

TECHNICAL APPENDIX 8.5

Kilgallioch Windfarm Extension

Northern Access Track Ecology Survey
Report



ScottishPower Renewables

9th Floor ScottishPower Headquarters

320 St Vincent Street

Glasgow

G2 5AD

ITP Energised

7 Dundas Street

Edinburgh

EH3 6QG

Registration Number: SC450178

Tel: 0131 557 8325

© Copyright 2019. The concepts and information contained in this document are the property of Energised Environments Limited. Use or copying of this document in whole or in part without the written permission of Energised Environments Limited constitutes an infringement of copyright. ITP Energised is a trading name for the legal entity Energised Environments Limited.

Limitation: This report has been prepared solely for the use of the Client and any party with whom a warranty agreement has been executed, or an assignment has been agreed. No other parties may rely on the contents of this report without written approval from Energised Environments Limited, for which a charge may be applicable.

Energised Environments Limited accepts no responsibility or liability for the consequences of use of this document for any purpose other than that for which it was commissioned, nor the use of this document by any third party with whom an agreement has not been executed.



Table of Contents

Executive Summary	3
1 Introduction	4
1.2 Site Description	4
2 Legislation and Guidelines	4
2.2 Legislation	4
2.3 Best Practice Ecological Guidance	5
2.4 Biodiversity Priorities	5
3 Methods	6
3.1 Extended Phase 1 Habitat Survey	6
3.2 Protected or otherwise notable species	6
3.3 Survey Limitations	7
4 Results	7
4.1 Habitat Survey	7
4.2 Protected or Otherwise Notable Species	8
5 Discussion	10
5.1 Habitats	10
5.2 Protected or Otherwise Notable Species	10
6 References	11
Figure TA_8.5.1: Phase 1 Habitat Survey and Target Notes	12
Figure TA_8.5.1: Pond Suitability for Great Crested Newt	13
Annex A: Target Notes	14
Annex B: Plant Species Recorded in the Survey	22

Executive Summary

ITPenergised was commissioned by ScottishPower Renewables (SPR) to carry out an extended Phase 1 habitat and protected species survey in relation to the proposed northern access track to the proposed Kilgallioch Windfarm Extension Site, located approximately 9.5 km to the north west of Kirkcowan, Dumfries and Galloway (hereafter referred to as the 'Site').

This report describes the methods used to gather and record habitat and protected species baseline information for the Site and wider Study Area and summarises the findings of the survey.

The Site consists of commercial coniferous plantation woodland, mixed plantation woodland, scattered coniferous woodland, felled coniferous woodland, unimproved acid grassland, marsh grassland, continuous bracken, running water, buildings and bare ground. Whilst there are a relatively diverse range of species present, they are considered to be common and widespread.

No evidence of otter activity was identified within the Study Area. There are several watercourses throughout the Study Area. Given the connectivity of the watercourses to the wider area, notably Tarf Water located to the south of the Study Area, Pullower Burn to the north and Long Loch, Black Loch, Craigie Loch and Loch Martle to the north east, otter could forage and commute throughout the Study Area. The larger of the watercourses on Site, Pullower Burn, could support otter for foraging and commuting as well as holt construction. However, the majority of the watercourses within the Site are considered small and only suitable in terms of commuting otter.

No evidence of badger activity was identified within the Study Area. Given the high mobility of badger they could commute and forage throughout the Study Area. The marshy grassland and deforested areas are unsuitable for sett building due to the wetland habitat and flat topography. However, the coniferous plantation woodland could be used to construct setts in areas of suitable substrate conditions.

No evidence of any water vole activity was recorded during the survey. Many of the watercourses throughout the Site flowed through marshy grassland and could be used by water vole. However, some of the watercourses are small and overgrown and, as such, are considered suboptimal for water vole. Water vole were recorded on the Tarf Water and some of the connected smaller watercourses during the protected mammals survey of the main Site (see Technical Appendix 8.2) and, given the connectivity of the watercourses to the wider area, water vole could move into the Study Area in the future.

No evidence of pine marten was recorded during the survey. Pine marten could use the coniferous and mixed woodland within the Study Area to forage, commute and construct dens (particularly in areas of wind-throw).

No evidence of red squirrel was recorded during the survey. Squirrels could use the coniferous and mixed woodland within the Study Area to forage and construct dreys.

No evidence of any reptiles or amphibians were recorded during the survey. The marshy grassland and wetland habitat provides suitable habitat for reptiles and amphibians.

1 Introduction

1.1.1 ITP Energised was commissioned by ScottishPower Renewables (SPR) to carry out an extended Phase 1 habitat and protected species survey in relation to the proposed northern access track to the proposed Kilgallioch Windfarm Extension Site, located approximately 9.5 km to the north west of Kirkcowan, Dumfries and Galloway (hereafter referred to as the 'Site'). The Site has central Ordnance Survey Grid Reference NX 23237 74393.

1.1.2 The purpose of the survey was to document the habitats present within the Site and a 150m survey buffer (the 'Study Area') and determine the likely/potential presence of protected or otherwise notable species. The survey was extended up to 250m from the Site boundary to survey for evidence of protected or otherwise notable animal species, as well as features with the potential to support them.

1.1.3 This report describes the methods used to gather and record habitat and protected species baseline information for the Site and wider Study Area and summarises the findings of the survey.

1.2 Site Description

1.2.1 The proposed northern access route is located within the operational Kilgallioch Windfarm, which is located within South Ayrshire while the track route passes south towards the Site and crosses the regional boundary into Dumfries and Galloway. The habitats within the Study Area predominantly comprise commercial forestry, although marshy grassland, unimproved grassland, wet heath, continuous bracken, running water and bare ground (consisting of track, quarries and concrete hard standing) was also recorded. Several watercourses are present throughout the Site including tributaries associated with Tarf Water in the south of the Study Area and tributaries associated with Pullower Burn and Black Loch in the north.

2 Legislation and Guidelines

2.1.1 An overview of relevant legislation, policy and guidance is provided below.

2.2 Legislation

2.2.1 Full consideration has been given to all relevant nature conservation legislation when carrying out this assessment. This includes the following:

- The Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) 1992 (92/43/EEC);
- Directive of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (2009/147/EC);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Wildlife and Countryside Act 1981 (as amended);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Protection of Badgers Act 1992 (as amended); and
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended).

Otter

2.2.2 Otter (*Lutra lutra*) is protected under Schedule 5 of The Wildlife and Countryside Act 1981 (as amended) and receives protection under Section 9 of the Act. Otter is also a European Protected Species and so afforded protection under the Conservation (Natural Habitats, &c.) Regulations 1994. As such, it is an offence to deliberately or recklessly:

- Capture, injure or kill an otter;

- Harass an otter or group of otters;
- Disturb an otter in a holt or any other structure or place it uses for shelter or protection;
- Disturb an otter while it is rearing or otherwise caring for its young;
- Obstruct access to a holt or other structure or place otters use for shelter or protection, or otherwise deny the animal use of that place;
- Disturb an otter in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species; and
- Disturb an otter in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

2.2.3 It is also an offence to:

- Damage or destroy a breeding site or resting place of such an animal (whether deliberately or recklessly); and
- Keep, transport, sell or exchange, or offer for sale or exchange any wild otter (or any part or derivative of one) obtained after 10 June 1994.

