

Appendix 10.3
Protected Species Survey

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Appendix 10.3: Protected Species Survey

Introduction

- 10.3.1 This Appendix relates to the protected species surveys undertaken to inform an Ecological Impact Assessment (EcIA) of the proposed Kendoon to Tongland 132 kilovolt (kV) Reinforcement Project ('the KTR Project'). It includes an account of the methods adopted, baseline findings and an interpretation of results.
- 10.3.2 For the purposes of the Environmental Impact Assessment (EIA), the KTR Project encompasses five new overhead line (OHL) connections and the associated removal of the existing N and R routes. Reference should be made to Figure 1, and this Appendix should be read in conjunction with Chapter 10: Ecology of the EIA Report.

Scope of Survey

- 10.3.3 LUC was appointed by SP Energy Networks (SPEN) to complete a suite of ecological surveys, including protected species surveys, to inform an EcIA of the KTR Project.
- 10.3.4 Surveys for the following species were undertaken and reported in this Appendix:
- Pine marten;
 - Red squirrel;
 - Bats;
 - Otter;
 - Water vole; and
 - Great crested newt.
- 10.3.5 Surveys for badger were also completed, however due to the persecution of this species, survey methods, findings and interpretation are reported separately, in Appendix 10.4: Confidential Badger Survey .
- 10.3.6 The EcIA also considers potential effects on fish, informed by surveys and interpretation completed by the Galloways Fisheries Trust (GFT). A standalone report, prepared by GFT, is presented in Appendix 10.5: Fish Survey Report.
- 10.3.7 Reference should be made to Chapter 11: Ornithology for details of ornithological survey and assessment.

Desk Study

- 10.3.8 A desk study was undertaken to inform protected species surveys. An account of the method adopted, and findings, is provided in Appendix 10.1: Desk Study and Legal Context, which also sets out the legislative provisions afforded to protected species.
- 10.3.9 Extensive pine marten and red squirrel data was provided by (then)Forestry Commission Scotland and (then) Forest Enterprise Scotland¹. This data is discussed in this Appendix as appropriate.

Field Surveys

Overview

- 10.3.10All protected species surveys were undertaken over a two year period, between 2017 and 2019. Surveys were completed during accepted survey seasons, in appropriate weather conditions, and by experienced and, where necessary, licenced field ecologists. All survey data was collected on GIS-enabled field tablets to increase accuracy and facilitate robust interpretation.
- 10.3.11 Surveys sought to identify suitable habitat for, and, where appropriate, direct evidence of, protected species. Suitable habitat was considered to include opportunities to shelter, rest, forage and commute. All surveys followed good practice methods, as described in detail below. Surveys were undertaken within pre-defined Study Areas, as defined by good practice methods.
- 10.3.12 Study Areas are defined below (reference should be made to Chapter 5: Felling, Construction, Operational Maintenance and Decommissioning for technical descriptions of footprint, wayleave and windthrow areas etc.):
- Pine Marten and Red Squirrel: KTR Project footprint², wayleave, windthrow areas and 50m buffer;
 - Bats: KTR Project footprint, wayleave, windthrow areas;
 - Otter: KTR Project footprint, wayleave, windthrow areas and 200m up/down-stream buffer on suitable watercourses;
 - Water vole: KTR Project footprint, wayleave, windthrow areas and 50m up/down-stream buffer on suitable watercourses; and
 - Great crested newt (GCN): ponds within 500m of development footprint, wayleave and windthrow areas.
- 10.3.13 Study Areas are shown in Figure 1.

Pine Marten and Red Squirrel

- 10.3.14 Due to their overlapping habitat requirements, surveys for pine marten and red squirrel were completed in parallel. Surveys methods complied with good practice methods^{i,ii} and included a two-stage process.

Stage 1

- 10.3.15 During the first stage of surveys, competent field ecologists walked the Study Area, noting all habitat with potential to support each species. This extended to mature coniferous and mixed woodlands/forests and treelines. Within suitable habitat, direct evidence of each species was searched for. In small features, a complete search was made. In larger areas, such as extensive forest coups, transect walks were undertaken. Transects generally followed defined wayleaves, firebreaks and access tracks.
- 10.3.16 Field signs searched for are listed in Table 1.

