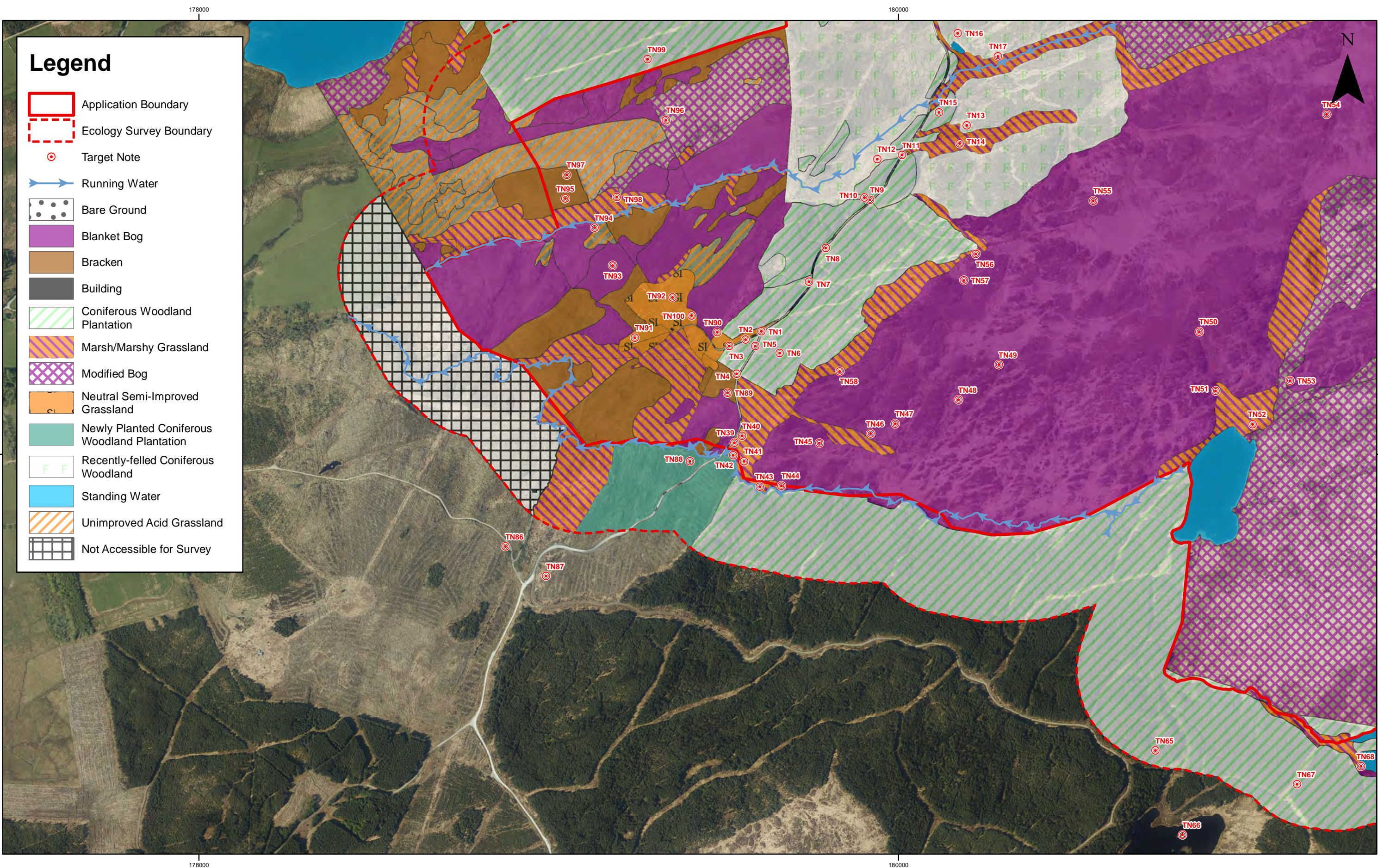
NVC Community Number	NVC Community Name	Annex 1 Habitat Type
M15	<i>Scirpus cespitosus-Erica tetralix</i> wet heath	H7130 – Blanket Bog H4010 – Northern Atlantic wet heaths with <i>Erica tetralix</i>
M17	<i>Scirpus cespitosus-Eriophorum vaginatum</i> blanket mire	H7130 – Blanket Bog
M25	<i>Molinia caerulea-Potentilla erecta</i> mire	H7120 – Degraded raised bog still capable of natural regeneration