2.2.4 It should be noted that otter shelters are legally protected whether an otter is present or not.

Water Vole

2.2.5 Water vole (*Arvicola amphibius*) receives partial protection through its listing on Schedule 5 of The Wildlife and Countryside Act 1981 (as amended). In Scotland, this legal protection is currently restricted only to the water voles' places of shelter or protection; it does not extend to the animal itself. It is an offence to intentionally or recklessly:

- Damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection; or
- Disturb a water vole while it is using any such place of shelter or protection.

Badger

2.2.6 Badger (*Meles meles*) are fully protected under the Protection of Badgers Act 1992 amended by the Wildlife and Natural Environment (Scotland) Act 2011, which makes it an offence to:

- Take, injure or kill a badger;
- Possess or cruelly ill-treat a badger;
- Interfere with a badger sett;
- Sell and possess a live badger; and
- Mark and ring a badger.
- Interfering with a badger sett includes:
 - Damaging or destroying a sett or any part of it;
 - Obstructing access to a sett;
 - Disturbing a badger whilst it is in a sett; and
 - Causing or allowing a dog to enter a badger sett.

2.2.7 Should such actions be undertaken, despite having no intention to do so, they would still be considered an offence.

2.2.8 The 1992 Protection of Badgers Act defines a badger sett as "any structure or place which displays signs indicating current use by a badger". A sett in an occupied territory is therefore classified as being in current use even if it is only used seasonally or occasionally by badgers, and it is afforded the same protection as an inhabited sett.

Pine Marten

2.2.9 Pine marten (*Martes martes*) are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Additionally, certain methods of killing or taking pine martens is illegal under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

2.2.10 It is an offence to intentionally or recklessly:

- kill, injure or take a pine marten;
- damage, destroy or obstruct access to a nest or den – i.e. any structure or place which such an animal uses for shelter or protection; and
- disturb such an animal when it is occupying a nest or den for shelter or protection (except when this is inside a dwelling house).

2.2.11 It is also an offence to:

- possess or control, sell, offer for sale or possess or transport for the purpose of sale any living or dead pine marten or any derivative of such an animal; and
- knowingly cause or permit any of the above acts to be carried out.

Red Squirrel

2.2.12 It is an offence to intentionally or recklessly:

- kill, injure or take a red squirrel (*Sciurus vulgaris*);
- damage, destroy or obstruct access to a drey or any other structure or place which a red squirrel uses for shelter or protection; and
- disturb a red squirrel when it is occupying a structure or place for shelter or protection.

2.2.13 It should be noted that this protection does not apply to areas where red squirrels only feed.

2.2.14 It is also an offence to:

- possess or control, sell or offer for sale, or possess or transport for the purpose of sale any living or dead red squirrel or any derivative of such an animal;
- release a grey squirrel into the wild; and
- knowingly causing or permitting any of the above acts to be carried out is also an offence.

2.3 Best Practice Ecological Guidance

2.3.1 As part of the baseline report, cognisance has been taken of the Chartered Institute of Ecology and Environmental Management (CIEEM) good practice guidelines, notably the standard methods developed for Preliminary Ecological Appraisals (CIEEM, 2017) and Ecological Impact Assessment (CIEEM, 2018).

2.3.2 Phase 1 habitat survey follows the standard Joint Nature Conservation Committee methodology (JNCC, 2010).

2.3.3 As part of the protected species survey, cognisance has been taken of the following best practice guidelines and survey method publications:

Otter

- Competencies for Species Survey: Otter (CIEEM, 2013a); and
- Monitoring the Otter *Lutra lutra* (Chanin, 2003).

Water Vole

- Competencies for Species Survey: Water Vole (CIEEM, 2013b); and

- The Water Vole Mitigation Handbook (the Mammal Society, 2016).

Badger

- Competencies for Species Survey: Badger (CIEEM, 2013c); and
- Surveying for Badgers: Good Practice Guidelines (Scottish Badgers, 2018).

Pine Marten

- Competencies for Species Survey: Pine Marten (CIEEM, 2013d);
- National Pine Marten Survey of Ireland 2005 (O’Mahony, O’Reilly and Turner, 2006); and
- A guide to Identifying evidence of Pine Martens in Wales (Vincent Wildlife Trust, 2017).

Red Squirrel

- Red squirrel conservation: Field study methods (Gurnell and Pepper, 1994); and
- Practical Techniques for Surveying and Monitoring Squirrels (Gurnell et al, 2009).

2.4 Biodiversity Priorities

Scottish Biodiversity List

2.4.1 Scottish Ministers created the Scottish Biodiversity List (SBL) (Scottish Government, 2013) in 2005 to satisfy the requirements under Section 2(4) of the Nature Conservation (Scotland) Act 2004 and assist public bodies in carrying out conservation of biodiversity, as well as to provide the general public with information regarding conservation within Scotland. The SBL comprises species and habitats listed using both scientific and social criteria. Only scientific criteria are considered relevant to this report. They include the following:

- All UK Priority Species present in Scotland;
- Species which Scotland has an international obligation to safeguard;
- All species defined as nationally rare at a UK level that are present in Scotland;
- Species with populations present (resident, wintering or breeding) in 5 or fewer 10km squares or sites in Scotland;
- All species that are endemic to Scotland;
- Any sub-species or race that is widely recognised and accepted by the scientific (or other relevant) community and that is endemic to Scotland, if it also meets one of the other criteria; and
- Natural and semi-natural habitats that are known to be particularly important for supporting assemblages of plant or animal groups that are data deficient, such as fungi, bryophytes, lichens, algae and invertebrates.

Local Biodiversity Reporting

Dumfries and Galloway Local Biodiversity Action Plan

2.4.2 The Dumfries and Galloway LBAP covers the majority of the Study Area with the exception of the northern most section of the Site that falls within the region of South Ayrshire.

2.4.3 The Dumfries and Galloway LBAP was published in 2009 and aims to:

- ‘identify and address strategic and/or pan-Dumfries and Galloway biodiversity issues;
- review and monitor biodiversity actions contained within the LBAP, with reference to the Scottish Biodiversity Strategy Implementation Plans.
- provide a link between local groups and national biodiversity strategies, action plans and reporting procedures; and

- raise awareness and promote biodiversity by championing individual actions and biodiversity issues generally.' (Dumfries and Galloway Local Biodiversity Partnership, 2009)

2.4.4 The LBAP outlines action for five habitat types relevant to the study area listed as:

- Forest habitat networks;
- Lowland rivers and backwaters;
- Lowland Burns and Ditches Acid Grasslands
- Marshes; and
- Conifer plantations.

2.4.5 The LBAP lists otter, water vole and red squirrel as local priority species and recognises that whilst badger are listed as important in the Scottish Biodiversity Strategy, they are not considered to be locally threatened.

Ayrshire Biodiversity Action Plan

2.4.6 The current edition of the Ayrshire Biodiversity Action Plan 2007 – 2010 (South Ayrshire Council, 2008) is a revised edition of the original document produced by the Ayrshire Biodiversity Group in 2001 and it includes a comprehensive suite of Habitat Action Plans for 26 habitat types which together cover almost all habitat types found within the three unitary authorities of North, East and South Ayrshire.

2.4.7 The LBAP outlines action for two habitat types relevant to the study, listed as:

- Rivers and Streams; and
- Planted Conifers.

2.4.8 The LBAP also lists otter, water vole and red squirrel as key Ayrshire species.

3 Methods

3.1 Extended Phase 1 Habitat Survey

3.1.1 An extended Phase 1 habitat survey was carried out on the Site and 150m buffer (access permitting) on the 30th September and 1st October 2019, by a qualified and experienced ecologist, using the standard JNCC survey methodology (JNCC, 2010) to map each of the habitats present within the Survey Area. The vegetation was described in a series of georeferenced target notes (TNs), with plant nomenclature following Stace (2010). Target notes were also produced to describe notable habitats too small to be mapped (i.e. <0.1ha).