Table 1: Pine Marten and Red Squirrel Field Signs

Field Signs	Pine Marten	Red Squirrel
	Scat (including age classification)	Foraged cones (diagnostic)
	Dens	Dreys (non-diagnostic)
	Tracks and prints	Tracks and prints

- 10.3.17 Where evidence of either species was identified, Stage 2 surveys were undertaken.
- 10.3.18 To aid in determining appropriate locations for Stage 2 surveys, extensive existing data provided by Forest Enterprise Scotland (FES) was reviewed. A large proportion of the Study Area has been under long-term observation for both species by FES as the Galloway Forest Park is considered a stronghold for pine marten and red squirrel. In order to not disrupt their studies, consultation with both FES and Scottish Natural Heritage (SNH) was undertaken with a view to identifying appropriate survey locations. Data collected by FES and during Stage 2 is considered in later sections of this Appendix.

¹ Forestry Commission Scotland and Forest Enterprise Scotland changed to Scottish Forestry and Forestry and Land Scotland on 1st April 2019

² Which includes all proposed new access tracks and ancillary infrastructure.

Stage 2

- 10.3.19 Stage 2 surveys involved revisiting areas where evidence had been recorded, excluding areas under current observation by FES. Camera traps and baited feeding stations in clusters of four were placed approximately every 500m within the target zone areas (refer to Figure 1). Camera traps formed a quadrant, where possible, with baited and non-baited feeding stations located at opposite corners. Feeding boxes were used in an attempt to discourage other species, such as mice and birds, from using them. Feeding boxes also helped to keep the target species in place long enough to register images for later identification. Two non-baited stations were also used as anecdotal evidence suggests pine martens can skew evidence of red squirrel presence through dominance.
- 10.3.20 Camera traps were placed at an approximate height of 165cm and secured firmly. Camera traps (Primarily Bushnell Trophy cams) were fixed to an adjacent tree within approximately 5m. Cameras were set to record upon detecting motion; they recorded videos in ten second intervals. Data was collected and analysed to determine the presence of both species. Camera trap/bait feeding stations were not used on the existing R Route which is to be removed as part of the KTR Project as the limited nature of predicted effects in this area did not justify the survey method.
- 10.3.21 Camera trap nomenclature and context details are provided in Table 2.

Table 2: Camera Trap/Baited Feeding Station Details

Camera Trap Group	Location (National Grid Reference)	Habitat Description	Connection
A	NX 59085 88931	Conifer plantation.	Polquhanity to Glenlee via Kendoon (P-G via K)
B	NX 59323 88400	Conifer plantation.	P-G via K
C	NX 59394 88134	Conifer plantation.	P-G via K
D	NX 59509 87643	Conifer plantation.	P-G via K
E	NX 60322 87697	Conifer plantation. Approximately 100m north of confluence of Water of Ken and Polharrow Burn.	P-G via K and Carsfad to Kendoon (C-K)-
F	NX 65151 69608	Conifer plantation. Approximately 200m east of River Dee.	Glenlee to Tongland (G-T)
G	NX 64199 68893	Conifer plantation. Approximately 200m east of River Dee.	G-T
H	NX 64461 67584	Conifer plantation.	G-T
I	NX 65031 66203	Conifer plantation. Approximately 75m east of forestry track.	G-T
J	NX 65155 65727	Conifer plantation. Approximately 50m south of forestry track.	G-T
K	NX 65527 65283	Conifer plantation. Approximately 30m south of forestry track.	G-T
L	NX 65964 65138	Conifer plantation. Approximately 60m north of A712.	G-T
M	NX 66189 64562	Conifer plantation. Approximately 40m west of forestry track.	G-T
N	NX 66612 64000	Conifer plantation. Approximately 90m north of forestry track.	G-T
O	NX 69680 61369	Edge of conifer plantation bordering marshy field. Approximately 300m south-east of Bargatton Loch.	G-T
P	NX 69330 53915	Improved grassland and scattered scrub.	G-T

Bats

- 10.3.22 A range of survey methods were adopted to characterise bat roost potential, and bat activity, within the Study Area. All survey methods were based on current good practice methodsⁱⁱⁱ.

