



Appendix 7.1

Ecology Baseline Report

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1 Introduction

1.1 Project Background

1. ScottishPower Renewables (SPR) hereafter referred to as 'the Applicant' is proposing to construct and operate Carrick Windfarm located 6 kilometres (km) south of Straiton, South Ayrshire (hereafter 'the Proposed Development'). The Proposed Development will comprise of 13 wind turbines with a maximum height to blade tip of 200m, access roads, borrow pits and ancillary infrastructure (including Substation Compound, crane pads, temporary construction compounds).
2. The Site is located within the Carrick Forest, with Linfern Loch located near the Site (but excluded from the Site Boundary) and the River Stinchar flowing east to west to the south of the Proposed Development. Several smaller watercourses drain the Site including the Pulreoch Burn, Linfern Loch Burn, Tairlaw Burn and Knockoner Burn. The Site is an existing commercial forest predominately covered by Sitka spruce *Picea sitchensis* plantation. The surrounding habitat to the south and east is also predominately comprised of plantation woodland. To the north and west of the Site there is agricultural land, predominantly rough grazing fields. Several lochs are located within 10km of the Site to the east including Loch Bradan, Loch Riecaur, Loch Finlas and Loch Doon.
3. For the purpose of this report and associated surveys, an area encompassing a 50 metre (m) buffer surrounding the outermost wind turbines (the 'wind turbine envelope'); plus the access roads, borrow pits and ancillary infrastructure, will hereafter be referred to as the 'Proposed Development Area'. This is shown on **Figure 7.1.1 Carrick Site Location and Layout** and has been established to reflect the minimum area subject to ecology surveys. Specific survey areas for certain species are further defined in **Section 2.2.1**.

1.2 Ecology Background

4. No previous ecological surveys have been undertaken in relation the Proposed Development.
5. As part of the Environmental Impact Assessment Report (EIAR) a desk-based scoping exercise was undertaken to identify key environmental issues which should be considered in relation to the Proposed Development (WSP, 2020). The resulting Scoping Report **scoped-in** the following ecological receptors relevant to this report for consideration with the EIA: otter *Lutra lutra*, water vole *Arvicola amphibius*, red squirrel *Sciurus vulgaris*, pine marten *Martes martes*, badger *Meles meles*, bats, reptiles and amphibians, including great crested newt (GCN) *Triturus cristatus*. Other ecological receptors such as habitats, fish and freshwater pearl mussel *Margaritifera margaritifera* are discussed in other appendices to **Chapter 7: Ecology and Biodiversity** of the EIAR.

1.3 Scope of Report

6. This Appendix presents the methods and results of the protected species desk study and the following baseline surveys for the Proposed Development: water vole, otter, badger, pine marten, red squirrel, bat Potential Roost Features (PRFs) and GCN survey methods and results. This report also covers statutory and non-statutory designated sites.

7. This report does not include ornithological, freshwater pearl mussel, bat, fish or National Vegetation Classification (NVC) survey results which are all contained within separate appendices relating to **Chapter 7: Ecology and Biodiversity** of the EIAR.
8. The relevant legislation relating to designated sites and protected species considered in this Appendix is outlined within **Annex A**.

2 Methods

2.1 Desk Study

9. A desk study exercise was undertaken in April 2020 to review existing ecological baseline information available in the public domain and to obtain information held by relevant third parties. Freely downloadable datasets (available from Scottish Natural Heritage (SNH¹),) were consulted for information regarding the presence of national statutory designated habitats within 2km of the Site (Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR)). This search was extended to 10km for non-avian European designated sites (Special Areas of Conservation (SACs)) and internationally designated Ramsar sites (hereafter referred to as the 'Designated Sites Study Area'). European sites designated for their ornithological interests (Special Protection Areas (SPAs)) are discussed in **Chapter 8: Ornithology** of the EIAR and its associated appendices.
10. For the purpose of the desk study exercise, records of protected and notable species of conservation concern were collated up to a distance of 2km from the Site Boundary. This search was extended to 5km for bats records and further extended to 10km for more mobile bat species such as *Nyctalus sp* (hereafter referred to as the 'Protected and Notable Species Study Area'). This approach is consistent with current good practice guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2017).
11. Non-statutory designated sites include Local Wildlife Sites (LWS) including provisional LWS (pLWS) and other sites such as Red Squirrel Priority Woodland (RSPW)². South West Scotland Environmental Information Centre (SWSEIC) also provided bog and woodland habitat maps available up to 2km from the Site Boundary, which are summarised in this report. These maps show the Intermediate Bog Inventory, Lowland Raised Bog Inventory and Ancient Woodland Inventory as well as results of the Native Woodland Survey of Scotland which details native woodland, nearly native woodland and Planted Ancient Woodland Sites (PAWS).
12. Information on the location of protected species records was provided by SWSEIC, Forestry and Land Scotland (FLS) and Botanical Society of Britain and Ireland (BSBI). SWSEIC also provided records from iRecord, Glasgow Museum Biological Record Centre (GMBRC) and Scottish Wildlife Trust (SWT). Bat Conservation Trust Scotland were also consulted but were unable to provide any data relevant to the Site.
13. The results of the desk study are shown in **Figure 7.1.2 Desk Study Records**.

2.2 Field Survey

2.2.1 Overview

14. The following survey areas were used for the ecology surveys:
 - 'Protected Species Survey Area' defined as 100m buffer around the Proposed Development Area;

¹ Now known as NatureScot

² Although this designation has been superseded by Red Squirrel strongholds, these sites still indicate habitats considered to be of local importance for red squirrels.

- ‘Otter Survey Area’ defined as the Proposed Development Area plus 200m up and downstream of watercourse crossing points along access roads;
- PRFs for bats were recorded (where applicable) within 200m plus rotor length (which was 75m at the time of survey³) from indicative wind turbine locations (i.e. 275m) and within at least 100m of infrastructure (hereafter the ‘Bat PRF Survey Area’); and
- ‘GCN Survey Area’ defined as all ponds within 500m from the Proposed Development Area.

15. These various survey areas are shown in **Figure 7.1.3 Ecology Survey Areas**.

16. Prior to the dedicated protected species surveys, a protected species walkover was undertaken to highlight areas of good habitat suitability for each species (hereafter referred to as the ‘habitat suitability assessment’). This was completed across the initial developable area which was identified to inform the early stages of the development process and which was referred to in the EIA Scoping Report (WSP, 2020). This is hereafter referred to as the ‘Scoping Developable Area’. The habitat suitability assessments focussed on each indicative wind turbine location and access roads as well as open areas and forestry rides. At each data collection point, all habitat visible from that point was assessed as being of either negligible, low, moderate or high suitability for badger, bat, pine marten, red squirrel, water vole and otter. Habitat suitability for each species was based on potential for resting sites (such as burrows, holts, dens etc.), foraging suitability (such as abundance of prey, trees of age to bear cones or presence of vegetation preferred by water vole (e.g. soft rush *Juncus effusus*) and commuting suitability (such as vegetative cover, connection to other suitable habitats and connected watercourses). These three factors were combined to give an overall suitability of the habitat for each species at each point. A description of the habitat suitability categories is summarised in **Table 7.1.1** below.

Overall Suitability	Description
Negligible	No potential for resting sites (collectively referring to otter holts/couches, water vole burrows, pine marten dens, squirrel dreys), foraging resource or commuting habitat.
Low	Area with low abundance of foraging resources and no or low potential for resting sites. The species may utilise the habitat as part of a wider territory.
Moderate	Habitat with low availability or suitability for resting sites but ample foraging resources and commuting potential connecting to other suitable habitat.
High	Abundance of resting sites, foraging resources and commuting routes connecting to other suitable habitat.

Table 7.1.1: Habitat Suitability Categories

17. The locations of the areas assessed, and their habitat suitability for each species is shown in **Figures 7.1.5a-7.1.5e**.
18. Throughout the surveys, surveyors remained vigilant for evidence of notable species of conservation concern including reptiles and brown hare *Lepus europaeus*. Evidence or sightings of notable species was recorded with a grid reference and photographs where appropriate.

2.2.2 Water Vole

19. Following the habitat suitability assessment to identify suitable habitat to support water vole, a dedicated field sign search was undertaken at each suitable watercourse within the Protected Species Survey Area during the appropriate season for water vole survey (considered mid-May to mid-September for lowland Scotland). The survey followed the methodology prescribed in Dean *et al.*, (2016) and involved walking the entire length of all of the watercourses within the Protected Species Survey Area to conduct a thorough visual inspection of the banks and

immediate vicinity for water voles or their field signs. Field signs, as described in Strachan *et al.* (2011), include the following:

- faeces: recognisable by their size, shape and content. If not too dried-out, these are also distinguishable from rat droppings by their smell;
- latrines: faeces deposited at discrete locations;
- feeding stations: food items are often brought to feeding stations along pathways and hauled onto platforms. recognisable as neat piles of chewed vegetation up to 10cm long;
- burrows: appear as a series of holes along the water's edge, distinguishable from rat burrows by size and position;
- lawns: may appear grazed areas around land holes;
- nests: where the water table is high above ground, woven nests may be found;
- footprints: tracks may occur at the water's edge and lead into bankside vegetation. May be distinguishable from rat footprints by size; and
- runways in vegetation: low tunnels pushed through vegetation near the water's edge; these are less obvious than brown rat *Rattus norvegicus* runs.

20. Additionally, any field signs or evidence relating to other relevant wildlife (for example American mink *Neovison vison* (a key predator of water voles) or brown rat) was recorded.

2.2.3 Otter

21. These surveys were undertaken at the same time as the water vole surveys within the Otter Survey Area, which is within the appropriate season for otter surveys (surveying possible all year round but weather and vegetation cover can be limiting factors). An otter survey was conducted following standard survey methods along the entire length of all of the watercourses within the Otter Survey Area (Chanin, 2003). The surveys involved conducting a thorough visual inspection of the banks and immediate vicinity for otters or their field signs. Field signs include:

- resting sites: including temporary and permanent sites;
- prints: characteristic foot prints often observed in soft ground and muddy areas;
- spraints: otter faeces that may be used to mark territories, often observed on in-stream boulders. They can be present within or outside the entrances of holts and couches. Spraints have a characteristic smell and often contain fish remains. Features with two or more spraints of mixed age are considered to be spraint sites, with signs of regular use;
- anal jelly: like spraint often observed on prominent in-stream boulders;
- feeding signs: remains of prey items may be found at preferred feeding stations. Remains of fish, crabs, or skinned amphibians can indicate the presence of otter;
- paths: terrestrial routes that otters can take when moving between resting sites and watercourses, or at high flow conditions when they will travel along bank sides in preference to swimming; and
- slides and play areas: typically worn areas on steep slopes where otters slide on their front, often found between holts/couches and watercourses. Play areas are used by juvenile otters and are often evident by trampled vegetation and the presence of slides. These are often positioned in sheltered areas adjacent to natal holts.

22. Terminology used for resting sites is as follows:

- resting site - collective term for holts and couches;
- potential resting site - a site considered to provide suitable resting habitat together with absent or inconclusive signs of use or potential use;
- holt - an underground, resting site, often underneath heather root matrices or within tree roots;
- couch - an above ground resting site that can be used for sleeping or grooming;

³ Maximum rotor length now being considered is up to 85m, however this increase is not considered a constraint to the PRF survey given the small distance and the habitat within the wider area being coniferous plantation woodland which presents little opportunity for PRFs.

- breeding site - a term used to identify an area of land in which otters breed, within which a natal holt (see below) is located;
- natal holt - a discrete holt that is used by the female to birth the cubs and where they can remain for up to three months; and
- nursery area - an area within a breeding site with high levels of activity associated with cubs. Holts within these areas are considered unlikely to be the primary natal holts where cubs are born.

23. Additionally, any field signs or evidence relating to other relevant wildlife was recorded.

2.2.4 Badger

24. A badger survey of the Protected Species Survey Area (where access was possible) within habitat suitable to support badgers was completed with reference to industry standard methodology applicable throughout the United Kingdom (UK) (Scottish Badgers, 2018; Harris *et al.*, 1989; and Roper, 2010).

25. Where present, evidence indicative of badgers was recorded; including:

- setts;
- dung pits and latrines;
- prints;
- mammal paths;
- hairs; and
- other evidence including snuffle holes, feeding remains and scratching posts.

26. Where setts were recorded, their status and level of activity was noted. Sett status is broadly categorised as follows:

- main: generally, the largest sett within a badger social group home range, with a relatively large number of sett entrances with well-worn pathways between them, and conspicuous spoil mounds. This type of sett tends to be occupied throughout the year and be used for breeding;
- annex: normally found within 150m of the main sett and comprising multiple entrances, this type of sett is connected to the main sett by one or more obvious well-worn pathways. It may not be occupied throughout the year and can be used for breeding if there is more than one breeding sow within the social group;
- subsidiary: similar to an annex sett, but typically located further from the main sett (at least 50m away). This type of sett will not be occupied throughout the year and lacks the well-worn paths connecting it to another sett that are associated with main and annex setts; and
- outlier: normally consisting of one or two entrances, often with little spoil outside and with no obvious path connecting it to another sett. This type of sett will tend to be found furthest from the main sett and will only be used sporadically throughout the year.

27. In addition to sett entrances there may be:

- collapses: where a tunnel has collapsed in on itself; and
- air holes: where badgers have made a small hole in a tunnel roof from below which is visible from above.

28. Sett use, or level of activity was broadly categorised as follows (as defined by Scottish Badgers, 2018).

- well used sett/hole: shows evidence of current use, such as fresh spoil or bedding, well-worn pathways between entrances and the presence of badger hair;
- partially used sett/hole: no evidence present indicating current occupation (as distinct from current use), though hairs may be present, as these can persist for some time. The sett may be occupied intermittently and cannot be categorically described as dis-used. It could easily be re-occupied; for example, it may contain some leaves or sticks in tunnel entrances, but entrances are not blocked, and it would take little effort for a badger to reoccupy it. Badger field signs may not have decayed to the extent they can be categorically considered to no longer indicate current use; and

- disused sett/hole: a badger sett that appears to have been abandoned by a badger social group is described as 'disused'; these differ from partially used setts which can be temporarily disused (not in current occupation, but in current use). Disused setts are often completely blocked with vegetation or have collapsed, and badger field signs are no longer present, or have decayed to the extent they do not indicate current use.