3.1.2 The survey also recorded evidence of protected or otherwise notable species, as well as habitats or features with the potential to support such species within the Survey Area. Birds and other animals were identified and recorded on an ad hoc basis.

3.1.3 Whilst not a full botanical or protected species survey, the field walkover survey enables experienced ecologists to obtain an understanding of the ecology of a site, such that it is possible to:

- Confirm the nature conservation significance of a site and assess whether the potential for impacts on habitats/species is likely to represent a material consideration in planning terms; or
- Establish the scope and extent of any additional specialist ecological surveys that may be required, before such a confirmation can be made.

3.2 Protected or otherwise notable species

Otter

3.2.1 A thorough search was undertaken of the riparian zone and up to 20m away from the water's edge (where suitable habitat was found to be present). Throughout the survey, overhanging banks, cavities, bankside vegetation and riparian features, such as boulders and mud, were searched for the following signs of otter use:

- Spraints – otter dung, which is used for marking territories, is often located on prominent features within the channel or on the bank (including weirs, bridges, rocks, tree roots, watercourse confluences, etc.); and
- Footprints – located in soft mud, silt or sand banks.

3.2.2 Other potential evidence of otter presence was also searched for in the survey. The following signs, when interpreted in conjunction with spraints and footprints, can provide data to support an assessment of otter activity on a site. They cannot, however, be used in isolation to definitively indicate otter presence/absence:

- Resting-up places – comprising couches (areas of flattened vegetation) or hovers (lay-up areas, including ledges under rocks or hollows under fallen trees or roots).
- Potential holt sites – holes or dens;
- Runs and trails – pathways from the water into dense cover or around bankside trees;
- Slides – down banks as an entry to waterbodies; and
- Feeding remains – e.g. remains of fish and amphibians.

Water Vole

3.2.3 A thorough search was undertaken in the riparian zone and up to 20m away from the water's edge for evidence of water voles.

3.2.4 Potential evidence of water vole searched for included the following:

- Latrines – water vole droppings are often concentrated in discreet latrine sites near the nest, at range boundaries and places where they regularly enter and exit the water;
- Feeding stations and feeding remains – feeding remains in the form of neat piles of chewed lengths of vegetation are often found in runways and at haul-out platforms;
- Tunnel/burrow entrances – these are typically found along the water's edge on top of the bank up to 5m from the water's edge. Holes on top of the banks often have grazed 'lawns' around them;
- Paths and runs at the water's edge;
- Footprints – these may be identified in soft mud or silt;
- Sightings and or sounds of water voles entering the water; and
- Droppings – while most droppings will be deposited in latrines, some may also be found scattered along runways in vegetation.

3.2.5 Specifically, for watercourses, the approximate depth and speed of water flow, the waterway width, bankside vegetation and surrounding land use, was also recorded, as these factors may determine the suitability of habitat for supporting water voles.

3.2.6 It should be noted that any single field sign recorded in isolation, especially when ambiguous (e.g. a burrow or footprints) would not be definitive in confirming presence.

Badger

3.2.7 As part of the survey, field signs including setts, day beds, badger faeces in dung pits, as well as evidence of foraging, badger paths, scratching posts, hair and footprints were actively searched for. The survey was based on the

methods described by Scottish Badgers (2018). The survey included all hedgerows, field boundaries, watercourses, paths and other linear features within the Study Area.

3.2.8 On identification of a badger sett, the observer noted the number of entrances, in addition to a description of the activity level and status of the sett. The status of a sett was evaluated and determined based on descriptions presented in Scottish Badgers good practice guidelines (2018), which assigns setts into one of four categories:

- Main sett (used throughout the year and constitutes the main breeding sett);
- Annexe sett (forms part of the main sett area, but is not directly linked by an underground passage to the main sett, either due to a barrier (e.g. separated by a watercourse or ditch) or by distance);
- Subsidiary sett (offers an alternative large sett complex to the main sett but is usually although not always at least 50m away and are not always obviously linked by a well-used path); and
- Outlier sett (often comprising just one or two holes and is infrequently used by badgers).

3.2.9 Each sett entrance is classified according to its degree of usage:

- Well used: are clear of vegetation and debris, sides worn smooth but not necessarily excavated recently;
- Partially used: not in regular use and have debris in the entrance; and
- Disused: not in use for some time, are partially blocked and could not be used without considerable effort.

3.2.10 It should be noted that the status of a badger sett can change over a relatively short period of time. For example, some badger social groups will move the location of the main sett to other less used setts within their territory in response to external factors, such as disturbance.

Pine Marten

3.2.11 As part of the survey, field signs, including scats and potential den sites, were actively searched for. Differences between field signs of pine marten and other species can be determined in a number of different ways.

- Scat – Found in areas of woodland and forest tracks and are used as territorial markers. Pine marten scats can be differentiated from other similar species such as fox due to aroma, size and constituent parts as they tend to be made up of a variety of food including eggs, insects, berries and bone, although definitive identification can require DNA testing;
- Footprints – Pine marten are mustelids so have five toes compared to species that may be mistaken including fox and dog, both of which have four toes; and
- Den Sites – Pine martens prefer to utilise woodland habitats where they can use their climbing abilities to access tree cavities, squirrel dreys and areas of wind-throw. Evidence of use may also be seen from prey remains surrounding den sites including feathers and small mammal bones.

Red Squirrel

3.2.12 As part of the survey, all suitable red squirrel habitat within the Study Area was searched for:

- Dreys or dens (hereafter "dreys");
- Prints; and
- Evidence of feeding activities, such as knawed pine cones.

3.3 Survey Limitations

3.3.1 The survey took place towards the end of the optimal survey period for water vole, although this is not considered to represent a constraint to the survey results as it is possible to survey for this species until November. Site conditions were suitable for survey, with no heavy rain preceding survey to potentially wash away field evidence such as otter spraints, for example. As such, no survey limitations were identified.

4 Results

4.1 Habitat Survey

4.1.1 The results of the habitat survey are presented below and shown in Figures TA_8.5.1 and 8.5.2, which illustrate the location and extent of all habitat types recorded within the Site boundary and 150m survey buffer. Target note (TN) locations are also shown and described in Appendix A. See Appendix B for a full species list, where (for purposes of brevity) the scientific names of plants mentioned in the report text below are also provided.

4.1.2 The following 10 habitat types were found to be present within the Study Area and are described below:

- Coniferous plantation woodland;
- Mixed plantation woodland;
- Scattered coniferous woodland;
- Recently-felled coniferous woodland;
- Unimproved acid grassland;
- Marshy grassland;
- Continuous bracken;
- Running water;
- Buildings; and
- Bare ground.

Coniferous plantation woodland

4.1.3 Commercial coniferous plantation forestry is predominant habitat throughout the Study Area, with species comprising almost entirely of Sitka spruce. Some areas have suffered wind blow and have several fallen trees as a result (TN1 and TN2).

Mixed plantation woodland

4.1.4 A small coupe of mixed plantation woodland, comprising silver birch, Sitka spruce and Norway spruce, is located to the north of the existing Kilgallioch Windfarm substation (TN3).

Scattered coniferous woodland

4.1.5 A small area of scattered coniferous woodland is present to the east of the access track. The species here include predominantly Sitka spruce, although the ground vegetation beneath the canopy comprises marshy grassland dominated by soft-rush (TN4).