Bat Roost Potential (BRP) Surveys

- 10.3.23 Bat Roost Potential (BRP) surveys were undertaken in summer 2017, at buildings and trees within the Study Area. The survey aims to identify those features that may support roost features and may subsequently require further targeted survey effort. The relative proportion of features with BRP can also support interpretation of the likely or potential importance of a Study Area for bat species.
- 10.3.24 It is recognised that the method can be unfeasible on large scale infrastructure projects, which can include a very large number of trees. A BRP survey could, in theory, identify many hundreds of trees with bat roost potential and it may not be possible, or appropriate, to survey each individual tree during planning consent stages. However, the method still allows the generalisation of groups of trees and features and can advise later stages of project design and implementation.
- 10.3.25 Via a site walkover, field ecologists identified potentially suitable features and used the criteria set out in Table 3 to determine their BRP category. All potential features were recorded on GIS-enabled field tablets with accompanying feature descriptions.

Table 3: Bat Roost Potential (BRP) Categories

BRP Category	Roosting Habitat Features	Commuting and Foraging Habitat Features	Survey Requirement
Negligible	Negligible habitat features likely to support roosting, commuting or foraging bats.		No surveys required.
Low	Structures in this category offer one or more potential roost sites for individual, opportunistically roosting bats. These sites do not offer the space, shelter, or appropriate conditions to support large numbers of bats or maternity roosts. Trees in this category include those of sufficient size and age to support suitable roosting features, but none are visible from the ground.	Habitat on and around the Site could be used by a small number of commuting bats. This category includes densely urbanised landscapes or linear vegetation features poorly connected to the wider landscape (e.g. defunct hedges in an agricultural context).	One dusk or dawn survey required for structures. No surveys required for trees.
Moderate	Structures and trees in this category offer one or more roost site that, due to their space, shelter or conditions, offer roosting potential for a range of species. Roosts may be more permanent, rather than opportunistic. Small maternity roosts of common species may form in one of these roost sites.	Habitat on and around the Site is well-connected to wider continuous habitat and offers commuting and foraging habitat to a larger number of bats across a number of species (e.g. tree lines or linked gardens in the urban context, or continuous hedge/ tree lines and watercourses in an agricultural setting).	One dusk and one dawn survey required for both structures and trees. Tree-climbing may be an appropriate alternative to dusk and dawn surveys.
High	Structures and trees in this category have one or more potential roost sites that are suitable for large number of bats. Roosts are likely to be permanent and include maternity roosts. Potential roost sites exist for a wide range of species or species of particular conservation interest.	Habitat on and around the Site is diverse, continuous and linked to extensive suitable habitat. This category includes well-vegetated rivers, streams, hedgerows and woodland edge. Habitat is sufficiently diverse to offer opportunities to a wide range of species or those of particular conservation interest.	One dawn and one dusk survey, plus one further dusk or dawn survey.

Passive Bat Activity Surveys

- 10.3.26 To gain an understanding of the composition and volume of bat fauna present within the Study Area, static bat detectors (Anabat Express) were installed at suitable, representative locations (refer to Figure 1). Locations included watercourses, forest wayleaves etc.

10.3.27 Ten detectors were deployed. Their locations are described in Table 4. Detectors were set to record for at least five nights during the accepted survey season, from 30 minutes before sunset until 30 minutes after sunrise.