29. Where encountered, other mammal excavations were recorded during the survey. Information including the location, a description of the type of evidence (i.e. pathway or burrow) and where applicable any signs of current use were recorded.

2.2.5 Pine Marten

30. Pine marten surveys were completed concurrently with badger and red squirrel surveys. Following the habitat suitability assessment, habitat suitable to support pine marten within the Protected Species Survey Area was surveyed. Surveys included a systematic search for signs of pine marten presence and potential den sites within areas of suitable habitat as informed by the pine marten habitat suitability assessment with reference to survey guidance (Cresswell *et al.*, 2012). This search involved looking for the following field signs:

- den sites: such as elevated tree cavities, roof voids of buildings or barns, owl boxes, large raptor or corvid nests, squirrel dreys and rocky outcrops with elevated crevices. Current use may be indicated by the presence of scats beneath the entrance;
- scats: highly variable size and shape depending on their contents. Typically found on pathways, rides and access roads through woodland or rocky habitat; and
- prints: more likely to be present in snow as pine marten generally avoid mud.

31. Pine martens are elusive and largely nocturnal, which makes them difficult to see, but their scats are often quite distinctive (in structure, smell and content) and are the most commonly encountered field sign. Scats are most abundant during the period of June to August, which is when the surveys were undertaken.

2.2.6 Red Squirrel

32. Following the habitat suitability assessment, habitat suitable to support red squirrel within the Protected Species Survey Area was surveyed. The survey was carried out following guidance outlined by Forestry Commission (Gurnell *et al.*, 2009) and in accordance with survey guidance for initial non-intrusive visual surveys (Cresswell *et al.*, 2012). In addition to visual observations of the species, the woodland habitat was systematically searched for evidence of red squirrel, with field signs including:

- prints;
- foraging signs, including chewed or stripped cones with top section remaining untouched, which are often discarded on prominent features at feeding stations; and
- nest sites, also known as dreys, within trees (can be conifer or broadleaf species) and comprising of spherical collections (c. 0.3m) of twigs and leaves and usually located at least 3m up, in the fork of branches close to the trunk.

33. The surveyors walked transects (approximately 10-15m apart) throughout woodland blocks and treelines stopping every 50m to look up for signs of dreys and/or red squirrels. Incidental sightings of the invasive non-native grey squirrel *Sciurus carolinensis* were also recorded where present.

2.2.7 Bat

34. Dedicated bat activity surveys are detailed within **Appendix 7.3 Bat Survey Report** of the EIAR. However, during the habitat suitability assessment walkover, any trees or structures with the potential to support roosting within the Bat PRF Survey Area were recorded (where applicable). Information recorded on PRFs included location, feature type, roost suitability and overall suitability (roost and surrounding habitat).

2.2.8 Great Crested Newt

2.2.8.1 Habitat Suitability Index Assessment

35. All ponds (n=9), within the GCN Survey Area were assessed for their suitability to support GCN, using the standard Habitat Suitability Index (HSI) assessment method (ARG UK, 2010, based on Oldham *et al.* (2000)). Waterbodies were identified using 1:25,000 Ordnance Survey (OS) mapping, cross referenced against aerial photography, as well as by FLS.
36. Ponds were assessed and scored on ten key variables which are known to influence the presence of breeding populations of GCN, in accordance with standard methods (ARG UK, 2010). These variables are:
 - geographic location;
 - waterbody area;
 - waterbody permanence;
 - water quality;
 - waterbody shading;
 - impact of waterfowl;
 - fish stocks;
 - number of other waterbodies within 1km;
 - terrestrial habitat around the waterbody; and
 - macrophyte cover within the waterbody.
37. Scores for each of the above variables were used to calculate an overall HSI value for each waterbody. This was then cross referenced with the guidelines (ARG, 2010) to assign each pond to one of five categories indicating their likelihood of supporting GCN; poor, below average, average, good or excellent as presented in **Table 7.1.2**.
38. Index calculation is not a definitive method of identifying whether a pond supports GCN or not; therefore, professional judgement and availability of historical records of GCN in the locality has also been used to inform the requirement for further survey.

HSI Score	Pond Suitability
<0.5	Poor
0.5-0.59	Below average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

Table 7.1.2: GCN Habitat Suitability Index

2.2.8.2 Environmental DNA Sampling

39. An environmental DNA (eDNA) survey was undertaken on all ponds located within the GCN Survey Area, following the methods of Biggs *et al.* (2014). This involved collecting 30 millilitres (ml) water samples from 20 locations at each pond, which were then combined and shaken to homogenise the samples. The 20 samples were taken from all areas within each pond, including areas of vegetation to support egg laying and clear areas suitable for displaying. From the combined 20 samples, six 15ml sub-samples were pipetted into tubes containing 35ml of ethanol to preserve the eDNA sample. The remaining combined pond water sample was returned to the ponds. The six sub-samples per pond were then sent to RSK ADAS Ltd. for laboratory analysis to determine presence/absence of GCN. It should be noted that the potential for inconclusive results occurs where the DNA from

GCN has not been detected but the control samples have indicated that the sample has been degraded or the eDNA was not fully extracted during the eDNA analysis process. This can occur due to the water chemistry or may be due to the presence of high levels of sediment in the samples collected which can interfere with the DNA extraction process.

2.2.8.3 Presence/Likely Absence Survey

40. All ponds within the GCN Survey Area were subject to further survey to determine the species' presence or likely absence.
 41. The survey comprised four visits to each pond, spread across the recommended survey period (mid-March to mid-June, with at least two of the visits falling between mid-April and mid-May). Survey visits were completed under suitable weather conditions, when overnight temperatures were above 5°C and wind and rain were not sufficient to affect the torchlight survey results (through disturbance to the water surface affecting visibility into the pond).
 42. At least three survey techniques were used during each survey visit to search for the presence of GCN in line with good practice survey guidance (English Nature, 2001). These included:
 - **torchlight searching** – each pond was searched systematically for amphibians after dark, using a bright torch; all amphibians observed were recorded, with the number of male, female and juvenile newts of each species noted, where possible (juvenile newts may be difficult to identify to species level depending upon their stage of development). The duration of the torchlight survey was determined by the time taken to walk slowly around each pond's perimeter, although survey effort was consistent at each waterbody;
 - **bottle-trapping** – each pond was trapped using bottle traps constructed and set in accordance with standard guidance (English Nature, 2001; JNCC, 1998). Traps were set at a ratio of one for every 2m of waterbody perimeter with a maximum of 50 per waterbody. The traps were set prior to dusk, and checked and removed early the following morning; and
 - **egg searching** – suitable vegetation in each pond was searched for newt eggs which are laid on submerged or floating leaves and folded around the egg. The duration of the egg search was either the amount of time required to search thoroughly all vegetation present, or a maximum of 15 minutes per survey visit⁴.
 43. No population assessment was required following the presence/absence results presented in **Section 3.2.7**.
- ### 2.2.9 Dates of Survey and Personnel
44. All surveys were led by competent, and where necessary licenced, surveyors with extensive survey experience enabling compliance with Chartered Institute of Ecology and Environmental Management (CIEEM) competencies for Species Survey (CIEEM, 2019).
 45. The habitat suitability assessment was undertaken between the 28 May and 12 June 2020.
 46. The otter and water vole surveys were completed on the following dates in 2020:
 - 23-24 June;
 - 2 July;
 - 6 July; and
 - 4 August.
 47. The badger, pine marten and red squirrel surveys were completed on the following dates in 2020:
 - 8 July;
 - 10 July;
 - 28-30 July;

⁴ Once a GCN egg had been recorded, no egg searching occurred on subsequent visits to avoid unnecessary uncovering of eggs which would then be at an increased risk of predation.

- 3-4 August; and
 - 21 August 2020.
48. The GCN HSI, eDNA and presence/likely absence surveys were completed on the following dates in 2020:
- 30 April -1 May;
 - 13-14 May;
 - 27-28 May; and
 - 10-11 June.
49. On the 7 May 2021, protected species surveys were carried out within the area of the revised Substation Compound location and appropriate species buffers, as defined in **Section 2.2.1**.

2.3 Notes and Limitations

50. When the habitat suitability assessments were undertaken, site access was restricted due to the presence of an active osprey *Pandion haliaetus* nest (see **Appendix 8.4 Baseline Ornithology Report 2019-20 (Year 2) Confidential Annex** of the EIAR). Therefore, there was a 1km exclusion area in which no access could be taken. However, any areas within the Protected Species and Otter Survey Areas which were not accessed during the habitat suitability assessment were subsequently surveyed during the dedicated protected species surveys. Therefore, all areas were adequately covered throughout the surveys.
51. Areas of immature Sitka spruce plantation forest where the coverage was very dense, and access and visibility poor were not accessed during the dedicated protected species surveys. Instead surveyors walked around the edge of these areas along rides and access roads and looked for paths or field signs indicative of animals accessing the woodland, upon which these areas were then investigated further. Additionally, during the habitat assessment, indicative wind turbine locations within immature woodland were accessed. Therefore, this limitation is not considered to affect the validity of the data collected.
52. Areas of clear-felled forestry can be difficult and dangerous to survey with rotting log and brash piles, sharp protruding branches, trip hazards and hidden ditches present throughout. Every effort was made to cover areas of clearfell where the habitat was considered suitable to support protected species such as in large log piles for pine marten. These areas were also covered during the habitat suitability assessments; therefore, the areas were considered to have been adequately covered for this assessment.
53. Within areas of mature woodland in the north and north west of the Protected Species Survey Area there were large areas of wind-blown trees which were considered unsafe to access to search for signs of protected species. The areas surrounding them were surveyed and any paths leading into the fallen trees noted. It is possible that pine marten dens could be present within these fallen trees which could not be recorded.
54. Otter and water vole surveys completed on the 4 August 2020 were undertaken at the start of significant period of rain. This means water levels may have been higher than normal and field evidence may have been washed away. However, field evidence of otter was found during this survey suggesting that the weather conditions did not represent a significant limitation to the survey.
55. Areas along River Stinchar and Tairlaw Burn were not fully accessible due steep banks and overgrown vegetation which were not considered safe to access. These areas were viewed with binoculars from the opposite bank and no otter holts or couches were viewed.
56. The southern margins of GCN Pond 8 were predominantly formed of soft mud meaning that this part of the pond could not be accessed safely by the surveyors. However, this section of the pond was a small proportion of the overall pond size and the body of water beyond the soft mud margins had limited habitat suitability for GCN due to the absence of marginal vegetation and egg laying plants. Therefore, the inability to survey this small section of pond is not considered to have adversely influenced the validity of the survey results.

57. It should also be noted that the GCN surveys were undertaken over a prolonged period of dry weather meaning that several of the smaller ponds surveyed contained limited water. However, the presence of other ponds which persisted throughout this dry period and the metapopulation characteristics of GCN populations means that under such conditions it is likely that if GCN were present, individuals would have migrated to those other ponds over the survey period, which was not found to be the case. It should also be acknowledged that the GCN HSI assessments for these ponds found them to be of poor suitability generally and so the potential for GCN to be present at these ponds is considered to have been low in spite of their limited water content. Consequently, the outcome of the GCN surveys is not thought to have been limited by the dry weather conditions.

3 Results

3.1 Desk Study

3.1.1 Statutory Designated Sites

58. One statutory designated site was identified within the Designated Sites Study Area: Merrick Kells SAC (and SSSI). The full details of the statutory designated site are provided below in **Table 7.1.3** while its location is provided in **Figure 7.1.4a Statutory Designated Sites**.

Name	Designation	Distance and Orientation from the Site	Description
Merrick Kells	SAC, SSSI	6.7km south east	Designated for acid peat-stained lakes and ponds, acidic scree, blanket bog, clear water lochs with aquatic vegetation and poor to moderate nutrient levels and its important otter population.

Table 7.1.3: Statutory Designated Sites Summary

3.1.2 Non-statutory Designated Sites

59. Three pLWS were found within Designated Sites Study Area, within one being located on the edge of the Site itself. Additionally, the former Galloway RSPW was also found to overlap with the Site. The full details of the non-statutory designated sites are provided below in **Table 7.1.4**, while their locations are provided in **Figure 7.1.4b Non-statutory Designated Sites and Ancient Woodland**.

Name	Designation	Distance and Orientation from the Site	Description
River Stinchar (Milton to Black Hill)	pLWS	South west edge of Site	An area of predominately upland habitats including blanket bog on higher ground. Area is known to contain scarce plant species and breeding birds.
Craigenreoch and Eldrick Hill	pLWS	1.9km south	Upland habitats with large tract of good quality blanket bog. Large range of upland place species and important site for breeding birds.
Galloway	RSPW	Covers the whole Site	Woodland identified using Reynolds and Bentley selection criteria as a priority

Name	Designation	Distance and Orientation from the Site	Description
			woodland for red squirrel conservation (Reynolds and Bentley, 2004).
Straiton Hills	pLWS	425m north east	An area of botanical and ornithological interest with upland and wetland habitats, moorgrass grassland, blanket bog, rush pasture, several lochs and wooded glens.

Table 7.1.4: Non-Statutory Designated Sites Summary

60. During the desk study SWSEIC provided information on intermediate and raised bog, native woodland, ancient woodland and plantation on ancient woodland. None of these areas were located within the Site Boundary.
61. The desk study notes that there are no areas of intermediate or raised bog within the Site. No areas of ancient woodland, native woodland and PAWS were located in the Site. The nearest area of AWI woodland is Tairlaw Glen located 400m north east of the Site, with two other areas of AWI located within 2km, Whiterow Scaurs and Whiterow Burn.

3.1.3 Protected Species Desk Study Records

62. The following protected species desk study results were identified between 2010 and 2020 within Protected and Notable Species Study Area as summarised in **Table 7.1.5** and shown in **Figure 7.1.2 Desk Study Records**.