4.1.6 An additional small coupe of scattered coniferous woodland (comprising Sitka spruce, Norway spruce and Douglas fir) is present below the quarry in the south of the Study Area (TN5). The underlying vegetation comprised marshy grassland and was dominated by soft-rush.

Recently-felled coniferous woodland

4.1.7 Recently-felled coniferous woodland was present throughout the Study Area and consisted of felled Sitka spruce. The ground vegetation formed marshy grassland dominated by soft-rush. Other species found here include rosebay willowherb, broad-leaved dock, tufted hair-grass, wavy hair-grass, sheep's fescue and common dandelion (TN6).

4.1.8 A further area of felled coniferous woodland was also located at TN7 and was found to be thick with regenerating Sitka spruce of approximately 1.5m in height.

Unimproved acid grassland

- 4.1.9 Unimproved grassland was present to the east of the substation and comprised sheep's fescue, wavy hair-grass, bracken, broad leaved dock, foxglove and rosebay willowherb. There was a sheep fold and single standing silver birch tree present at the centre (TN8).
- 4.1.10 Further unimproved grassland is present to the east of the quarry in the centre of the Study Area. Species include tufted hair-grass, sheep's fescue, broad-leaved dock, colt's-foot, bramble and common dandelion. Grey willow is also occasional throughout the grassland (TN9).

Marshy grassland

- 4.1.11 Marshy grassland was recorded along much of the access track in the south of the Study Area and was dominated by soft-rush. Other species recorded here included cock's-foot, marsh thistle, sheep's fescue, broad-leaved dock, wavy hair-grass and common dandelion. Grey willow, young Sitka spruce, heather and bramble were also occasionally recorded (TN10 and TN12).
- 4.1.12 Further north, along each side of the access track the marshy grassland comprised soft-rush, heather, blaeberry, sheep's fescue, wavy hair-grass and bracken. Grey willow and Sitka spruce regen were also frequent along the edges of these areas. To the west of the access track the marshy grassland also contained tufted hair-grass, broad-leaved dock and bramble (TN11).
- 4.1.13 Further areas of marshy grassland are present within more open ground (TN13, TN14) and woodland rides and fire breaks. Although dominated by soft-rush, other species found here include Grey willow, Butterfly-bush and scotch broom. Grey willow was frequent along the length of Pullower Burn (TN13).
- 4.1.14 An area of marshy grassland was found to also support dense stands of bog myrtle, as well as soft-rush, in the north west of the study area (TN14). Other species found here include grey willow, tufted hair-grass, rosebay willowherb and young Sitka spruce. Bulrush is also present within the marshy grassland along the edges of the watercourse flowing from Long Loch to Pullower Burn (TN15).

Continuous bracken

- 4.1.15 Stands of continuous bracken is present amongst areas of mixed woodland and unimproved grassland to the east and south of the substation building (TN8) as well as the unimproved grassland to the east of the quarry in the centre of the Study Area (TN9).

Running water

- 4.1.16 A watercourse flows from the east, under the access track and continues south west towards the Tarf Water. It is small and overgrown (TN16).
- 4.1.17 A watercourse in the south of the Study Area has overhanging banks and originates in the east and flows south west towards Tarf Water (TN17).
- 4.1.18 A watercourse flows from west to east through areas of deforested coniferous woodland. The watercourse is small and overgrown, located north of the quarry in the centre of the Study Area (TN18).
- 4.1.19 A small waterfall is present in the north of the Study Area located to the south of the access track and flows underground at the track. Where the water gathers and pools at the base of the falls bulrush is present (TN19).
- 4.1.20 Pullower Burn is located in the north west of the Study Area and flows south north through marshy grassland and after passing under the access track continues north into coniferous plantation woodland (TN20).
- 4.1.21 A watercourse is present in the north of the Study Area and flows north towards Pullower Burn. The watercourse is over grown with grey willow along the embankments (TN21). Another tributary of Pullower Burn is present between the quarry and the substation and flows north (TN22).

- 4.1.22 A watercourse present in the east of the Study Area flows north towards Long Loch and is surrounded by soft-rush, tufted hair-grass and marsh thistle (TN23).
- 4.1.23 A watercourse flowing towards a tributary leading to Loch Martle was over grown and is located in the east of the Survey Area (TN24).
- 4.1.24 Lastly, a watercourse flows through deforested coniferous woodland and marshy grassland. It is over grown and located in the north east of the Study Area (TN25).
- 4.1.25 The substrate of the watercourses comprised sandy loam mixed with pebbles and larger rocks including siltstone, sandstone, quartz and shale.

Buildings

- 4.1.26 There are two buildings located within the Study Area that are associated with the operational Kilgallioch Windfarm; a substation and the waste treatment located to the north of the Study Area (TN26).

Bare ground

- 4.1.27 Bare ground is present throughout the Study Area in the form of tracks, quarries and works areas. A large area of bare ground is present north of the substation due to current works being carried out at the operational Kilgallioch Windfarm (TN26).
- 4.1.28 There are three quarries present within the Study Area located to the east of the track in the south of the Study Area (TN27), to the west of the track in the centre of the Study Area (TN28) and west of the substation in the north of the Study Area (TN29).

4.2 Protected or Otherwise Notable Species

Otter

- 4.2.1 No evidence of otter activity was identified within the Study Area.
- 4.2.2 There are several watercourses throughout the Study Area. Given the connectivity of the watercourses to the wider area, notably Tarf Water located to the south of the Study Area (TN30), Pullower Burn to the north and Long Loch (TN31), Black Loch, Craigie Loch and Loch Martle to the north east, otter could forage and commute throughout the Study Area. The larger of the watercourses on Site, Pullower Burn, could support otter for foraging and commuting as well as holt construction (TN20). However, the majority of the watercourses within the Site are considered small and only suitable in terms of commuting otter (TN15, TN16, TN17, TN18, TN21, TN22, TN23, TN24 and TN25).
- 4.2.3 The marshy grassland present throughout the majority of the Study Area is unsuitable for holt construction due to the wetland habitat and flat topography. However otter could use the coniferous plantation woodland to construct holts where there is an underlying gradient and suitable substrate conditions.

Badger

- 4.2.4 No evidence of badger activity was identified within the Study Area.
- 4.2.5 However, given the high mobility of badger they could commute and forage throughout the Study Area. The marshy grassland and deforested areas are unsuitable for sett building due to the wetland habitat and flat topography. However the coniferous plantation woodland could be used to construct setts in areas of suitable substrate conditions.

Water Vole

- 4.2.6 No evidence of any water vole activity was recorded during the survey.

4.2.7 Many of the watercourses throughout the Site flowed through marshy grassland and could be used by water vole (TN15, TN17, TN20, TN21, TN22, TN23 and TN24). Some of the watercourse are small and overgrown and, as such, are considered suboptimal for water vole (TN16, TN18, TN21 and TN25).

4.2.8 Water vole were recorded on the Tarf Water and some of the connected smaller watercourses during the protected mammals survey of the main Site (see **Technical Appendix 8.2**) and, given the connectivity of the watercourses to the wider area, water vole could move into the Study Area in the future.

Pine Marten

4.2.9 No evidence of pine marten was recorded during the survey. Pine marten could use the coniferous and mixed woodland within the Study Area to forage, commute and construct dens (particularly in areas of wind-throw).

Red Squirrel

4.2.10 No evidence of red squirrel was recorded during the survey. Squirrels could use the coniferous and mixed woodland within the Study Area to forage and construct dreys.