Table 4: Passive Bat Survey Anabat Locations

Anabat No	Location (National Grid Reference)	Dates of Recording	Habitat Description	Connection
1	NX 59372 87870	01 – 17 Sep 2017	On bank of Polmaddy Burn, between two areas of conifer plantation. Optimal foraging habitat.	P-G via K and N Route
2	NX 61350 81761	01 – 17 Sep 2017	Area of woodland approximately 100m south of Glenlee Substation. Optimal foraging habitat.	P-G, Earlstoun to Glenlee (E-G) and R Route
3	NX 60714 80565	01 – 19 Sep 2017	At edge of Glenlee Substation car park, approximately 15m south of Substation water outlet. Optimal foraging habitat and commuting corridor.	P-G, E-G and R Route
4	NX 65101 69431	09 – 26 Aug 2017	At edge of conifer plantation, on edge of river Dee. Optimal foraging habitat and commuting corridor.	G-T
5	NX 64750 67369	14 – 20 June 2017	At edge of conifer plantation bordering marshy grassland, at top of small valley. Optimal foraging habitat.	G-T
6	NX 65752 64976	09 – 15 Aug 2017	In recently felled conifer plantation. Optimal foraging habitat.	G-T
7	NX 66230 64528	09 – 24 Aug 2017	In fire break of conifer plantation. Potential commuting corridor.	G-T
8	NX 70448 59501	05 – 07 Jul 2017	In large area of improved grassland with grazing animals. Potential foraging habitat. Farm buildings nearby provide potential roosting opportunities.	G-T and R Route
9	NX 69958 56614	05 – 12 Jul 2017	In large area of improved grassland with grazing animals. Broadleaved woodland and farm buildings nearby. Potential foraging and roosting habitat.	G-T and R Route
10	NX 69453 53578	05 – 06 Jul 2017	At Kendoon power station. River Dee flows to the south with broadleaf trees on banks. Optimal foraging habitat and commuting corridor.	G-T and R Route

10.3.28 All data was collected, and sonogram analysis completed, by competent field ecologists using Analook.

Active Bat Activity Surveys

10.3.29 In addition to passive data collection, four driven or walked transects were undertaken, with a view to further understanding bat activity across the Study Area. The location of driven and walked transects are shown in Figure 1 while Table 5 provides further context. Note that the locations of transects were limited by the health and safety considerations associated with night time surveys.

Table 5: Active Bat Survey Transect Details

Transect Type	Survey Date and Time	Habitat Description	Connection
Driven	27/06/17	From Glenlee Substation through mixed woodlands. Across river and through improved grassland adjacent to Water of Ken. Through broadleaf woodland on western shore of Earlstoun Loch. Through grassland and scattered scrub onto improved grassland and arable. Following along western shore of Water of Ken, through broadleaf woodland. Grassland along the western shore of Carsfad Loch. Through marshy grassland and scattered broadleaf. Optimum foraging and commuting habitats.	P-G via K, N Removal Route, R Removal Route, C-K and E-G
Walked	05/07/17	Conifer plantation and semi-natural woodland along eastern edge of Stroan Loch. Uphill through conifer plantation following forestry tracks. Opening out into felled conifer plantation, marshy grassland and scattered conifer. Through conifer plantation. Potential foraging habitat and commuting routes.	G-T
Driven	09/08/17	From Glenlee Substation through mixed woodlands. Across river and through improved grassland adjacent to Water of Ken. Through broadleaf woodland on western shore of Earlstoun Loch. Through grassland and scattered scrub onto improved grassland and arable. Following along western shore of Water of Ken, through broadleaf woodland. Grassland along the western shore of Carsfad Loch. Through marshy grassland and scattered broadleaf. Optimum foraging and commuting habitats.	P-G via K, N Removal Route, R Removal Route, C-K and E-G
Walked	30/08/17	Conifer plantation and semi-natural woodland along eastern edge of Stroan Loch. Uphill through conifer plantation following forestry tracks. Opening out into felled conifer plantation, marshy grassland and scattered conifer. Through conifer plantation. Potential foraging habitat and commuting routes.	G-T

10.3.30 Each survey was undertaken in suitable weather conditions between sunset and sunset plus 2 hours. Anabat Express detectors were used throughout and either hand-held or safely mounted to car window frames. Driven transects were driven no faster than ten miles per hour.