Species	Number of records	Source of record (s)	Description
Pine marten	3	SWSEIC, FLS	Sightings and usage of den boxes within the Site around South Balloch, River Stinchar and Knockbuckle and outwith the Site along the Newton Stewart Road.
Red squirrel	13	SWSEIC	Sightings located outwith the Site edge predominantly in the north east at Tairlaw Plantation and Tairlaw Ring.
Bat	33	FLS, SWSEIC	Records of six species were provided which were soprano pipistrelle <i>Pipistrellus pygmaeus</i> , common pipistrelle <i>Pipistrellus pipistrellus</i> , Daubenton's bat <i>Myotis daubentonii</i> , whiskered <i>Myotis mystacinus</i> /brandts <i>Myotis brandti</i> ⁵ , Leisler's bat <i>Nyctalus leisleri</i> and noctule bat <i>Nyctalus noctula</i> . No records were from within the Site. The nearest records were located at Loch Bradan and the Water of Girvan. The other records were in Glentrool Forest and at Balloch Hill. Only two of the records are roost records, which are soprano pipistrelles using bat boxes at Tairlaw to the east of Site.
GCN	1	FLS, SWSEIC	Positive eDNA tests were returned from four ponds located within the Site in 2015, although only one of these, near Knockbuckle in the north east of the Site, is within the GCN Survey Area (Pond 8 in the GCN Surveys). However, presence/absence surveys were not conducted at any of these ponds. SWSEIC held no records of GCN within 2km of the Site and advised that the only

⁵ Record was heard on bat detector where it is not possible to differential between these two bat species.

Species	Number of records	Source of record (s)	Description
			known/confirmed GCN population in South Ayrshire was at Culzean Castle, approximately 15km north west of the Site.

Table 7.1.5: Protected Species Desk Study Results

63. No records of badger, water vole or otter were provided within the Protected and Notable Species Study Area between 2010 and 2020.

3.1.4 Notable Species Desk Study Records

64. The several records of notable species of conservation concern were found within the Protected and Notable Species Study Area between 2010 and 2020 including European hedgehog *Erinaceus europaeus*. These records are summarised in **Table 7.1.6**.

Species	Number of Records	Source of Record(s)	Description
Amphibians (excluding GCN)	2	SWSEIC, FLS	Adult common frog <i>Rana temporaria</i> sighting and frogspawn located at Tairlaw.
Grey Squirrel	51	SWSEIC	Sightings predominantly at Stuckavullich Woods and Auchalton Meadow both outwith the Site, to the north east.
Invertebrates	2	SWSEIC	Invertebrate records included small pearl-bordered fritillary <i>Boloria selene</i> and small heath butterfly <i>Coenonympha pamphilus</i> at Stinchar Bridge in the south.
Lichens	3	SWSEIC	<i>Hypotrachyna sinuosa</i> which is listed on the Scottish Biodiversity List was recorded at Water of Ken Woods, Haugh of Ur and Carrick Forest drive to the Site of the Site.
Moss	1	FLS	One record of Stag's-horn Clubmoss <i>Lycopodium clavatum</i> outwith the Site at Tairlaw, east of the Site.
Mountain hare <i>Lepus timidus</i>	3	SWSEIC	All records located along the north east of the Site boundary on the Newton Stewart Road, one sighting was of a leveret.
Plants	3	BSBI, SWSEIC	No records were returned from within the Site. Species records within the search area were bluebell <i>Hyacinthoides non-scripta</i> , alpine clubmoss <i>Diphasiastrum alpinum</i> and corn spurrey <i>Spergula arvensis</i> . All other records were outwith the Protected and Notable Species Study Area or grid references only provided to 1km grid square.

Table 7.1.6: Notable Species Desk Study Records

3.2 Field Survey Results

3.2.1 Water Vole

65. The habitat suitability assessment found the Pulreoch Burn had moderate to high suitability for water vole and sections of Knockoner Burn had moderate suitability with suitable foraging resources, slow flowing water and banks which would support burrowing. Other watercourses within the rest of the Scoping Developable Area were predominately of low or negligible suitability for water vole including forestry ditches lacking cover, foraging resources and suitable banks for burrowing. The results of the water vole habitat assessment are shown in **Figure 7.1.5a Water Vole Habitat Suitability Assessment**.
66. Abundant water vole evidence was recorded along the Pulreoch Burn and unnamed tributaries including burrows, feeding signs and latrines (**TN1-16 and TN20-22**). The burrows at **TN20** were located directly adjacent to an existing forestry access track. Evidence of water vole was also recorded on unnamed tributaries of Tairlaw Burn (**TN17-19**) and Knockoner Burn (**TN23-26**). The full details of the water vole evidence recorded in the Protected Species Survey Area is detailed in **Annex B** and shown in **Figure 7.1.6 Protected Species Survey Results**.

3.2.2 Otter

67. The habitat suitability assessment found Pulreoch Burn, tributaries of Tairlaw Burn and Palmulan Burn and the River Stinchar to have moderate suitability for otter including foraging, resting and commuting habitat. Other smaller burns within the Scoping Developable Area were considered to have low suitability including forestry ditches. The results of the otter habitat assessment are shown in **Figure 7.1.5b Otter Habitat Suitability Assessment**.
68. Abundant otter evidence was found along Pulreoch Burn including multiple spraints (**TN27, 30, 31 and 33**) and couch (**TN32**) under a fallen conifer tree with spraint on a boulder next to it. The couch is approximately 290m north east of the Proposed Development Area with no potential to be used for breeding. Otter spraint was also recorded on Tairlaw Burn (**TN29**) during the survey and Palmulan Burn (**TN28**) during the habitat suitability assessment. No other resting sites were recorded in the Otter Survey Area. The results are detailed in **Annex B** and shown in **Figure 7.1.6 Protected Species Survey Results**.

3.2.3 Badger

69. The habitat suitability assessment found the north western, central and southern parts of the Site to be of moderate suitability for badger with suitable habitat for sett creation and foraging resources. The rest of the Scoping Developable Area was found to have low suitability with large areas of the Site being wet and flat being unsuitable for sett creation. The results of the badger habitat assessment are shown in **Figure 7.1.5c Badger Habitat Suitability Assessment**.
70. No evidence of badger was recorded during the badger surveys within the Protected Species Survey Area.

3.2.4 Pine Marten

71. The habitat suitability assessment for pine marten found moderate to high habitat suitability across large areas of the Scoping Developable Area. The highest areas of suitability were around Garleffin Fell, with moderate suitability around Stob Hill and River Stinchar. The rest of the Scoping Developable Area was found to be of low or negligible suitability with immature plantation woodland or recently felled forestry. The results of the pine marten habitat assessment are shown in **Figure 7.1.5d Pine Marten Habitat Suitability Assessment**.
72. Abundant pine marten and potential pine marten scats were recorded in the western and central parts of the Protected Species Survey Area within mature Sitka spruce plantation woodland. Two adult pine martens were observed during the habitat suitability survey in the north west of the Site (**TN35**) and one potential den was located at Stob Hill near the centre of the Protected Species Survey Area (**TN53**) during the pine marten survey. Within the north and north west of the Protected Species Survey Area, large areas of fallen trees were not accessible due to health and safety constraints. However, the presence of pine marten scat surrounding these fallen trees may indicate the presence of a den amongst the fallen trees. No aerial dens or potential aerial den features (e.g. cavities or rot holes) were recorded within the Protected Species Survey Area. The results are detailed in **Annex B** and shown in **Figure 7.1.6 Protected Species Survey Results**.

3.2.5 Red Squirrel

73. The habitat suitability assessment for red squirrel found the northern and western parts of the Scoping Developable Area to have moderate suitability for red squirrel within the mature woodland. The eastern and southern parts of the Scoping Developable Area were predominately of low suitability for red squirrel based on the habitat present being recently clear-felled woodland and immature Sitka spruce plantation not suitable to provide food or support dreys. The results of the red squirrel habitat assessment are shown in **Figure 7.1.5e Red Squirrel Habitat Suitability Assessment**.

74. Conifer cones chewed by squirrels were recorded at eight locations primarily in areas of mature plantation in the centre of the Protected Species Survey Area (**TN59-66**). No sightings of red or grey squirrels were made during the surveys. Chewed cones cannot be attributed to either species and only indicates presence of squirrels. No dreys were recorded within the Protected Species Survey Area. The results are detailed in **Annex B** and shown in **Figure 7.1.7 Incidental Species Records**.

3.2.6 Bat PRFs

75. No bat PRFs were identified within the Bat PRF Survey Area.

3.2.7 Great Crested Newt

3.2.7.1 eDNA and HSI Assessment

76. Seven ponds were identified within the GCN Survey Area (Ponds 1-7) plus a further pond (Pond 8) which was located within the original survey area based upon the Scoping Developable Area and which was one of the four ponds at which FLS had reported a positive eDNA result in 2015. A further five ponds which were identified by FLS (Ponds 9 and 10) and on OS mapping (Ponds 11, 12 and 13) to be within the GCN Survey Area were either not found or existed as ephemeral, wet marshy areas, unsuitable for GCN, as opposed to defined waterbodies which were likely to be present and hold water throughout the year and between at last most years.
77. The eight existing ponds were all assessed as being of 'Poor' suitability for supporting GCN. These ponds also underwent eDNA analysis and returned either negative or indeterminate results. The indeterminate results are most likely derived from the peat-stained water associated with the ponds within the GCN Survey Area, which can affect eDNA analysis. The eDNA results and HSI scores are presented in **Table 7.1.7** while the full HSI results can be found in **Annex C**.

Pond ID	Approximate Grid Reference	eDNA Results	HSI Pond Suitability
Pond 1	NX 37362 98638	Negative	0.30 (Poor)
Pond 2	NX 37322 98634	Negative	0.30 (Poor)
Pond 3	NX 37407 98682	Indeterminate	0.30 (Poor)
Pond 4	NX 37379 98679	Indeterminate	0.30 (Poor)
Pond 5	NX 37397 98700	Indeterminate	0.30 (Poor)
Pond 6	NX 37461 98681	Indeterminate	0.30 (Poor)
Pond 7	NX 37487 98740	Indeterminate	0.30 (Poor)
Pond 8	NX 38970 99698	Indeterminate	0.42 (Poor)
Pond 9*	NX 39084 98047	NA	NA
Pond 10*	NX 39492 97103	NA	NA
Pond 11*	NX 38281 97081	NA	NA
Pond 12*	NX 38202 96972	NA	NA

Pond ID	Approximate Grid Reference	eDNA Results	HSI Pond Suitability
Pond 13*	NX 38162 96936	NA	NA

Table 7.1.7: GCN HSI Results

*Ponds were dry or not found throughout the entirety of the survey period

3.2.7.2 Population Assessment

78. Despite the poor habitat suitability scores and negative eDNA scores, the full suite of presence/likely absence surveys were completed on all eight ponds.
79. No GCN were recorded during the bottle trapping and torch surveys in any of the ponds surveyed and no GCN eggs were recorded throughout the survey period. The species is therefore considered likely to be absent from the GCN Survey Area, despite the historical positive eDNA result provided by FLS.
80. Palmate newts were consistently recorded in Pond 8 during torchlight surveys and bottle trapping. Palmate newts were rarely recorded in Pond 1 and 4. The remaining ponds recorded no newt species throughout the survey period. A full record of the results can be found in **Annex C**.

3.2.8 Incidental Records

81. Throughout the surveys, surveyors also recorded incidental signs or sightings of notable species of conservation concern which included brown hare (**TN79**), osprey (**TN69, 73 and 74**) and common lizard (**TN68, 71 and 72**). Notable invertebrate species were also recorded including small pearl-bordered fritillary (**TN77 and 78**), Scotch Argus *Erebia aethiops*, golden-ringed dragonfly *Cordulegaster boltonii* and ringlet butterflies *Aphantopus hyperantus*. The specific locations were not recorded for common invertebrate species which were abundant in open areas and forestry rides. Full details of the incidental records are provided below in **Annex B** and shown in **Figure 7.1.7 Incidental Species Records**.

4 Conclusion

82. Water vole presence was confirmed along the Pulreoch Burn and connecting watercourses with burrows, latrines and feeding evidence recorded. Other watercourses in the west of the Protected Species Survey Area are suitable to support water vole but no evidence of the species' presence was recorded. However, watercourses present within the plantation woodland were not suitable to support water vole populations due to lack of foraging resources, cover from predators and soft banks not suitable for burrows.
83. Otter presence was confirmed along Pulreoch Burn, Palmullan Burn and Tairlaw Burn; they are also likely to be present on the River Stinchar however no evidence of the species was found within the small section covered within the Otter Survey Area. Only one otter couch was recorded which was on the edge of the Otter Survey Area on the Pulreoch Burn, approximately 290m from the Proposed Development Area.
84. No evidence of badgers was not recorded within the Protected Species Survey Area; however suitable habitat was present. With no barriers between the Protected Species Survey Area and wider area and historical data of badger presence, badgers could move into suitable habitat in the Protected Species Survey Area in the future.
85. From the desk study it is known that both red and grey squirrels are present in the Site and wider surrounding area. Therefore, without further surveys the squirrel evidence recorded in the Protected Species Survey Area cannot be attributed to one species.
86. Pine marten was confirmed to be present within the Protected Species Survey Area with the sighting of two adults in the mature woodland in the north west of the Protected Species Survey Area. The pine marten scats and potential den features cannot be confirmed without further survey including DNA analysis of the scats and camera trapping

any potential den features. However, a suspected den was located at Stob Hill approximately 250m from the nearest access track and 350m from the nearest wind turbine.

87. No bat PRFs were identified within the Bat Survey Area, further information on dedicated bats surveys undertaken at the Site are outlined within **Appendix 7.3 Bat Survey Report** of the EIAR.
88. GCN was not recorded within the GCN Survey Area despite the historical positive eDNA result provided by FLS. The habitat suitability for GCN was poor at all ponds located within the GCN Survey Area and it is considered unlikely that GCN would move into the GCN Survey Area in the future. However, there was suitable habitat for other amphibian species including common frog and palmate newt, both of which were recorded throughout the survey period.
89. Other notable species of conservation concern recorded as present in the Protected Species Survey Area during the surveys, include; common lizard, brown hare, small pearl-bordered fritillary and deer. The Site has the potential to support hedgehogs, various invertebrate species and other reptile species like adder and slow worm *Anguis fragilis*.

5 References

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Annex A

Relevant Legislation

Designated Sites

The Habitats Regulations provide strict protection to sites of European and/or international importance. This includes requiring projects or plans to be screened for likely significant effects upon SPAs, SACs and candidate SACs (cSACs). Guidance also requires potential SPAs (pSPAs) and Ramsar Sites are subject to the same assessment.