Bats


4.2.11 Bats could use linear features such as watercourses and woodland edges throughout the Site to forage and commute. The trees present within the Study Area are predominantly dense coniferous plantation woodland and as such lack features such as rotten cavities and lifting bark that could provide roosting features for bats. The areas of young coniferous plantation and mixed woodland comprise young trees that also lack features that could be of use to roosting bats. Additionally, any buildings and structures within the Study Area comprise turbines and the substations that are modern structures and as such lack features suitable for roosting bats.





Reptiles and Amphibians


4.2.12 No evidence of any reptiles or amphibians were recorded during the survey. The marshy grassland and wetland habitat provides suitable habitat for reptiles and amphibians. Additionally, six ponds were identified that could be used by Great Crested Newts.

4.2.13 A Habitat Suitability Index (HSI) Assessment was carried out on each of the ponds following the Oldham *et al.* (2000) methodology, amended with the recommendations of O’Brien *et al.* (2017) on geographic suitability zones within Scotland. According to O’Brien *et al.* (2017), the Site is in Category C of the suitability to support great crested newt and therefore categorised as unsuitable for this species. The location and results of the HSI assessment are shown in Figure 2 and Table 1; below.

Table 1: HSI Assessment

Pond ID	HSI Score	Suitability	Location	Plate
1	0.33	Poor	222857 574022	

Pond ID	HSI Score	Suitability	Location	Plate
2	0.35	Poor	222450 572282	
3	0.34	Poor	222608 575819	
4	0.40	Poor	222939 575351	
5	0.38	Poor	222885 575454	

Pond ID	HSI Score	Suitability	Location	Plate
6	0.37	Poor	222694 575591	

Bats

5.2.6 Whilst there are no suitable roosting features within the Study Area, bats could forage and commute throughout the area.

Reptiles and Amphibians

5.2.7 Whilst no evidence of any reptiles or amphibians was recorded during the survey, common and widespread species could use the marshy grassland within the Study Area.

5 Discussion

5.1 Habitats

5.1.1 The Site consists of commercial coniferous plantation woodland, mixed plantation woodland, scattered coniferous woodland, felled coniferous woodland, unimproved acid grassland, marsh grassland, continuous bracken, running water, buildings and bare ground. Whilst there are a relatively diverse range of species present, they are considered to be common and widespread.

5.2 Protected or Otherwise Notable Species

Otter

5.2.1 Given the connectivity of the Site to the wider area, otter could use the watercourses throughout the Study Area to forage and commute. Whilst the marshy grassland is unsuitable for holt construction, otter could use the coniferous plantation where there is a gradient to build a holt.

Badger

5.2.2 No evidence of badger was identified within the Survey Area. Given the high mobility of badger they could forage and commute throughout the Study Area as well as construct setts where the coniferous and mixed woodland is on a gradient.

Water vole

5.2.3 No evidence of any water vole activity was recorded during the survey. However, water vole was recorded within the wider Site boundary during other surveys for the proposed Development, and given the connectivity of the watercourses to the surrounding habitat, water vole could move into the Study Area in the future.

Pine Marten

5.2.4 Whilst no evidence of pine marten was recorded during the survey, Pine marten could use the coniferous and mixed woodland within the Study Area to forage, commute and construct dens.

Red Squirrel

5.2.5 Whilst no evidence of red squirrel was recorded during the survey, red squirrel could use the coniferous and mixed woodland within the Study Area to forage, commute and construct dreys.