10.3.31 All data was collected, and sonogram analysis completed, by competent field ecologists using Analook.

Otter

10.3.32 Surveys for suitable habitat for, and direct evidence of, otter were undertaken in 2017 and 2018, following good practice survey methods^{iv}. Surveys were completed by competent field ecologists and all suitable watercourses and waterbodies within the Study Area were visited.

10.3.33 Field signs searched for are included in Table 6.

Table 6: Otter Field Signs

Field Signs	Otter	
	Resting sites (see below for resting site classifications)	
	Spraint (including age description: fresh, recent or old)	
	Prints, tracks, slides and runs	
	Feeding remains	

10.3.34 Resting sites are classified as per Table 7, however classification normally relies on a degree of professional judgement, owing to overlapping evidence.

Table 7: Otter Resting Site Classifications

Resting Site Type	Description
Hover	A bolt hole or ledge that provides temporary cover or a place to eat prey. It is not fully enclosed and the back of the feature can normally be observed. There may be spraints, footprints and feeding evidence present.
Couch	An above-ground shelter, normally used for lying-up and grooming. They may take the form of a depression in tall vegetation or may be covered in a vegetated grass 'roof' .
Holt	A cavity or hole on or adjacent to a watercourse. It may be in the ground, under tree roots, within rocks or caves; where it cannot be readily observed. It a holt is confirmed as active it usually contains field evidence such as spraint.
Natal holt	A discreet holt site that is used by a bitch to birth cubs, where they will normally remain for up to 3 months, before being moved to a secondary holt. These sites are seldom located during surveys and they are rarely recorded without the aid of camera traps. It is generally accepted that most natal holts will contain bedding material and sprainting activity is minimal whilst occupied.
Breeding site	An area of land in which otters breed. The site may be large and it is usually more important to protect this site than an individual natal holt.

10.3.35All survey evidence was collected and recorded using GIS-enabled field tablets for accuracy. Where appropriate field evidence was photographed for later analysis.

Water vole

10.3.36Surveys for suitable habitat for, and direct evidence of, water vole undertaken in 2017 and 2018, following good practice survey methods^v. Surveys were completed by competent field ecologists and all suitable watercourses and waterbodies within the Study Area were visited. Field signs searched for are included in Table 8.

Table 8: Water Vole Field Signs

Field Signs	Otter
	Burrows and tunnel systems
	Runs, tracks and slides
	Latrines (with droppings categorised as fresh, recent or old)
	Feeding stations and remains

10.3.37All survey evidence was collected and recorded using GIS-enabled field tablets for accuracy. Where appropriate field evidence was photographed for later analysis.

10.3.38In line with good practice guidelines, survey data was collected in a manner that allowed by subsequent population size analysis.

Great Crested Newt

10.3.39A review of Ordnance Survey maps (1:10k) was undertaken to identify visible ponds and waterbodies within the Study Area. During site walkovers, and where access permitted, ponds were visited in summer 2017 with a view to determining their suitability to support great crested newt.

10.3.40Suitability was determined using the Habitat Suitability Index (HSI) approach^{vi}. The HSI is a standard indirect survey method which requires field ecologists to collect data on environmental variables, which **are subsequently 'scored' and analysed through an index model. The model provides an HSI 'score'** between 0 – 1, with 1 representing ponds most likely to support populations of the species.

10.3.41Ponds with higher scores, and therefore more likely to support great crested newts, would be subject to additional target surveys. Survey findings dictated that no further surveys were required and so detailed methods are not provided here. Further discussion is provided in the baseline section.

Other Observations

10.3.42While surveys for other species were not specifically undertaken, incidental observations of other species were made, particularly where legislation protections were relevant. For example, ad-hoc sightings of reptiles, and amphibians were noted on GIS-enabled field tablets.

Constraints and Limitations

10.3.43All ecological surveys represent a snap-shot in time. Habitats and species assemblages are dynamic and change over time in response to a range of variables. Data presented in this report should not be considered a long-term interpretation of ecological data and should not be relied upon as such.

10.3.44While weather conditions were, in general, optimal, occasional rain, flooding, and snow showers may have resulted in the loss of evidence of indicator species. While this limitation is recognised, it is not considered to undermine the value of the data collected which is considered sufficiently robust for the purposes of informing the EcIA.