SSSIs receive protection through the Nature Conservation (Scotland) Act 2004. Activities which may affect the SSSI must be notified to NatureScot in advance of proposed works and written consent received.

Local Nature Reserves

Local Nature Reserves (LNRs) can be declared by local authorities in conjunction with NatureScot to reflect areas of local nature conservation importance or amenity and to give access to the public. A management agreement, often in the form of a management plan, is usually required and bylaws may be introduced to regulate the use of the LNR. The legislative basis is the Wildlife and Countryside Act 1981 (as amended by the Local Government and Planning (Scotland) Act 1982). In addition a number of conservation organisations own or lease land as nature reserves.

Local Wildlife Sites

Local Wildlife Sites (or Local Biodiversity Sites) are identified to recognise places of local biodiversity importance outside statutory designated areas. Each local authority area operates a local wildlife sites system, though how these are assigned may differ between authorities.

Water Vole

Water voles are protected by the Wildlife and Countryside Act 1981 (as amended). This protection is currently restricted to a water vole's place of shelter. It is an offence to intentionally or recklessly:

- damage, destroy or obstruct access to a water vole burrow; and
- disturb a water vole while it is using its burrow.

This means that if water voles could be affected in these ways by a development, and no action is taken to prevent it, an offence may be committed.

Otter

Otters are classed as European Protected Species (EPS) under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). It is therefore an offence to deliberately or recklessly:

- kill, injure, capture or harass an otter;
- disturb an otter whilst it is occupying a holt (underground den) or other place it uses for shelter or protection, or while it is rearing or otherwise caring for its young, or in any way that impairs its ability to survive or breed, or significantly affects the local distribution or abundance of otters; and
- obstruct access to an otter breeding site or resting place, or otherwise prevent their use.

⁶ unless the den is in the roof space or other part of a house, where it is not an offence to discourage a pine marten from using the den, or to block access to the den, provided a pine marten is not in the den at the time and does not have dependent young.

And whether or not deliberate or reckless:

- to damage or destroy an otter breeding site or resting place.

This means that if otters could be affected in these ways by a development, and no action is taken to prevent it, an offence may be committed.

Badger

Badgers and their setts are protected under the Protection of Badgers Act 1992 as amended by the Wildlife and Natural Environment (Scotland) Act 2011. It is an offence under the Act to:

- wilfully injuring or killing a badger;
- disturbing a badger while it is in a sett; and
- intentionally or recklessly damaging or destroying any part of a badger sett, or obstructing access to a sett.

The Protection of Badgers Act defines a badger sett as 'any structure or place which displays signs indicating current use by a badger'.

Pine Marten

Pine martens and their dens are protected by the Wildlife and Countryside Act 1981 (as amended) and by the Nature Conservation Act 2004. It is an offence to intentionally or recklessly:

- kill, injure or capture a pine marten;
- disturb a pine marten in a den⁶; and
- damage, destroy or obstruct access to a pine marten den.

This means that if pine martens could be affected in these ways by a development, and no action is taken to prevent it, an offence may be committed.

Red Squirrel

Red squirrels and their dreys are protected by the Wildlife and Countryside Act 1981 (as amended) and by the Nature Conservation Act 2004. It is an offence to intentionally or recklessly:

- kill, injure or capture a red squirrel;
- disturb a red squirrel in a drey; and
- damage, destroy or obstruct access to a red squirrel drey.

This means that if red squirrels could be affected in these ways by a development, and no action is taken to prevent it, an offence may be committed.

Great Crested Newts

GCN are classed as European Protected Species (EPS) under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). It is therefore an offence to deliberately or recklessly:

- capture, injure or kill a wild animal;
- disturb an animal while using any structure or place it uses for shelter or protection – e.g. breeding pond, hibernation site;
- obstruct access to a breeding site or resting place of an animal, or otherwise deny the animal use of that site;

- disturb an animal in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species; and
- disturb an animal in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It's also an offence to:

- damage or destroy a breeding site or resting place of any such animal (whether or not deliberately or recklessly); and
- keep, transport, sell or exchange, or offer for sale or exchange any such animal (or any part or derivative of one) obtained after May 1994.

Reptiles

There are three terrestrial species of reptile naturally found in Scotland; adder, slow worm and common lizard (also known as viviparous lizard). All are protected by the Wildlife and Countryside Act 1981 (as amended) and by the Nature Conservation Act 2004. Offences relevant to development works include:

- to intentionally or recklessly kill or injure an adder, slow worm or common lizard.

This means that if reptiles could be affected in these ways by a development, and no action is taken to prevent it, an offence may be committed.

Amphibians (excluding GCN and natterjack toad *Epidalea calamita*)

Common amphibian species (excluding GCN and natterjack toad) found naturally in Scotland are given limited protection under the Wildlife and Countryside Act 1981 (as amended). These species are the common frog common toad *Bufo bufo*, palmate newt and smooth newt *Lissotriton vulgaris*. No protection is afforded to common amphibian species from development. They are only protected against trade (i.e. sale, barter, exchange, transport for sale or advertise for sale or to buy).

Brown Hare and Mountain Hare

Brown hares and mountain hares are protected in the closed season under the Wildlife and Countryside Act 1981 (as amended).

The mountain hare is also a species of 'Community interest' listed on Annex V of the Habitats Directive. To ensure a favourable conservation status, the taking of these animals and their exploitation may be subject to management measures.

Both species of hare are quarry species and may be legally controlled in open season.

It is an offence to intentionally or recklessly kill, injure or take a brown or mountain hare:

- in its closed season; and
- without a legal right to do so (i.e. poaching) – includes rabbit also.

It is also an offence to possess or control, sell or offer for sale, or transport for the purpose of sale any living or dead hare (or rabbit), or any derivative of such an animal, which has been killed without a legal right to do so.

Wild Mammals

Wild mammals are protected from intentional:

- stabbing;
- impaling;
- crushing; and
- asphyxiation.

Amongst other methods of which may cause harm and unnecessary suffering under the Wild Mammals (Protection) Act 1996.

Annex B

Field Results Target Notes

Target Notes

Target Note Number	Grid Reference	Species	Description
1	NX3909198955	Water vole	Adjacent to Pulreoch Burn has field and water vole burrows.
2	NX3860298834	Water vole	Multiple water vole burrows along watercourse with grazed lawn area around entrances.
3	NX3876598884	Water vole	Multiple water vole burrow along watercourse with grazed lawn area around entrance.
4	NX38289 98752	Water vole	Multiple burrows along burn.
5	NX3912098987	Water vole	Burrows adjacent to forestry road at Pulreoch Burn, approximately 10m from culvert. Water vole latrine with feeding signs and distinct runs are present between the rushes.
6	NX3911398980	Water vole	Several burrows and runs throughout area with feeding signs surrounding.
7	NX3910698965	Water vole	Three burrows adjacent to Pulreoch Burn including one sub-aquatic entrance.
8	NX3909898955	Water vole	Multiple burrows at watercourse.
9	NX3907798957	Water vole	Distinct water vole burrow 2m from water's edge, with characteristic feeding signs as well as droppings at the entrance of the burrow.
10	NX3892898992	Water vole	Distinct burrow with feeding signs.
11	NX3848798914	Water vole	Water vole feeding signs
12	NX3849098906	Water vole	One burrow.
13	NX3840898887	Water vole	One burrow.
14	NX3831398854	Water vole	One burrow.
15	NX3826098711	Water vole	Medium density of burrows from Pulreoch Burn confluence to this data point. Consistent feeding signs and latrines scattered throughout stretch of watercourse.
16	NX3826998692	Water vole	Burrow directly adjacent to watercourse.
17	NX3894097987	Water vole	Burrow adjacent to burn with signs of feeding on the outside burrow.
18	NX3906898180	Water vole	Burrow adjacent to burn.

Target Note Number	Grid Reference	Species	Description
19	NX3904798171	Water vole	Latrine found adjacent to burn on top of moss.
20	NX3822898636	Water vole	Three burrows within close proximity with several feeding stations throughout the area, next to slack section of burn. Signs of recent activity with lawns on the outside of burrows. The burrows are 5m from forestry road.
21	NX3828498515	Water vole	Water vole droppings on bankside.
22	NX3810298258	Water vole	Small cluster of burrows next to dry stone dyke wall.
23	NX3756798749	Water vole	Burrow found in small section of burn just before passage into coniferous woodland. No indication of a large population. Lack of feeding signs or droppings in the surrounding area.
24	NX3724298614	Water vole	Burrow on left hand bank with a run on the adjacent side. Feeding station found within 5m of burrow. Watercourse stagnant at time of surveys.
25	NX3720998638	Water vole	Several runs and occasional burrows.
26	NX3704698775	Water vole	Large runs however field vole signs surrounding runs.
27	NX38793 98924	Otter	Old spraint on boulder in burn.
28	NS36023 00281	Otter	Fresh spraint on rock in watercourse.
29	NX3916597391	Otter	Otter spraint on boulder next to watercourse. No structures near but ample resting areas in rush.
30	NX3901198974	Otter	Spraint found on boulder within Pulreoch Burn containing fish bones.
31	NX3890398977	Otter	Otter spraint on boulder.
32	NX3886998962	Otter	Couch with spraint on boulder adjacent to it. Chutes and worn paths into the watercourse. Couch situated under a fallen conifer where vegetation has been trampled underneath.
33	NX3903598138	Otter	Spraint found on top of boulder.
34	NX3569599163	Pine marten	Scat on ride between forest plantations.
35	NX3574499144	Pine marten	Sighting of two pine martens, one ran out of sight and the other up a tree ahead of surveyor.
36	NX 36619 96552	Pine marten	Potential pine marten scat on ride.
37	NX3514999231	Pine marten	Multiple pine marten droppings in centre of road.
38	NX3611099867	Pine marten	Potential old pine marten scat.
39	NX3521899209	Pine marten	Fresh pine marten scat.
40	NX3598399611	Pine marten	Potential pine marten scat in mature plantation.

Target Note Number	Grid Reference	Species	Description
41	NX3557299079	Pine marten	Old pine marten scat in mature woodland.
42	NX3421998649	Pine marten	Potential pine marten scat, broken up and lying on small path within forestry ride.
43	NX3531898696	Pine marten	Pine marten scat in middle of forestry ride
44	NX3540098825	Pine marten	Potential pine marten scat, quite broken up and within mature forestry ride with occasional scat that looks more like fox nearby.
45	NX3564698492	Pine marten	Suitability for pine marten in linear strip of clear fell along ride with potential denning opportunities but no evidence found.
46	NX3660399010	Pine marten	Fairly obvious mammal path that bisects forestry ride with potential pine marten scat but is old and degraded.
47	NX3658098775	Pine marten	Potential fresh pine marten scat.
48	NX3780898151	Pine marten	Pine marten scat adjacent to dry stone dyke wall.
49	NX3775398159	Pine marten	Abundance of pine marten scats adjacent to potential den site (TN53).
50	NX3745397967	Pine marten	Suitable denning site under a root plate with worn entrance. However, no evidence of pine marten recorded.
51	NX3740897966	Pine marten	Sweet smelling scat found in a small clearing in mature Sitka spruce plantation.
52	NX3748598211	Pine marten	Old scat with bones and fur throughout sat atop a mound of moss which was sweet smelling scent.
53	NX3776198172	Pine marten	Potential pine marten den under root plates and fallen trees. Pine marten scat at entrance of run which leads into large area off fallen trees with potential denning opportunities.
54	NX3912798439	Pine marten	Potential pine marten scat.
55	NX3581599439	Pine marten	Pine marten scat on top of a boulder adjacent to burn.
56	NX3371299589	Pine marten	Pine marten scat.
57	NX3655398669	Pine marten	Possible pine marten scat on forestry road, no smell.
58	NX3627498306	Pine marten	Possible pine marten scat, in wayleave on mound of moss, pleasant smell.
59	NX3531198678	Squirrel	Squirrel chewed cone in middle of forestry ride.
60	NX3705999053	Squirrel	Squirrel chewed cone.
61	NX3676899052	Squirrel	Several squirrel chewed cones.
62	NX3756998929	Squirrel	Squirrel chewed cones, adjacent to small burn along forestry ride.

Target Note Number	Grid Reference	Species	Description
63	NX3761798881	Squirrel	Squirrel chewed cone.
64	NX3809698563	Squirrel	Squirrel chewed pine cone in woodland.
65	NX3747097957	Squirrel	Multiple squirrel chewed cones on woodland floor.
66	NX3737998886	Squirrel	Partially squirrel chewed cone
67	NX3704996294	Owl	Owl nest box erected on dead standing tree.
68	NX3845198383	Common lizard	Common lizard sighting.
69	NX3704198294	Osprey	Osprey pair observed – one osprey alarm calling while flying overhead (observed outwith osprey exclusion zone).
70	NX3392298295	Mammal path	Worn mammal path underneath fence and into forestry, however no evidence of PS.
71	NX3415698391	Common lizard	Common lizard sighting.
72	NX3658198830	Common lizard	Common lizard observed.
73	NX3644798205	Osprey	Osprey alarm calling, did not appear happy with surveyor presence however surveyor over 750m from nest location.
74	NX3694798300	Osprey	Osprey alarm calling the day after TN73. Osprey alarm calling again as surveyor walked round north side of Loch over 750m from nest.
75	NX3773198207	Mammal path	Mammal path adjacent to area of fallen trees.
76	NX3844697157	Reptile habitat	Dry stone dyke wall suitable for basking reptiles.
77	NX3760199093	Small pearl bordered fritillary	Sighted flying within open ride.
78	NX3446099360	Small pearl-bordered fritillary	Sighted flying within open ride.
79	NX3459298230	Brown hare	Brown hare sighted running across forestry road.