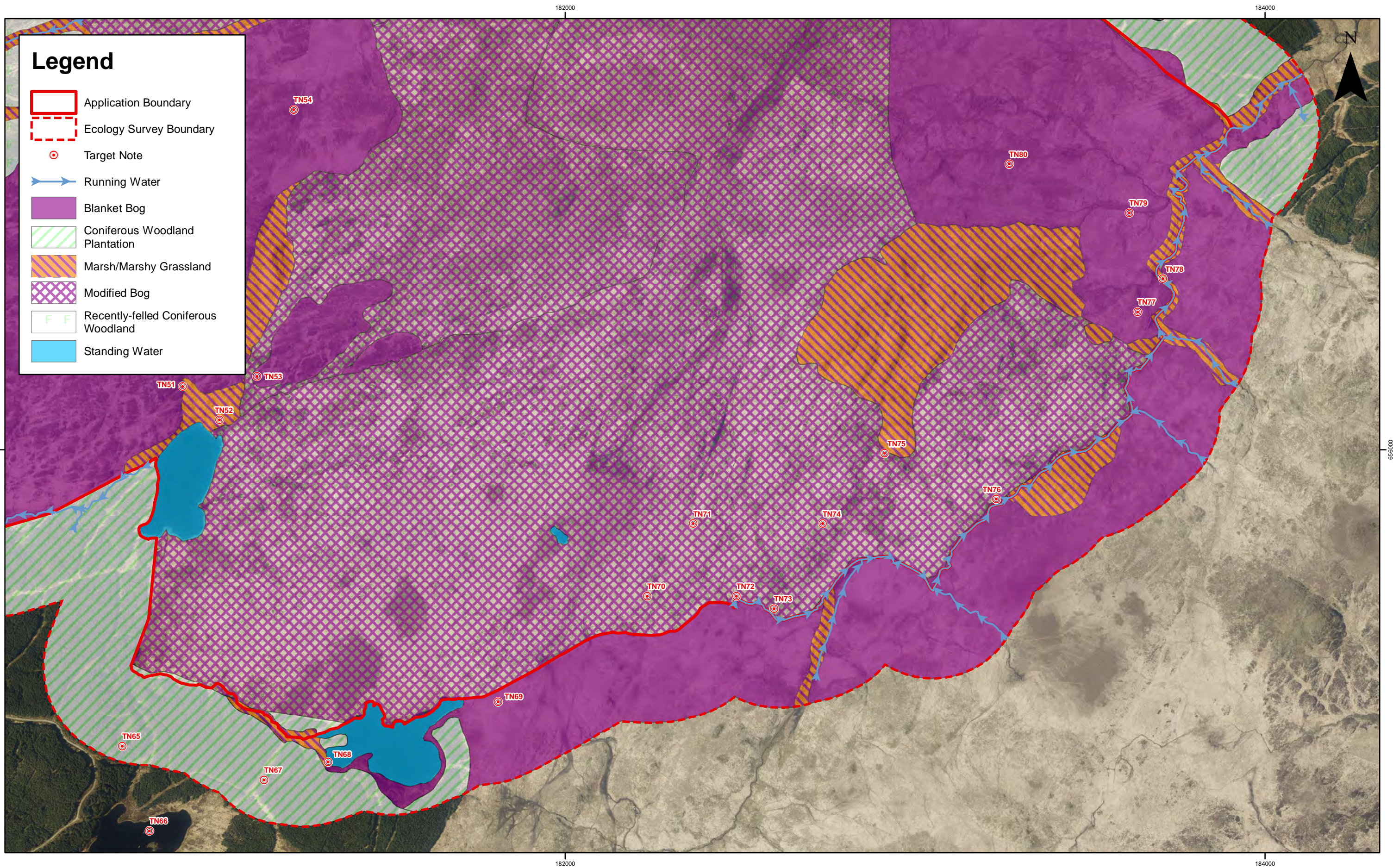
FIGURES





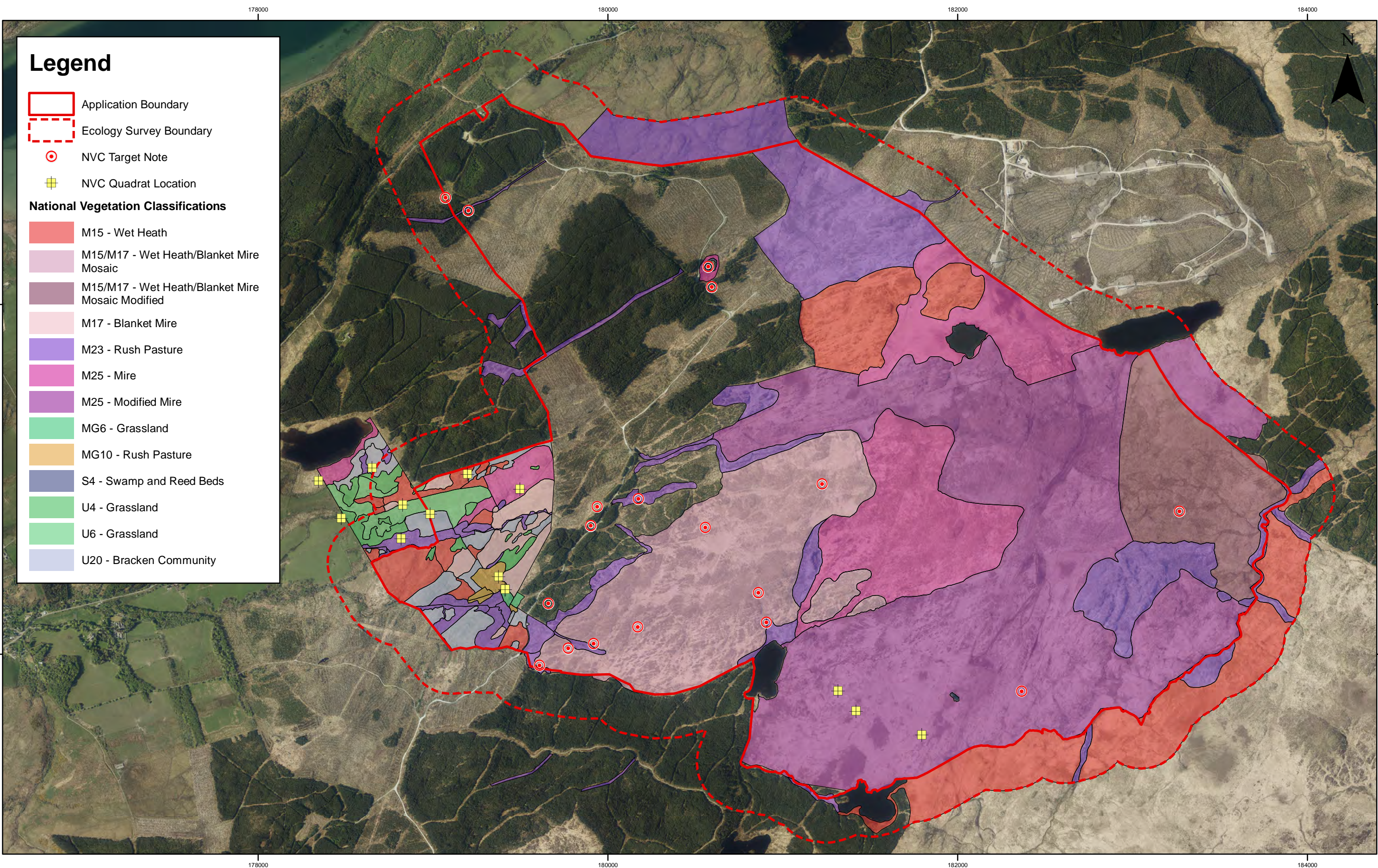








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								Rev	A	Datum:	
	A	07/10/19	JRS	First Issue.	© Crown Copyright 2019. All rights reserved. Ordnance Survey Licence 0100031673.			Date	07/10/19	OSGB36	
	Rev	Date	By	Comment				Figure	8.1.1.5	Projection: TM	