10.3.45With regard to pine marten and red squirrel surveys, it should be noted that camera trap/feeding station data must be carefully analysed. While presence can be confirmed in some areas, absence in others is not a certainty. Although equipment was installed for a sufficiently long period to allow animals to habituate, it must be recognised that some animals will continue to be nervous of the scent, noise and light associated with it.

10.3.46The camera/feeding stations were not always in quadrat formation. The design was chosen to best capture any animals moving through the area, however the topography, vegetation and accessibility influenced optimality.

10.3.47With regard to bats and analysis, the output recorded from bat echolocations via Anabats represents single bat passes. It cannot be determined if registrations belong to one bat foraging in the vicinity of the equipment, or multiple bats. The data from the outputs are of benefit for species level identification and an understanding of general activity levels.

10.3.48It is not always possible to distinguish some bat calls to species level. Bats may change how they echolocate depending in a number of factors, including the habitat type in which they are recorded. This may mean that they alter the frequency of the calls or repetition rate of pulses, which can result in recorded balls being difficult to distinguish between similar species. This is a widely accepted limitation of bat surveys.

10.3.49Recording equipment failure also affected bat surveys. On occasion, static bat detectors failed to record, meaning the full volume of data available for analysis was reduced. This is a widely recognised constraint of sensitive, outdoor bat survey equipment and is not considered a significant constraint.

Baseline

Overview

10.3.50Detailed descriptions of protected species activity are provided by connection in the following sections. However, in overview, the entire KTR as a Whole Study Area offered extensive suitable habitat for those species under consideration. In particular, the extensive forests and watercourses of the northern and central sections of the KTR Project provided optimal conditions for red squirrel, pine marten and otter. Towards the south of the KTR Project, where the landscape becomes more intensively agricultural, conditions are still suitable for badger and otter.

10.3.51The habitats within the KTR Project Study Area are generally broadly similar to those within the wider area. So while the Study Area provides optimal conditions, and extensive protected species evidence was identified, it should be recognised that a much wider habitat resource is available and that it, too, is likely to support populations of protected species.

10.3.52Note that while ponds within 500m were identified through aerial imaging, in the field, it quickly became apparent these generally fell within three categories:

- Stocked lochans and lochs.
- Temporary ponding of surface water. These were generally located in improved grassland fields and supported no aquatic vegetation.
- Backwaters or flooded areas associated with watercourses. These were generally connected to watercourses and likely to support fish populations.

10.3.53On the basis of the above, detailed HSI surveys were not undertaken as the likelihood of these features supporting GCN was considered to be negligible. Great Crested Newt is not further considered in this Appendix, however for completeness pond locations are mapped along with other protected species data.

10.3.54When considering the data provided below, reference should be made to the following figures in Annex 1:

- Figure 1, which provides Study Areas by species.
- Figure 2, which provides all terrestrial protected species survey findings. Note that Figure 2 also includes spatial desk study data relating to pine marten and red squirrel, as provided by FES.
- Figure 3, which provides all aquatic protected species survey findings
- Figure 4, which provides BRP and bat survey method details.
- Figure 5, which provides static bat detector analysis.

10.3.55Photographic examples of protected species field evidence are provided in Annex 2.

Polquhanity to Glenlee (via Kendoon) Including Removal of N and R Route (north)

Pine Martin and Red Squirrel

10.3.56Surveys identified extensive suitable habitat for both species, primarily mature coniferous plantation, between Polquhanity and Kendoon substation. Although the forest was generally even-aged, it is part of a much larger, diverse resource which stretches to the west.

10.3.57Evidence of red squirrel was recorded at numerous locations (refer to Figure 2). Evidence included:

- Foraging remains in a forestry proposed for a new quarry (Q1).
- Positive camera trap recordings at forestry locations between Polquhanity and Kendoon, within the proposed wayleave.
- Positive camera trap recordings at forestry locations in the grounds of Dundough Castle (remains of).
- Historic FES records across the wider area including near Earlston substation.