Annex C

GCN Survey Raw Data

HSI Assessment Data

SI No	SI Description	Pond 1	Pond 2	Pond 3	Pond 4	Pond 5	Pond 6	Pond 7	Pond 8
1	Geographic location	Area C = 0.01	Area C = 0.01	Area C = 0.01	Area C = 0.01	Area C = 0.01	Area C = 0.01	Area C = 0.01	Area C = 0.01
2	Pond area (m2)	0.9 = 0.05	0.9 = 0.05	1.5 = 0.05	9 = 0.05	1.2 = 0.05	2 = 0.05	4 = 0.05	128 = 0.1
3	Pond permanence	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5
4	Water quality	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
5	Shade	50 = 1	30 = 1	0 = 1	25 = 1	5 = 1	0 = 1	0 = 1	40 = 1
6	Waterfowl effect	1	1	1	1	1	1	1	1
7	Fish presence	1	1	1	1	1	1	1	1
8	Pond Density	1	1	1	1	1	1	1	1
9	Terrestrial habitat	1	1	1	1	1	1	1	1
10	Macrophyte cover	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5
HSI Pond Suitability		0.30 (Poor)	0.30 (Poor)	0.30 (Poor)	0.30 (Poor)	0.30 (Poor)	0.30 (Poor)	0.30 (Poor)	0.42 (Poor)

GCN Population Assessment Data

Pond 1		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	Palmete (P)	1m	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	Smooth (S)	0	0	0		9			
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			

Pond 1		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 3	GCN	0	0	0	1 male common frog recorded during torch survey				
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 2		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0	Prolonged dry period				
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
Survey 2	GCN	0	0	0					
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 3		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 4		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	1m	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			

Pond 4		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 5		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 6		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
	GCN	0	0	0	Pond dry				

Pond 6		Method							
Survey 2	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	0	0		16	Dry	2	Prolonged dry period
Survey 4	S	0	0	0		9			
	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during
	S	0	0	0		9			

Pond 7		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0					
	P	0	0	0		11	Light Rain	1	Light rain within 24 hours of survey
	S	0	0	0		9			
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	0	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 8		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
	GCN	0	0	0					

Pond 8		Method							
Survey 1	P	1m	6m 4f	0					Light rain within 24 hours of survey
	S	0	0	0		11	Light Rain	1	
Survey 2	GCN	0	0	0					
	P	0	3m	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0					
	P	4m	10m 3f	0	1 eft	16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0					
	P	0	6m 4f	0		12	Light Rain	2	Light rain during survey
	S	0	0	0		9			

Pond 9		Method							
	Species	Torching	Bottle Trapping	Egg Searches	Comments	Temperature Air (0C)	Precipitation	Wind Speed	Comments
Survey 1	GCN	0	0	0	Pond dry				
	P	0	0	0					Light rain within 24 hours of survey
	S	0	0	0		11	Light Rain	1	
Survey 2	GCN	0	0	0	Pond dry				
	P	0	0	0		11	Dry	2	Prolonged dry period
	S	0	0	0		8			
Survey 3	GCN	0	0	0	Pond dry				
	P	0	0	0		16	Dry	2	Prolonged dry period
	S	0	0	0		9			
Survey 4	GCN	0	0	0	Pond dry				
	P	0	0	0		12	Light Rain	2	Light rain during survey

Pond 9		Method							
	S	0	0	0	9				

Annex D

Figures

Figure 7.1.1: Carrick Site Location and Layout

Figure 7.1.2: Desk Study Records

Figure 7.1.3: Ecology Survey Areas

Figure 7.1.4a: Statutory Designated Sites

Figure 7.1.5b: Non-statutory Designated Sites and Ancient Woodland

Figure 7.1.6a: Water Vole Habitat Suitability Assessment

Figure 7.1.7b: Otter Habitat Suitability Assessment

Figure 7.1.8c: Badger Habitat Suitability Assessment

Figure 7.1.9d: Pine Marten Habitat Suitability Assessment

Figure 7.1.10e: Red Squirrel Habitat Suitability Assessment

Figure 7.1.11: Protected Species Survey Results

Figure 7.1.12: Incidental Species Records

Carrick Windfarm Project Team

ScottishPower Renewables

9th Floor

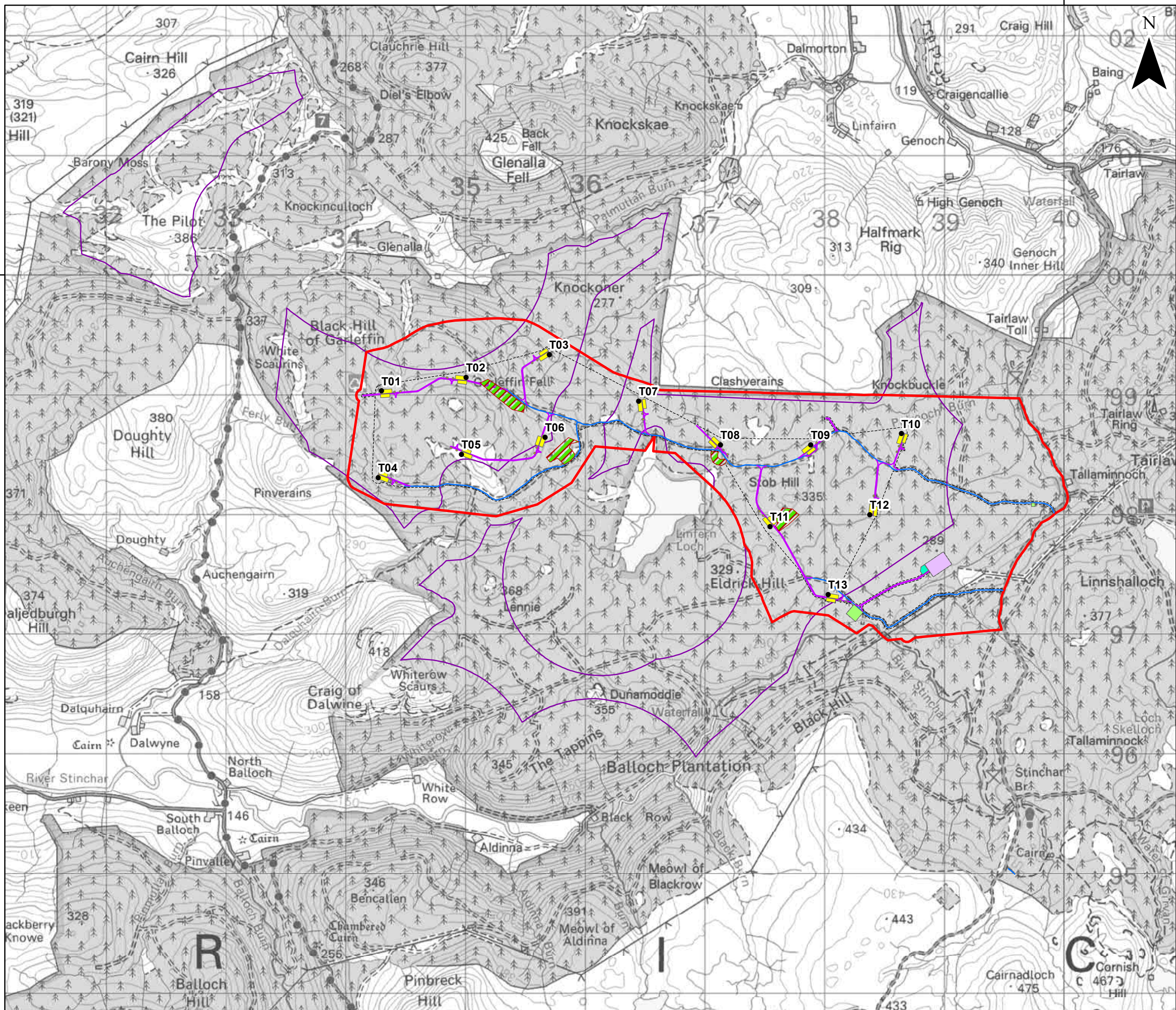
320 St Vincent Street

Glasgow

G2 5AD

carrickwindfarm@scottishpower.com

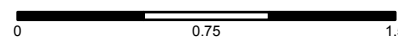




Legend

- Site Boundary
- Scoping Developable Area
- Proposed Development Area
- Proposed Infrastructure**
- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New Construction
- Carrick Access Track - Existing Forestry Track to be Upgraded

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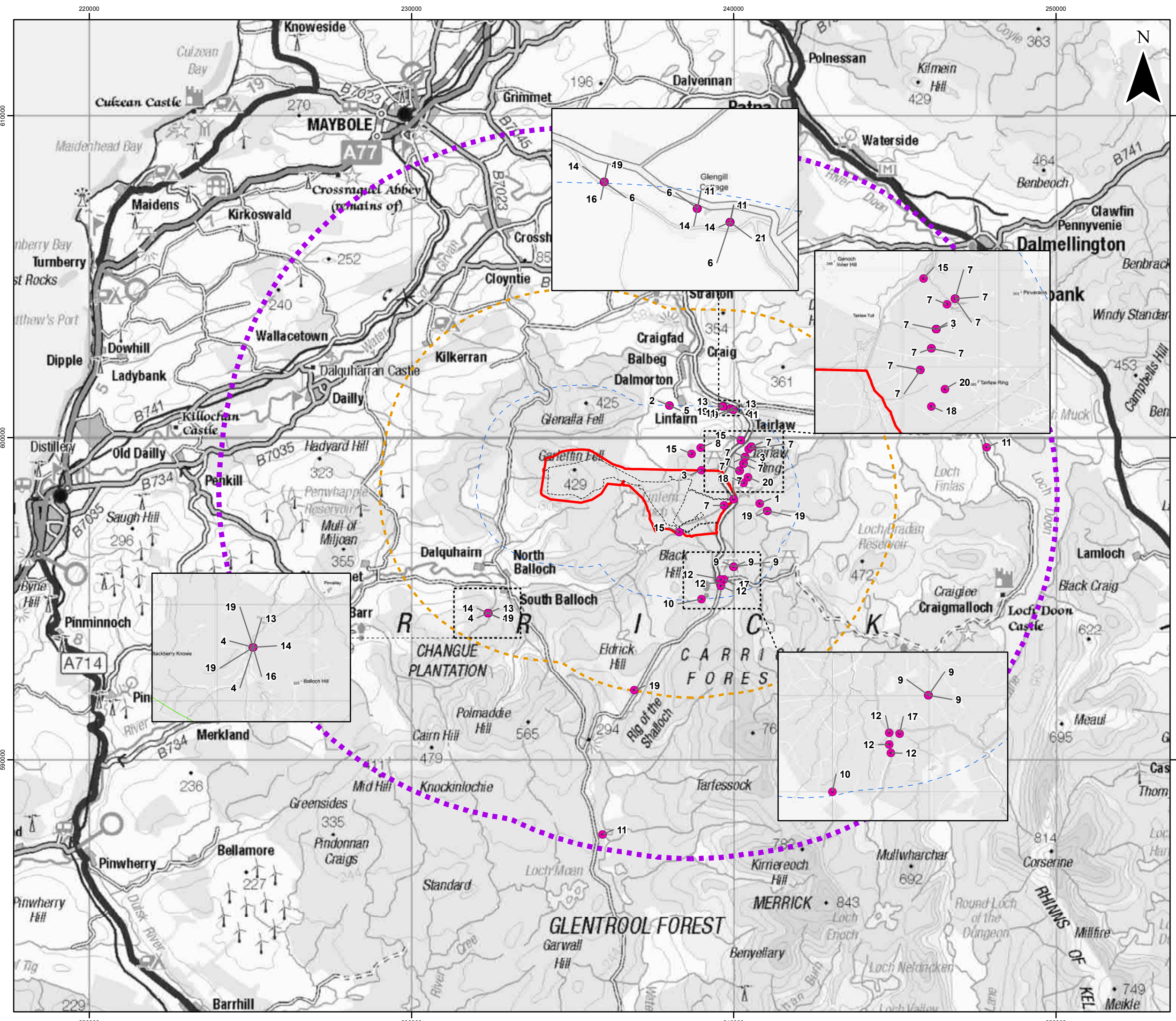


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C	21/10/2021	JO	Third Issue.
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.



Carrick Windfarm
Figure 7.1.1 Carrick Site Location and Layout Plan

Drg No	Carrick-WSP-I-094
Rev	C
Date	21/10/2021
Scale	1:30,000 @ A3



Legend

- Site Boundary
- Proposed Development Area
- 10km Buffer
- 5km Buffer
- 2km Buffer
- Desk Study Records

- 1- Alpine clubmoss
- 2- Bluebell
- 3- Common frog
- 4- Common pipistrelle bat
- 5- Corn spurrey
- 6- Daubenton's bat
- 7- Red squirrel
- 8- Great crested newt
- 9- Hypotrachyna sinuosa
- 10- Large black slug
- 11- Noctule bat
- 12- Mountain hare
- 13- Myotis bat
- 14- Natterer's bat
- 15- Pine Marten
- 16- Pipistrelle bat species
- 17- Small heath
- 18- Small pearl-bordered fritillary
- 19- Soprano pipistrelle bat
- 20- Stag's-horn clubmoss
- 21- Whiskered or brandt's bat