Legend

Application Boundary

Ecology Survey Boundary

NVC Target Note

NVC Quadrat Location

National Vegetation Classifications

M15 - Wet Heath

M15/M17 - Wet Heath/Blanket Mire Mosaic

M15/M17 - Wet Heath/Blanket Mire Mosaic Modified

M17 - Blanket Mire

M23 - Rush Pasture

M25 - Mire

M25 - Modified Mire

MG6 - Grassland

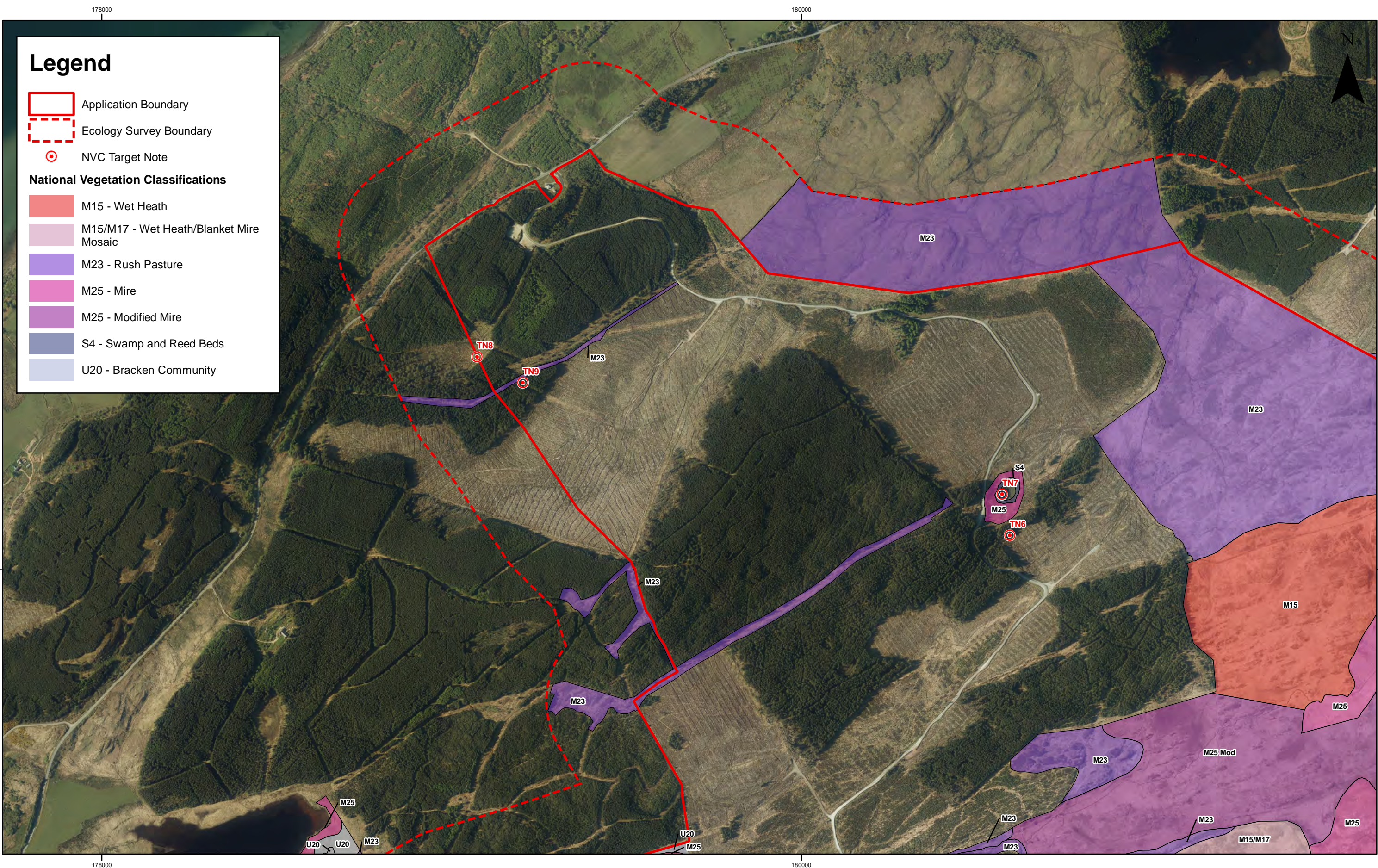
MG10 - Rush Pasture


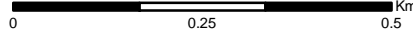
S4 - Swamp and Reed Beds

U4 - Grassland

U6 - Grassland

U20 - Bracken Community



					1:10,000 Scale @ A3	 © Crown Copyright 2019. All rights reserved. Ordnance Survey Licence 0100031673.	Sheirdrim Renewable Energy Development - EIAR Phase 1 Habitat and NVC Survey Report National Vegetation Classification Communities	Drg No	00481.00051.8.1.2.0	
								Rev	A	Datum:
	A	07/10/19	JRS	First Issue.				Date	07/10/19	OSGB36
	Rev	Date	By	Comment				Figure	8.1.2.2	Projection: TM