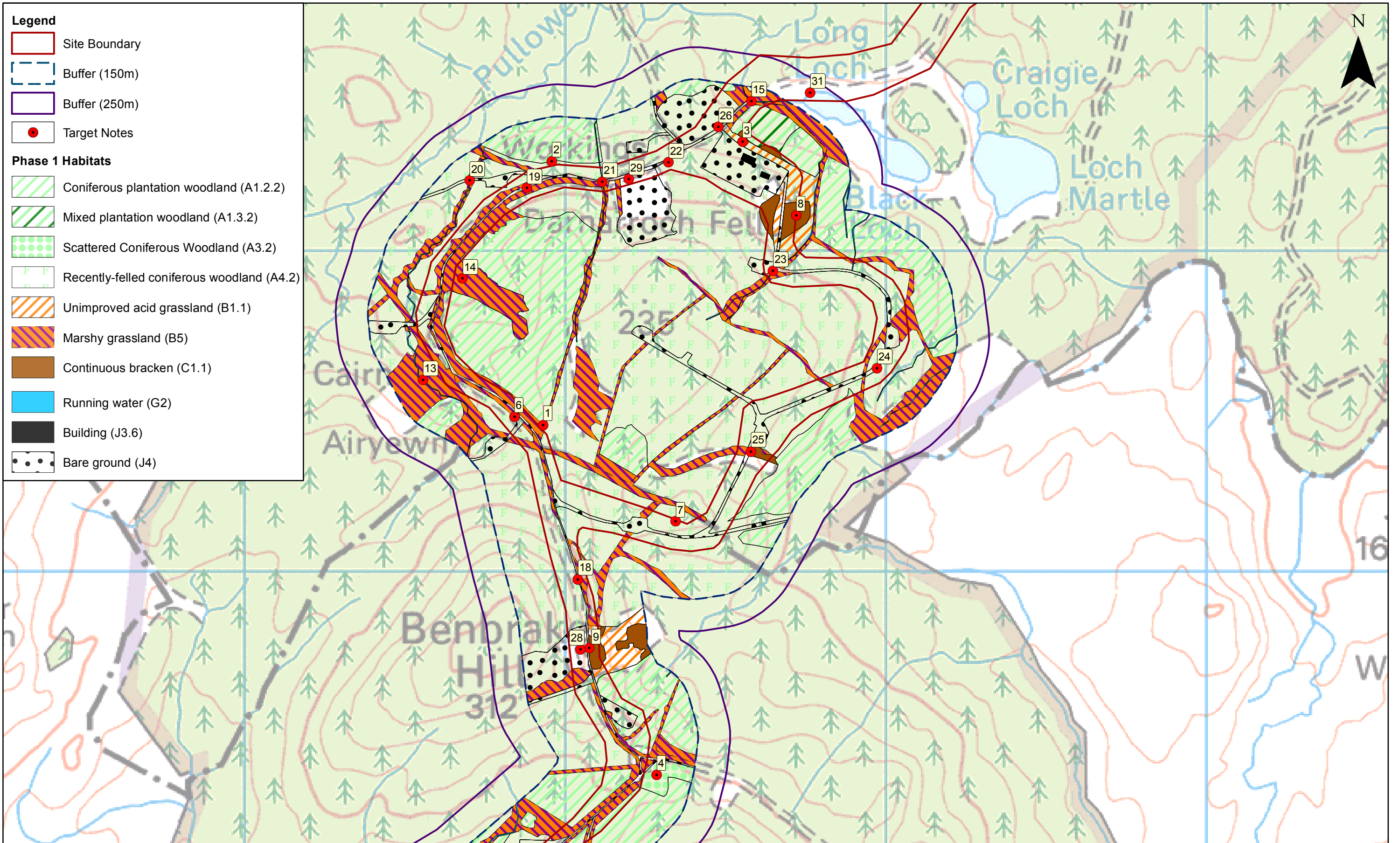
6 References

- Biodiversity in Ayrshire (2007). Ayrshire Biodiversity Action Plan. Available online at: <https://www.south-ayrshire.gov.uk/documents/2008%20ayrshire%20bap.pdf> (accessed October 2019).
- Chanin P (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10. English Nature, Peterborough.
- CIEEM (2013a). Competencies for Species Survey: Eurasian Otter. Available online at: <https://cieem.net/wp-content/uploads/2019/02/CSS-EURASIAN-OTTER-April-2013.pdf> (accessed October 2019).
- CIEEM (2013b). Competencies for Species Survey: Water Vole. Available online at: <https://cieem.net/wp-content/uploads/2019/02/CSS-WATER-VOLE-April-2013.pdf> (accessed October 2019).
- CIEEM (2013c). Competencies for Species Survey: Badger. Available online at: <https://cieem.net/wp-content/uploads/2019/02/CSS-BADGER-April-2013.pdf> (accessed October 2019).
- CIEEM (2013d). Competencies for Species Survey: Pine Marten. Available online at: <https://cieem.net/wp-content/uploads/2019/02/CSS-PINE-MARTEN-April-2013.pdf> (accessed October 2019).
- CIEEM (2017). Guidelines for Preliminary Ecological Appraisal (GPEA). Available online at: <https://cieem.net/wp-content/uploads/2019/02/Guidelines-for-Preliminary-Ecological-Appraisal-Jan2018-1.pdf> (accessed October 2019).
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland, version 1.1 updated September 2019. Chartered Institute of Ecology and Environmental Management. Available online at: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf> (accessed October 2019).
- Dumfries and Galloway Biodiversity Partnership (2009). Dumfries and Galloway Biodiversity Action Plan, April 2009. Available online at: <https://swseic.org.uk/resources/> (accessed October 2019).
- Gurnell J and Pepper H (1994). Red squirrel conservation: Field study methods. Research Information Note 255.
- Gurnell J, Lurz PWW, McDonald R and Pepper H (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Practice Note 11.
- Joint Nature Conservation Committee (2010). Handbook for Phase 1 Habitat Survey - a technique for environmental audit, revised re-print. Joint Nature Conservation Committee, Peterborough, UK.
- Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10(4), 143-155.
- O'Brien, D., Hall, J., Miro, A., and Wilkinson, J. (2017). Testing the validity of a commonly-used habitat suitability index at the edge of a species' range: great crested newt *Triturus cristatus* in Scotland. *Amphibia-Reptilia*, Volume 38, Issue 3, pages 265-273.
- O'Mahony D, O'Reilly C and Turner P (2006). National Pine Marten Survey of Ireland 2005.
- Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Available online at: https://www.scottishbadgers.org.uk/userfiles/file/planning_guidelines/Surveying-for-Badgers-Good-Practice-Guidelines_V1.pdf (accessed October 2019).
- Scottish Government (2013). Scottish Biodiversity List, version 1.5. April 2013. Available online at: https://www.webarchive.org.uk/wayback/archive/20160402063428mp_/http://www.gov.scot/Resource/0041/00419456.xls (accessed October 2019).
- Stace C (2010). *New Flora of the British Isles*: 3rd Edition. Cambridge University Press. Cambridge.
- SWSEIC (2019). Data Search Results. September 2019.
- The Mammal Society (2016). *The Water Vole Mitigation Handbook*.

Vincent Wildlife Trust (2015) Managing forests and woodlands for pine martens. Practical measures to protect and benefit pine marten. Available online at: <https://www.vwt.org.uk/wp-content/uploads/2015/04/Pine-Martens-and-Forest-Management-Leaflet.pdf> (accessed October 2019).

Vincent Wildlife Trust (2017) a guide to identifying evidence of pine martens in Wales. Available online at: <https://www.vwt.org.uk/wp-content/uploads/2017/11/Evidence-of-Pine-Martens-in-Wales.pdf> (accessed October 2019).

Figure TA_8.5.1: Phase 1 Habitat Survey and Target Notes



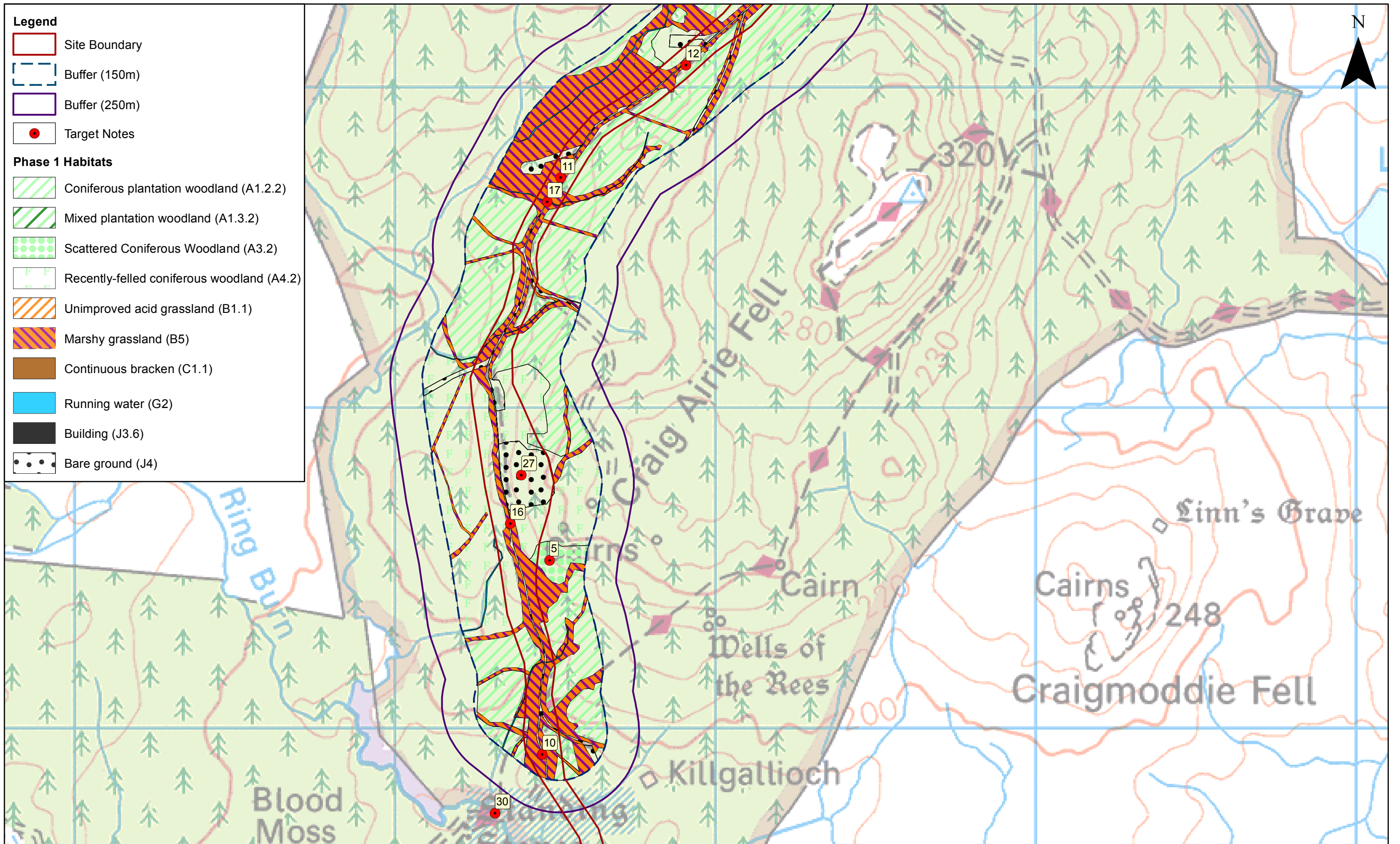
Rev	Date	By	Comment
A	08/10/2019	AG	First Issue.