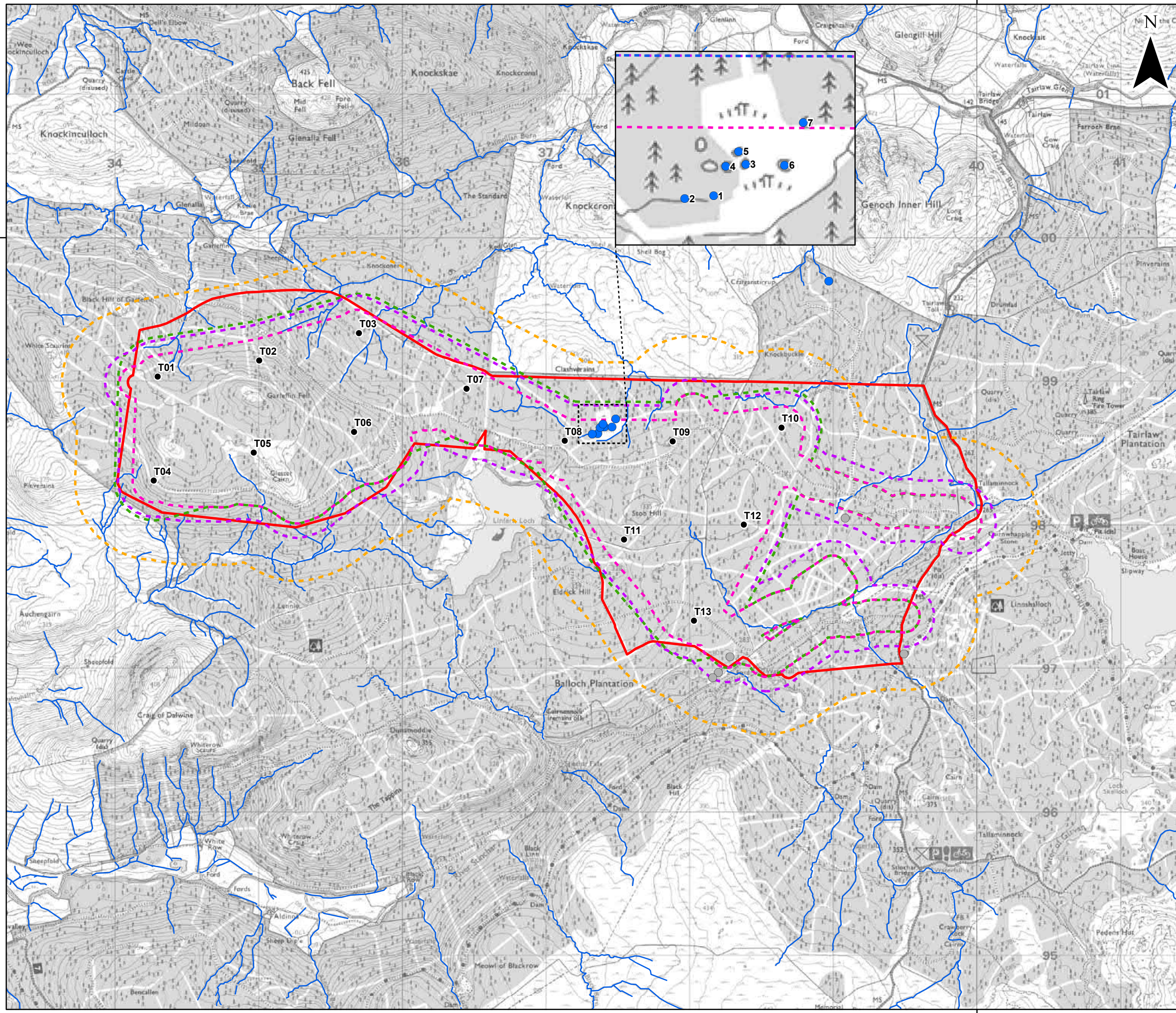
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C	18/10/2021	JO	Third Issue.
B	19/11/2020	BG	Second Issue
A	04/11/2020	BG	First Issue.



Carrick Windfarm
 Figure 7.1.2 Desk Study Records

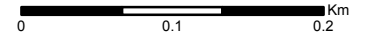
Drg No	Carrick-WSP-I-095
Rev	C
Date	18/10/2021
Scale	1:110,000 @ A3



- ### Legend
- Site Boundary
 - Proposed Wind Turbine
 - Watercourse
 - Otter Survey Area
 - Protected Species Survey Area
 - Bat PRF Survey Area
 - GCN Survey Area

- ### GCN Pond Status
- Existing
 - Dried up/no longer in existence

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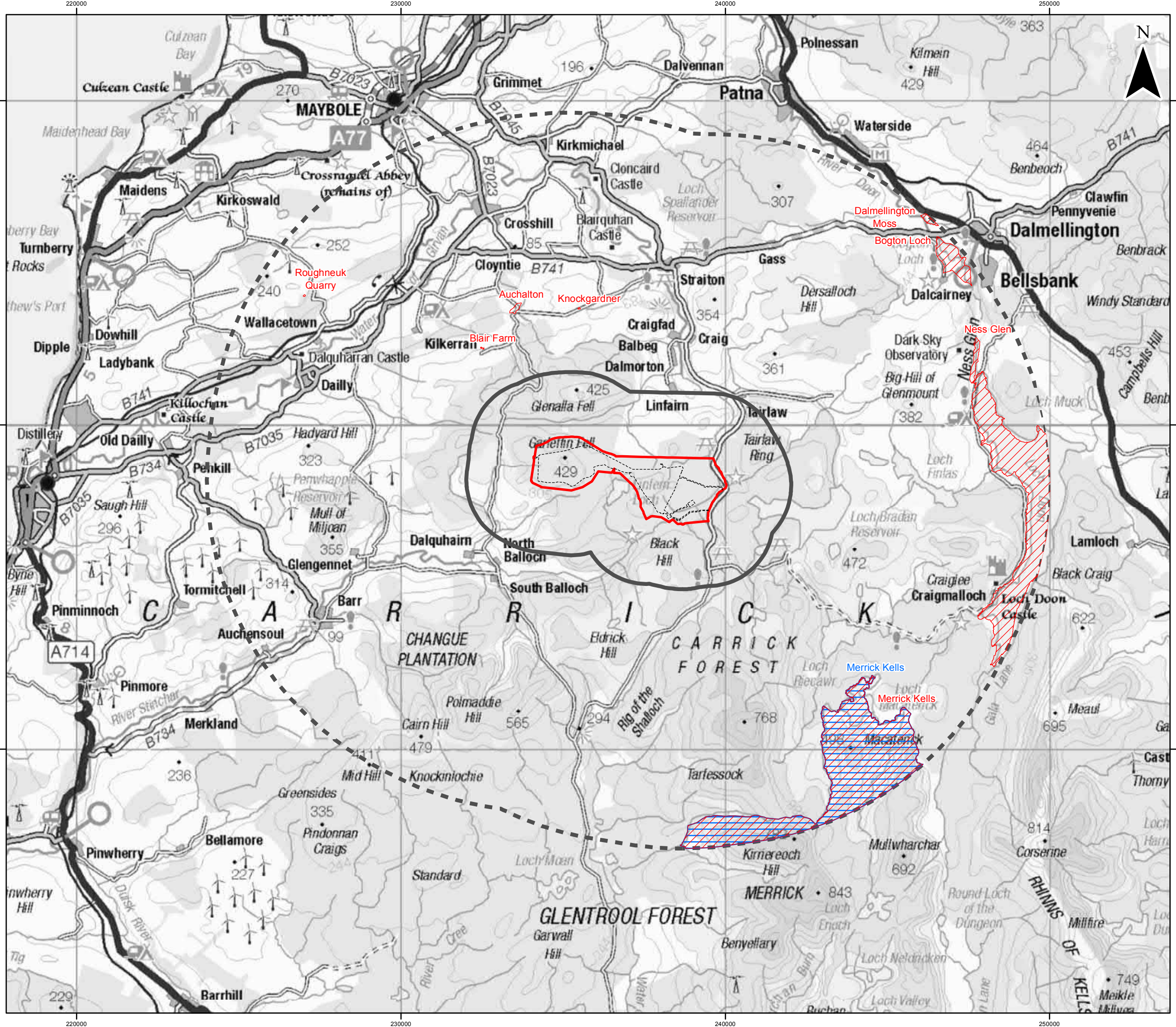


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B	21/10/2021	JO	Second Issue
A	09/11/2020	BG	First Issue.



Carrick Windfarm
 Figure 7.1.3 Ecology Survey Areas

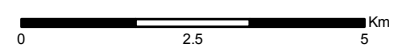
Drg No	Carrick-WSP-I-096
Rev	B
Date	21/10/2021
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Legend

- Site Boundary
- Proposed Development Area
- 2km Buffer
- 10km Buffer
- Site of Special Scientific Interest
- Special Area of Conservation

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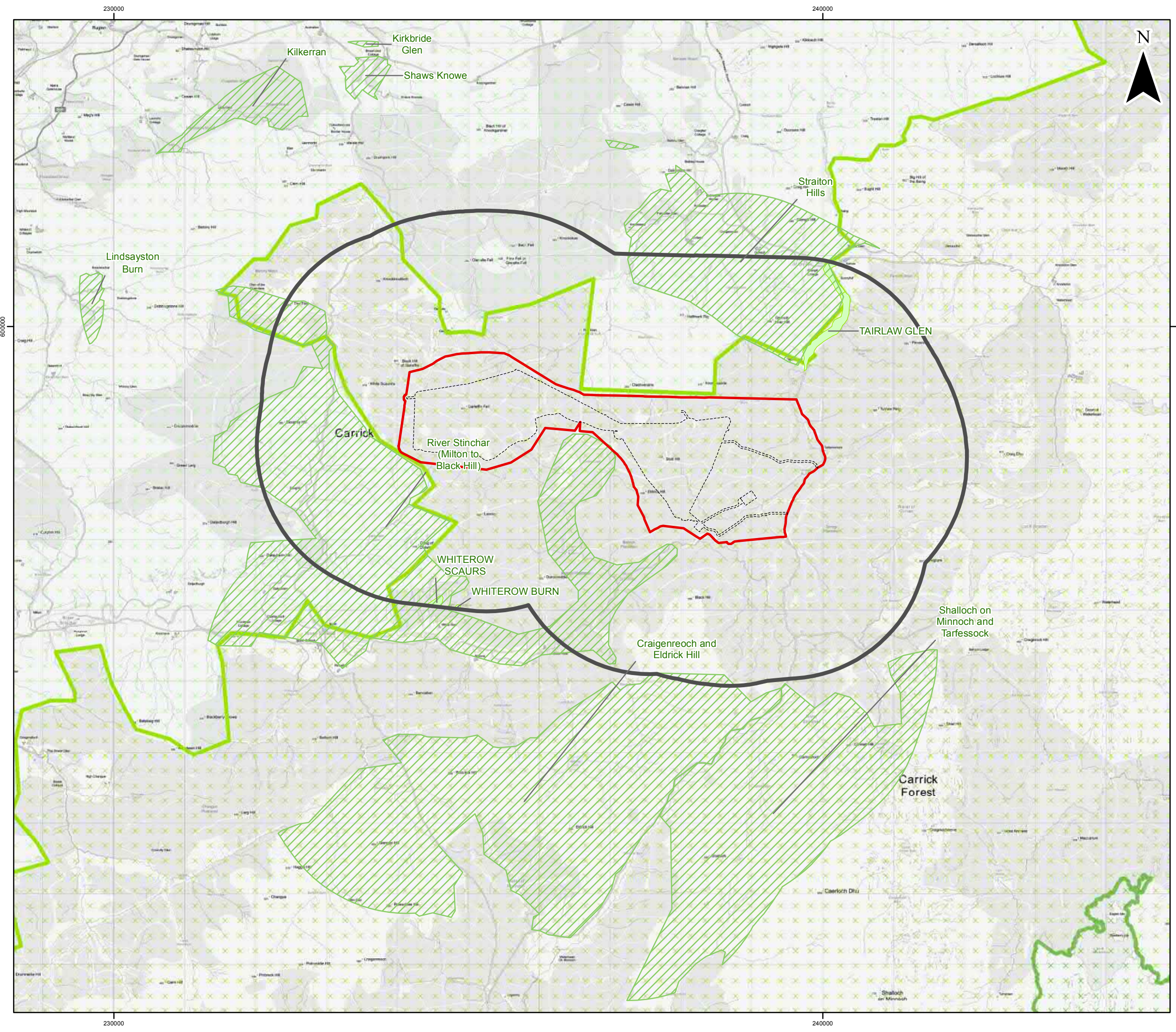


Rev	Date	By	Comment
C	01/11/2021	JO	Third Issue.
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A	10/11/2020	BG	First Issue.



Carrick Windfarm
Figure 7.1.4a Statutory Designated Sites

Drg No	Carrick-WSP-I-142
Rev	C
Date	01/11/2021
Scale	1:110,000 @ A3



Legend

- Site Boundary
- Proposed Development Area
- 2km Buffer
- Provisional Local Wildlife Site (pLWS)
- Ancient Woodland Inventory
- Biosphere Zone - Core Area
- Biosphere Zone - Buffer Area
- Biosphere Zone - Transition Area

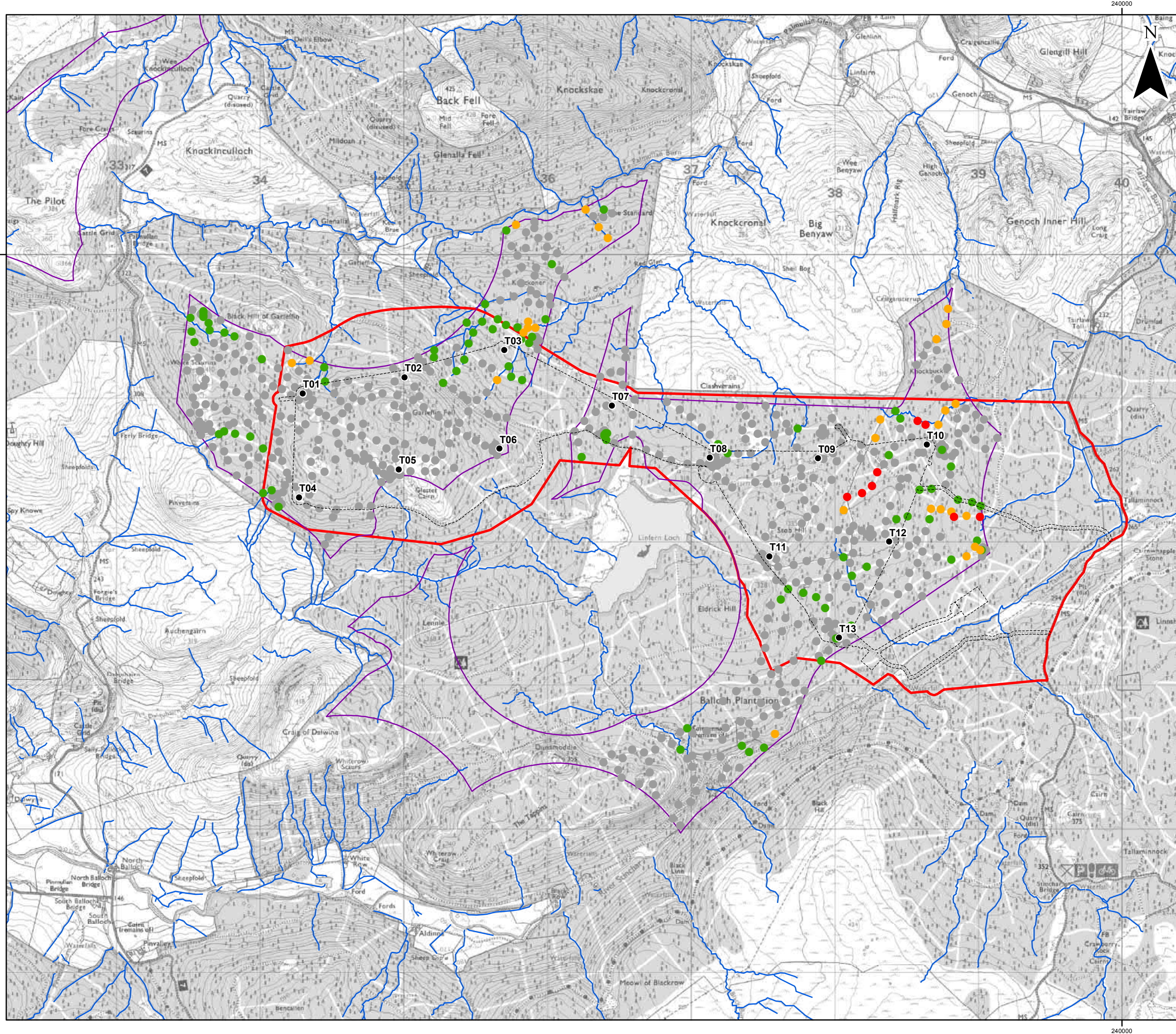
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Carrick Windfarm
 Figure 7.1.4b Non-Statutory Designated Sites and Ancient Woodland