10.3.58Although no dreys or foraging remains were directly observed, this is most likely associated with the density of the forest, rather than the actual absence of activity. This hypothesis is confirmed by the camera trap footage.

10.3.59No evidence of pine marten was identified during surveys. However, given the density of the forest, the connectivity of the various coups, historic records of pine marten and the very large home range of the species, it is likely that pine marten is present, but at low densities.

Bats

10.3.60Bat Roost Potential was restricted to the P-G via K Study Area, south of Kendoon. In particular, lines of mature trees between Kendoon substation and Carsfad substation, and Earlston substation and Glenlee substation, supported a number of trees with potential ranging from low to high. These features, coupled with extensive suitable foraging and commuting habitat, in the form of linear vegetation, watercourses and loch systems, significantly increases the potential for roosting bats to be present within the Study Area.

10.3.61There are a number of trees suitable to support roosting bats around Glenlee substation. Two buildings were recorded as having potential to support roosting bats. Bat surveys were undertaken to inform a separate EIA for proposed works at the Glenlee substation and these are reported in the EIAR of that project(see https://www.spenergynetworks.co.uk/pages/glenlee_substation.aspx)

10.3.62A further area of trees with BRP was recorded along the N route, again in an area of wider, suitable foraging and commuting habitat.

10.3.63Static detectors were deployed at three locations within the Study Area, as shown in Figure 4. Anabat One recorded relatively low levels of *Pipistrellus* and Anabat Two recorded activity across four genera; *Pipistrellus*, *Myotis*, *Plecotus* and *Nyctalus*, again at low levels. Refer to Figure 5 for spatial analysis,

which also provides detailed numbers of passes per species. No bat activity was recorded at Anabat Three.

10.3.64Transect surveys identified relatively low levels of pipistrelle activity.

Otter

10.3.65Surveys identified wide-ranging suitable habitat for otter. The Study Area supports the Water of Ken and many of its smaller tributaries, which drain from higher ground to the west. Many of these watercourses offered optimal conditions for sheltering, commuting and foraging. Dense bankside vegetation and rocky substrates presented opportunities for resting site creation, while the watercourses appeared to offer plentiful foraging opportunities and unobstructed freedom of movement.

10.3.66Seven resting sites were identified, as shown in Figure 3 and summarised in Table 9.

Table 9: P-G via K Otter Resting Sites

Resting Site Type	Context and Description
Hover	A hover was identified on a mossy bank, beneath a small birch tree, adjacent to the Polmaddy Burn. Diagnostic evidence included prints.
Hover	On the steep banks south of Kendoon substation, three separate resting sites were located within a 70m stretch, at Glenhoul Glen and Water of Ken confluence. Fresh sprainting was evident along the stretch. Resting sites included:
Couch	<ul style="list-style-type: none">• One hover, under a small overhanging ledge on the bankside. Prints were evident.• One couch, on a moss-covered rock adjacent to the bank. Prints and wearing was evident.
Holt	<ul style="list-style-type: none">• One holt, with potential to support breeding, beneath an uprooted lime tree. The holt had two entrances, marked with spraint.
Holt	On the steep banks of the Coom Burn, on the southern edge of Hag Wood, three separate resting sites were located within a 100m stretch. Sprainting was evidence throughout the area, including both aged and fresh spraint. Resting sides included:
Holt	<ul style="list-style-type: none">• One holt in an abandoned badger sett. Spraint and print evident.• One holt comprising a deep, two chambered cavity under a tree. Fresh spraint present.
Holt	<ul style="list-style-type: none">• One holt comprising at least three used entrances. The holt, which was marked by fresh and aged sprainting, was located in the bank in the cavities created by a large oak tree.

Water Vole

10.3.67The Study Area supported some suitable habitat for water vole, particularly in the north, near Polmaddy, where the watercourses are slower flowing and banksides support suitable food plants, including soft rush.

10.3.68The majority of watercourses, however, were less suitable. They were generally fast-flowing, wide, spatey watercourses, lacking in emergent vegetation, often as a consequence of livestock poaching.