1:11,000
Scale @ A3

© Crown Copyright 2019. All rights reserved.
Ordnance Survey Licence 0100031673.

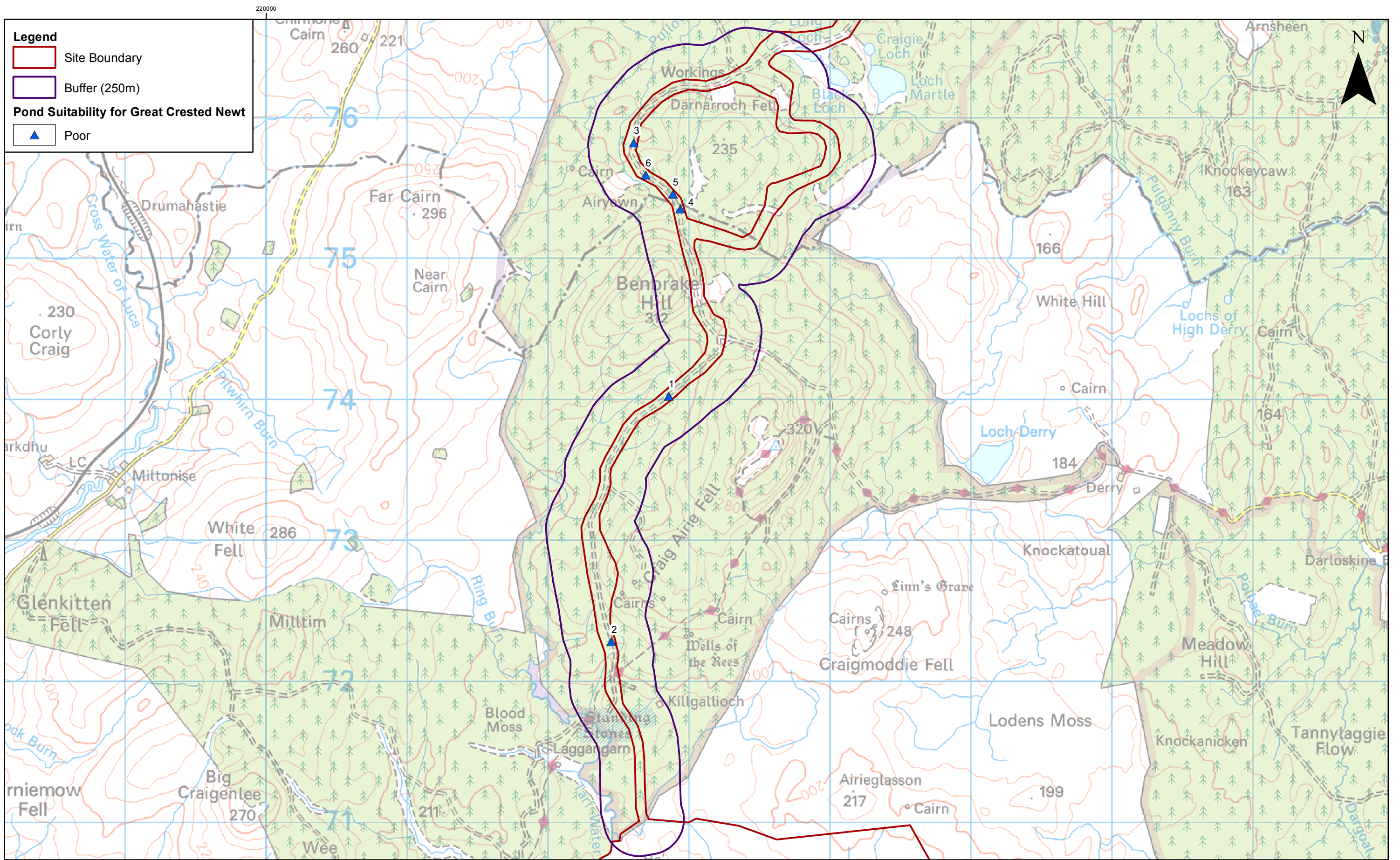
Kilgallioch Windfarm Extension
EIA Report: Figure TA_8.5.1
Phase 1 Habitat Survey and Target Notes

Drg No	EDI_1706_EIAR	
Rev	A	Datum: OSGB36
Date	09/10/19	Projection: TM
Figure	TA_8.5.1	



				1:11,000 Scale @ A3		Kilgallioch Windfarm Extension EIA Report: Figure TA_8.5.1 Phase 1 Habitat Survey and Target Notes	Drg No	EDI_1706_EIAR		
	Rev	Date	By	Comment	© Crown Copyright 2019. All rights reserved. Ordnance Survey Licence 0100031673.		Rev	A	Datum:	OSGB36
							Date	09/10/19	Projection:	TM
							Figure	TA_8.5.1		

Figure TA_8.5.1: Pond Suitability for Great Crested Newt



Rev	Date	By	Comment
A	08/10/2019	AG	First Issue.



1:25,000
Scale @ A3



© Crown Copyright 2019. All rights reserved.
Ordnance Survey Licence 0100031673.




Kilgallioch Windfarm Extension
EIA Report: Figure TA_8.5.2
Pond Suitability for Great Crested Newt



Drg No	EDI_1706_EIAR	
Rev	A	Datum: OSGB36
Date	23/10/19	Projection: TM
Figure	TA_8.5.2	



Annex A: Target Notes



Target Note	Grid Reference	Description
1	222932 575456	 <p>A stand of coniferous plantation woodland is present to the north east of the access track. The woodland comprises Sitka spruce and has suffered wind blow causing fallen trees along the edges. The areas of woodland could be of value to pine marten, badger and red squirrel.</p>
2	222959 576279	 <p>The coniferous woodland at the north of the Study Area has suffered wind blow and many trees have fallen over.</p>



Target Note	Grid Reference	Description
3	223554 576340	 <p>Continuous bracken is present between areas of mixed woodland to the north of the substation. Mixed woodland comprises silver birch, Sitka spruce and Norway spruce.</p>
4	223276 574349	<p>An area of scattered coniferous woodland is present to the east of the access track. The coniferous woodland is formed of Sitka spruce and the ground vegetation comprises marshy grassland dominated by soft-rush.</p>
5	222483 572523	 <p>An area of scattered coniferous woodland to the east of the access track comprised Norway spruce and Douglas fir as well as Sitka spruce. The underlying vegetation comprised marshy grassland and was dominated by soft-rush. The woodland could be of value to pine marten and red squirrel.</p>



Target Note	Grid Reference	Description
6	222841 575481	 <p>A section of felled coniferous plantation woodland was dominated by soft-rush whilst rosebay willowherb, broad-leaved dock, wavy hair-grass, sheep's fescue and common dandelion was abundant. The marshy grassland along the track was dominated by soft-rush whilst rosebay willowherb, grey willow, tufted hair-grass and sheep's fescue were abundant. Water horsetail was also present in a small area of wet ground by the track.</p>
7	223346 575155	 <p>In the felled area to the north of the track, young Sitka spruce are regenerating.</p>
8	223721 576110	 <p>Unimproved acid grassland is present to the north and east of the substation and is dominated by wavy hair-grass and sheep's fescue. Areas of continuous bracken are present throughout. Prevalent species include broad-leaved dock, foxglove and rosebay willowherb. A silver birch tree and sheep fold and present within the grassland.</p>