Drg No	Carrick-WSP-I-155
Rev	C
Date	21/10/2021
Scale	1:50,000 @ A3



24000



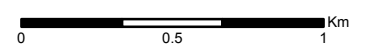
Legend

- Site Boundary
- Proposed Wind Turbine
- Proposed Development Area
- Scoping Developable Area
- Watercourse

Habitat Suitability - Water Vole

- High
- Moderate
- Low
- Negligible

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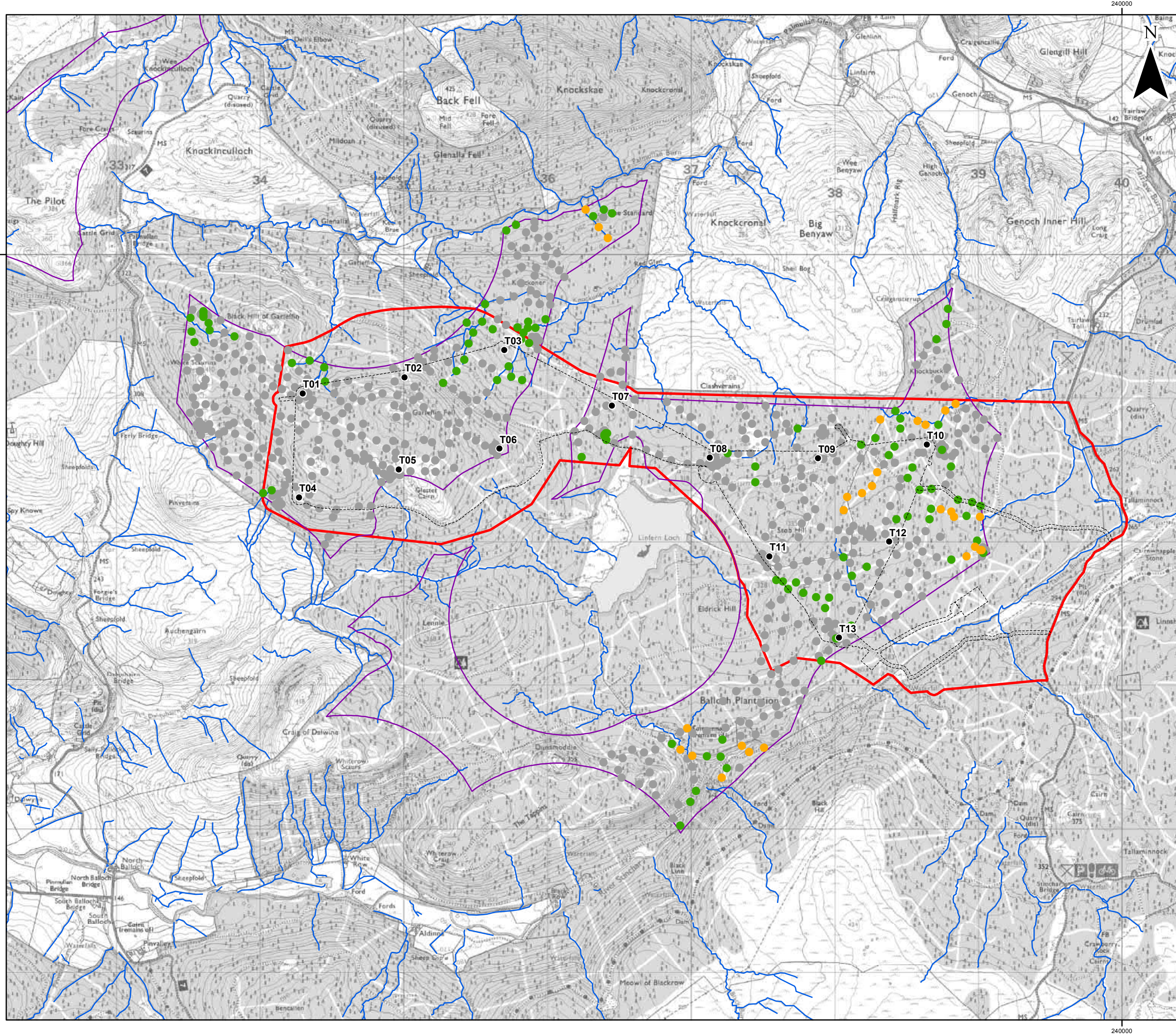
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C	21/10/2021	JO	Third Issue
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A	10/11/2020	BG	First Issue.



Carrick Windfarm
Figure 7.1.5a Water Vole Habitat Suitability Assessment

Drg No	Carrick-WSP-I-137
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Date	21/10/2021
Scale	1:25,000 @ A3

24000



24000



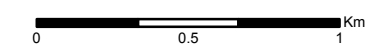
Legend

- Site Boundary
- Proposed Wind Turbine
- Proposed Development Area
- Scoping Developable Area
- Watercourse

Habitat Suitability - Otter

- Moderate
- Low
- Negligible

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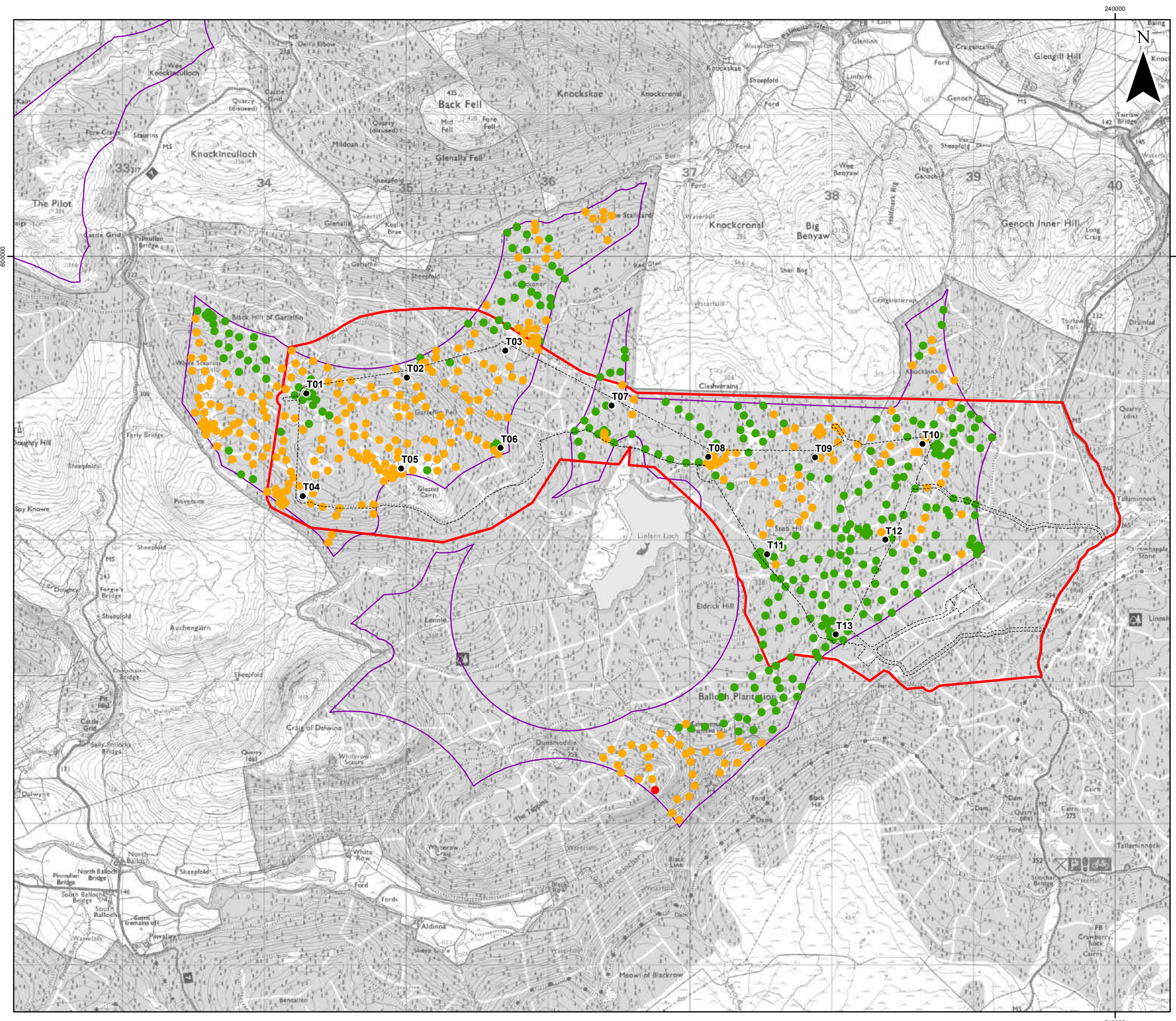
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C	21/10/2021	JO	Third Issue
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Carrick Windfarm
Figure 7.1.5b Otter Habitat Suitability Assessment

Drg No	Carrick-WSP-I-138
Rev	C
Date	21/10/2021
Scale	1:25,000 @ A3

24000



Legend

- Site Boundary
- Proposed Wind Turbine
- Proposed Development Area
- Scoping Developable Area

Habitat Suitability - Badger

- High
- Moderate
- Low

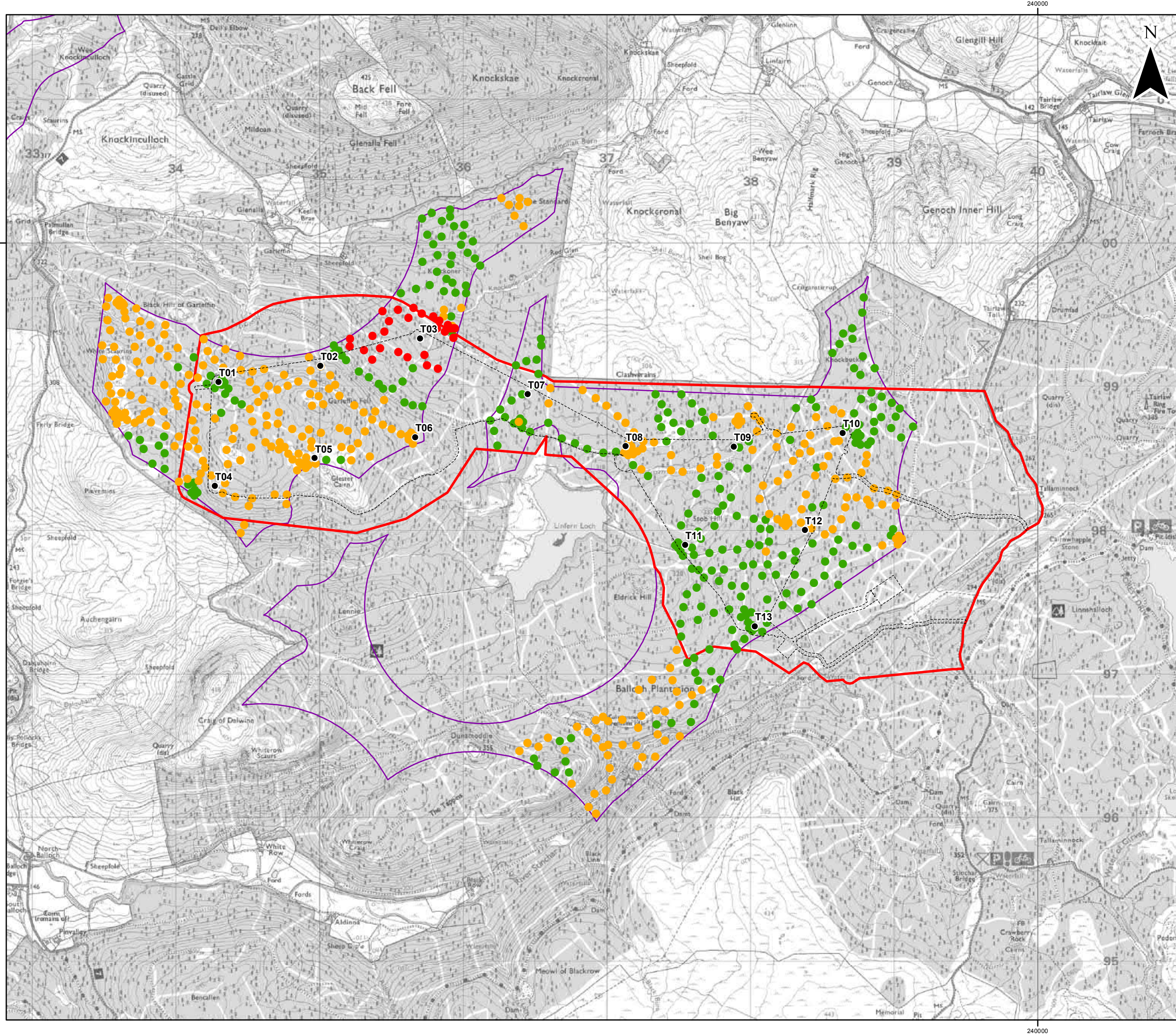
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Carrick Windfarm
Figure 7.1.5c Badger Habitat Suitability Assessment