Target Note	Grid Reference	Description
9	223075 574760	 <p>Continuous bracken is present to the east of the access track amongst unimproved acid grassland. Species include tufted hair-grass, sheep's fescue, broad-leaved dock, colt's-foot, bramble and common dandelion. Scattered grey willow occurs throughout the grassland.</p>
10	222460 571917	 <p>Marshy grassland was present at the side of the access track and was dominated by soft-rush. Abundant species included cock's-foot, marsh thistle, sheep's fescue, broad-leaved dock, wavy hair-grass and common dandelion. Grey willow, young Sitka spruce, heather and bramble were also occasionally recorded.</p>



Target Note	Grid Reference	Description
11	222517 573716	 <p>Along the east of the access track the marshy grassland comprised soft-rush, heather, blaeberry, sheep's fescue, wavy hair-grass and bracken. Grey willow and Sitka spruce were also frequent along the edges of the marshy grassland.</p>  <p>To the west of the access track further marshy grassland dominated by soft-rush was present. Other species comprise heather, blaeberry, sheep's fescue, wavy hair-grass, tufted hair-grass, bracken, broad-leaved dock and bramble. Grey willow and young Sitka spruce were also frequent throughout the marshy grassland.</p>



Target Note	Grid Reference	Description
12	222910 574070	 <p>Further marshy grassland dominated by soft-rush was present along each side of the access track. Other species include sheep's fescue, broad-leaved dock, marsh thistle, wavy hair-grass, tufted hair-grass, bramble, creeping buttercup and selfheal. An area of felled coniferous woodland dominated by soft-rush is present beyond the marshy grassland to the north.</p>
13	222557 575596	 <p>Marshy grassland dominated soft-rush whilst rosebay willowherb, broad-leaved dock, wavy hair-grass, sheep's fescue and common dandelion was abundant. Grey willow, Butterfly-bush and scotch broom were occasional throughout. Grey willow was frequent along the length of Pullower Burn. Pullower Burn could be of value to both otter and water vole.</p>



Target Note	Grid Reference	Description
14	222681 575913	 <p>A section of marshy grassland is dominated by bog myrtle and soft-rush. Other species present include grey willow, tufted hair-grass, rosebay willowherb and young Sitka spruce.</p>
15	223582 576466	 <p>A watercourse flowing from Long Loch to Pullower Burn flows through marshy grassland comprising soft-rush, tufted hair-grass, sheep's fescue, bog myrtle, ragwort, broad-leaved dock, heather and grey willow. Bulrush is also present on the edges of the watercourse.</p>



Target Note	Grid Reference	Description
16	222361 572638	 <p>A watercourse flows from the east, under the access track and continues south west towards Tarf Water. The watercourse is small and overgrown making it suboptimal for water vole.</p>  <p>Previously deforested coniferous plantation is present on the east and west of the access track. Soft-rush dominates the area and sheep's fescue, bracken, broad-leaved dock, grey willow and young Sitka spruce are also abundant.</p>




Target Note	Grid Reference	Description
17	222475 573641	 <p>A watercourse with overhanging banks originates in the east and flows south west towards Tarf Water.</p>
18	223041 574979	 <p>A watercourse flows from west to east through areas of deforested coniferous woodland. The watercourse is small and overgrown and is unlikely to be of value to water vole and otter.</p>




Target Note	Grid Reference	Description
19	222883 576188	 <p>A small waterfall is present to the south of the access track and where the water gathers at the bottom, bulrush is present. The watercourse is unsuitable for otter and water vole as it then flows underground.</p>
20	222703 576218	

Target Note	Grid Reference	Description
		Pullower Burn travels from the south through marshy grassland and after passing under the access track continues north into coniferous plantation woodland. The watercourse could be used by water vole and for foraging and commuting by otter. The flat topography and wetland habitat make the surrounding marshy grassland unsuitable for holt construction.
21	223123 576207	 <p>A watercourse travels north towards Pullower Burn. The watercourse is overgrown and is considered to be suboptimal for water vole.</p>
22	223323 576274	 <p>A watercourse is present between the quarry and the substation and flows north.</p>

Target Note	Grid Reference	Description
23	223649 575937	 <p>Soft-rush, tufted hair-grass and marsh thistle grow along the watercourse that flows north towards Long Loch.</p>
24	223971 575634	 <p>A watercourse was overgrown and flowing towards a tributary leading to Loch Martle.</p>

Target Note	Grid Reference	Description
25	223583 575372	 <p>A watercourse flows through deforested coniferous woodland and marshy grassland. The watercourse is overgrown and suboptimal for water vole.</p>
26	223479 576386	 <p>Bare ground associated with works being carried out at Kilgallioch Windfarm are present to the north of the substation.</p>

Target Note	Grid Reference	Description
		 <p>The Kilgallioch Windfarm substation is present to the north of the Study Area.</p>
27	222395 572788	 <p>A quarry comprising bare ground is present to the east of the access track. Sheep's fescue, common dandelion, soft-rush, colt's-foot, common bent and common mouse-ear were regenerating on areas of the bare ground.</p>
28	223049 574756	

Target Note	Grid Reference	Description
		Another quarry is present to the west of the access track.
29	223199 576225	 <p>A quarry is present to the west of the substation comprising bare ground. Broad-leaved dock, colt's-foot, sheep's fescue, rosebay willowherb and grey willow are regenerating on the bare ground.</p>
30	222313 571733	 <p>Tarf Water flows south of the Site boundary and provides suitable foraging and commuting habitat for otter. Due to the river banks flat topography and wetland habitat they are unsuitable for holt construction, however, otter could use the coniferous woodland along Tarf Water north of the access track.</p>
31	223765 576493	

Target Note	Grid Reference	Description
		Long Loch is located to the north east of the Site and could be used for commuting and foraging by otter.

Annex B: Plant Species Recorded in the Survey

Common name	Scientific Name
Blaeberry	<i>Vaccinium myrtillus</i>
Bog myrtle	<i>Myrica gale</i>
Bracken	<i>Pteridium aquilinum</i>
Bramble	<i>Rubus fruticosus</i>
Broadleaved dock	<i>Rumex obtusifolius</i>
Bulrush	<i>Typha latifolia</i>
Butterfly-bush	<i>Buddleja davidii</i>
Cock's-foot	<i>Dactylis glomerata</i>
Colt's-foot	<i>Tussilago farfara</i>
Common bent	<i>Agrostis capillaris</i>
Common dandelion	<i>Taraxacum officinale</i>
Common mouse-ear	<i>Cerastium fontanum</i>
Common ragwort	<i>Jacobaea vulgaris</i>
Creeping buttercup	<i>Ranunculus repens</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Foxglove	<i>Digitalis purpurea</i>
Grey willow	<i>Salix cinerea</i>
Heather	<i>Calluna vulgaris</i>
Marsh thistle	<i>Cirsium palustre</i>
Norway spruce	<i>Picea abies</i>
Rosebay willowherb	<i>Chamerion angustifolium</i>
Scotch broom	<i>Cytisus scoparius</i>
Selfheal	<i>Prunella vulgaris</i>
Sharp-flowered rush	<i>Juncus acutiflorus</i>
Sheep's fescue	<i>Festuca ovina</i>
Silver birch	<i>Betula pendula</i>
Sitka spruce	<i>Picea sitchensis</i>
Soft-rush	<i>Juncus effusus</i>
Tufted hair-grass	<i>Deschampsia cespitosa</i>
Water horsetail	<i>Equisetum fluviatile</i>
Wavy hair-grass	<i>Deschampsia flexuosa</i>



Registered Address:

7 Dundas Street

Edinburgh

EH3 6QG

+44 (0) 131 557 8325