Drg No	Carrick-WSP-I-139
Rev	C
Date	21/10/2021
Scale	1:25,000 @ A3



Legend

- Site Boundary
- Proposed Wind Turbine
- Proposed Development
- Scoping Developable Area

Habitat Suitability - Pine Marten

- High
- Moderate
- Low

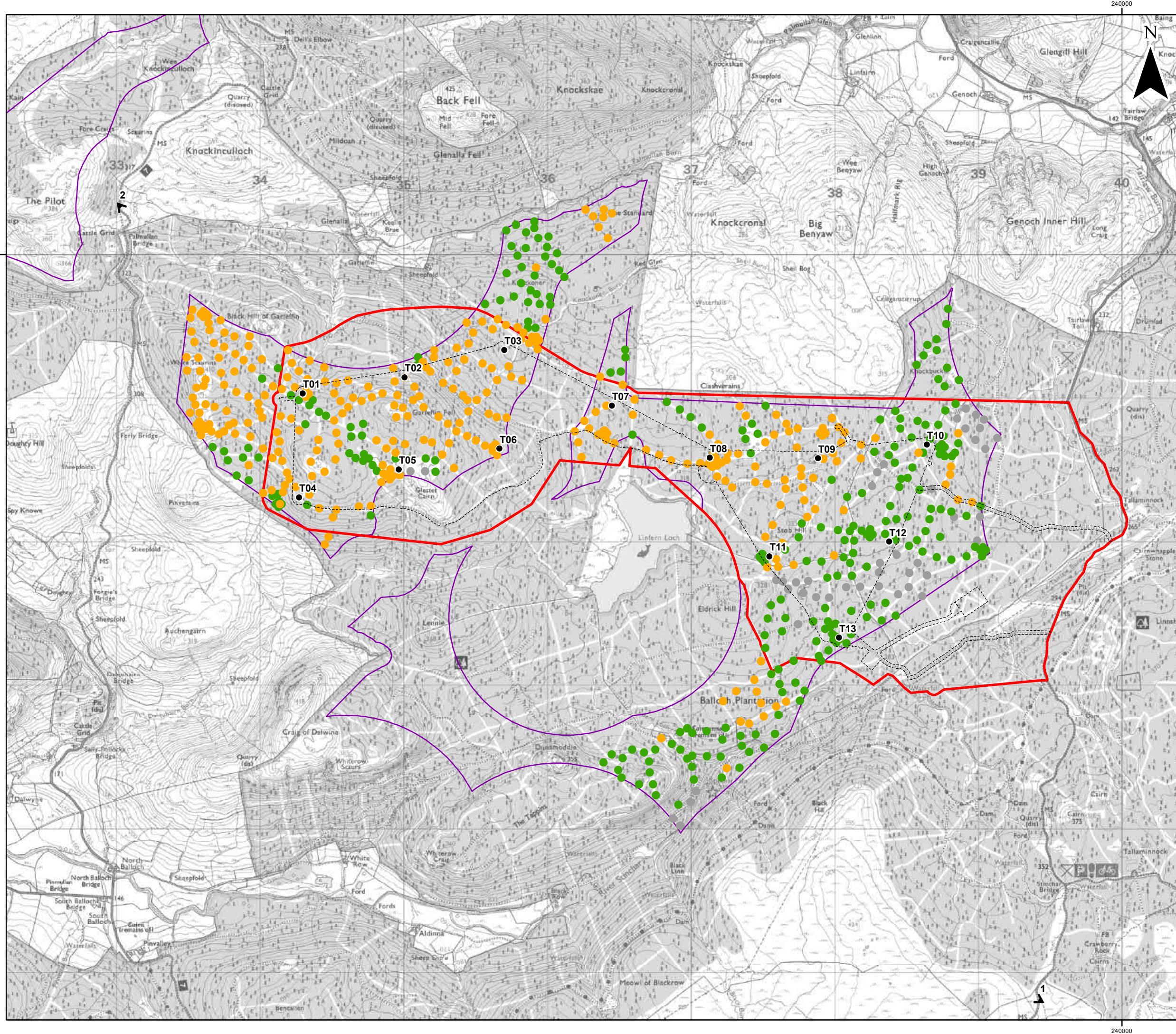
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A	10/11/2020	BG	First Issue.



Carrick Windfarm
 Figure 7.1.5d Pine Marten Habitat Suitability Assessment

Drg No	Carrick-WSP-I-140
Rev	C
Date	21/10/2021
Scale	1:25,000 @ A3



24000



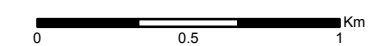
Legend

- Site Boundary
- Proposed Wind Turbine
- Proposed Development Area
- Scoping Developable Area

Habitat Suitability - Red Squirrel

- Moderate
- Low
- Negligible

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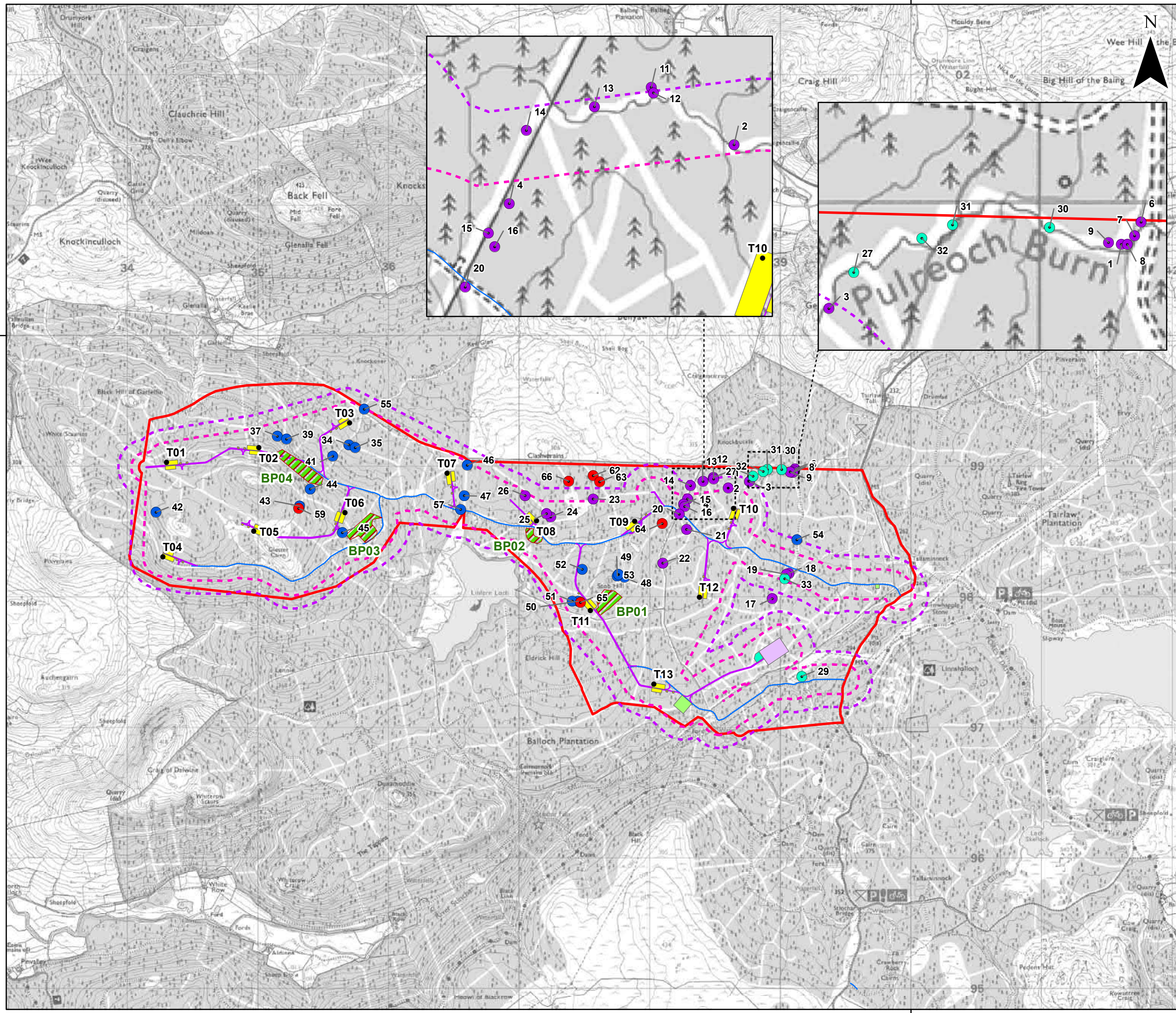
Rev	Date	By	Comment
C	21/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	10/11/2020	BG	First Issue.



Carrick Windfarm
Figure 7.1.5e Red Squirrel Habitat Suitability Assessment

Drg No	Carrick-WSP-I-141
Rev	C
Date	21/10/2021
Scale	1:25,000 @ A3

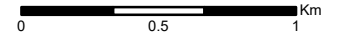
24000



Legend

- Site Boundary
 - Protected Species Survey Area
 - Otter Survey Area
- Target Notes**
- Otter
 - Pine marten
 - Squirrel
 - Water vole
- Proposed Infrastructure**
- Substation Compound
 - Temporary Construction Compound
 - Crane Pad
 - Hardstanding
 - Temporary SPEN Construction Compound
 - Borrow Pit Search Area
 - Wind Turbine
 - Carrick Access Track - New Construction
 - Carrick Access Track - Existing Forestry Track to be Upgraded

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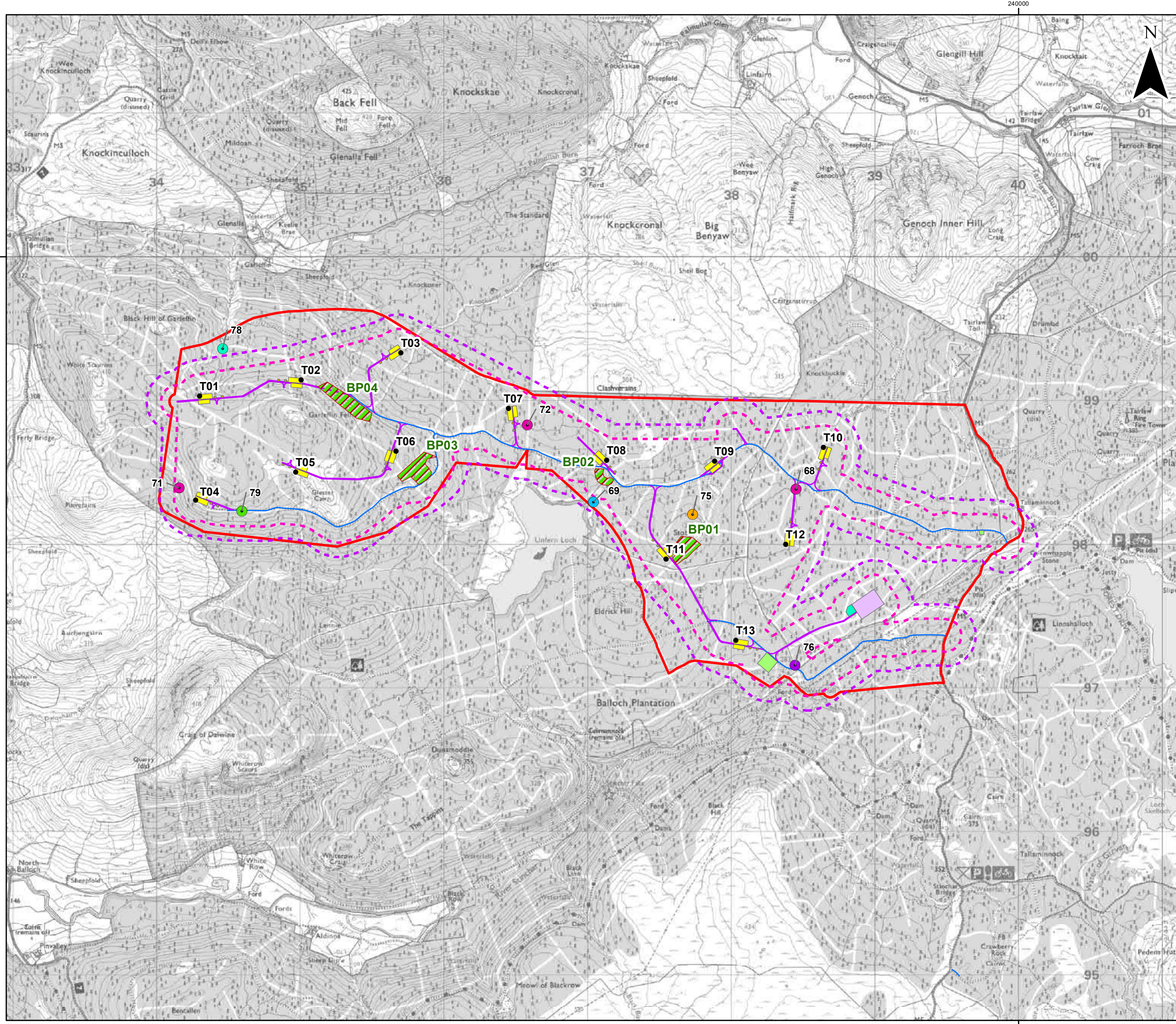


Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.



Carrick Windfarm
 Figure 7.1.6 Protected Species Survey Results

Drg No	Carrick-WSP-I-143
Rev	C
Date	29/10/2021
Scale	1:4,000 @ A3



Legend

- Site Boundary
- Outer Survey Area
- Protected Species Survey Area

Proposed Infrastructure

- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New Construction
- Carrick Access Track - Existing Forestry Track to be Upgraded

Target Notes

- Brown hare
- Common lizard
- Mammal path
- Osprey
- Reptile
- Small pearl-bordered fritillary

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0 0.5 1 Km

Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.



Carrick Windfarm
Figure 7.1.7 Incidental Species Records

Drg No	Carrick-WSP-I-144
Rev	C
Date	29/10/2021
Scale	1:25,000 @ A3

24000

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