10.3.69No evidence of water vole was recorded during surveys.

Carsfad-Kendoon

Pine Martin and Red Squirrel

10.3.70Field surveys identified limited suitable habitat for these species within the C-K Study Areas. Suitable areas were restricted to the wooded areas near the north of the connection, where forestry plantation surrounds Kendoon substation. Camera trap surveys, and historic FES data, shows an extant population of red squirrel in this area.

10.3.71No evidence of pine marten was identified during surveys. However, given the density of the forest, the connectivity of the various coups, historic records of pine marten and the very large home range of the species, it is likely that pine marten is present, but at low densities.

Bats

- 10.3.72Tree lines between Kendoon substation and Carsfad substation supported a number of trees with bat roost potential ranging from low to high. These features, coupled with extensive suitable foraging and commuting habitat, in the form of linear vegetation, watercourses and loch systems, significantly increases the potential for roosting bats to be present within the Study Area.
- 10.3.73Although no static detectors were installed in this Study Area, driven transects recorded relatively limited evidence of commuting pipistrelles.

Otter

- 10.3.74Surveys identified that suitable habitat was limited to the Water of Ken, in the north of the Study Area, and the western shore of Carsfad Loch. Three resting sites were identified, as shown in Figure 3 and summarised in Table 10.

Table 10: C-K Otter Resting Sites

Resting Site Type	Context and Description
Hover	On the steep banks south of Kendoon substation, three separate resting sites were located within a 70m stretch, at Glenhoul Glen and Water of Ken confluence. Fresh sprainting was evident along the stretch. Resting sites included: <ul style="list-style-type: none">One hover, under a small overhanging ledge on the bankside. Prints were evident.One couch, on a moss-covered rock adjacent to the bank. Prints and wearing was evident.One holt, with potential to support breeding, beneath an uprooted lime tree. The holt had two entrances, marked with spraint.
Couch	
Holt	

Water Vole

- 10.3.75Despite numerous watercourses within the Study Area, no suitable habitat was identified for water vole. Watercourses were either wide and fast-flowing, or lacking in bankside vegetation due to livestock poaching. No evidence of water vole was recorded during surveys.

Earlstoun to Glenlee

Pine Martin and Red Squirrel

- 10.3.76Suitable habitat for these species was limited to areas of mature conifer plantation around Earlstoun and Glenlee substations. While habitat within the Study Area is limited, it is recognised that the areas of forestry noted above are part of larger, continuous resources.
- 10.3.77Current surveys found no evidence of either species, however historic FES data suggests the presence of an extant red squirrel population around Earlstoun.

Bats

- 10.3.78Bat Roost Potential was extensive between Earlstoun substation and Glenlee substations with a large number of trees supporting classified as having low – high potential to support roosting bats. These features, coupled with extensive suitable foraging and commuting habitat, in the form of linear vegetation, watercourses and loch systems, significantly increases the potential for roosting bats to be present within the Study Area.
- 10.3.79There are a number of trees suitable to support roosting bats around Glenlee substation. Two buildings were recorded as having potential to support roosting bats. Bat surveys were undertaken to inform a separate EIA for proposed works at the Glenlee substation and these are reported elsewhere.
- 10.3.80Static detectors were deployed at two locations within the Study Area, as shown in Figure 4. Anabat Two recorded activity across four genera; *Pipistrellus*, *Myotis*, *Plecotus* and *Nyctalus*, at low levels. Refer to Figure 5 for spatial analysis, which also provides detailed numbers of passes per species. No bat activity was recorded at Anabat Three.
- 10.3.81Transect surveys identified relatively limited evidence of commuting pipistrelles.

Otter

- 10.3.82The Study Area supported extensive suitable habitat for otter. The Study Area includes a section of the Water of Ken, which runs to the east of the connection route. The Area around Earlstoun substation has potential to support otters within the extensive and dense bankside vegetation. Further south, the Water of Keen meets the Coom Burn, which crosses the Study Area, near Glenlee substation. The Coom Burn offers opportunities for shelter, foraging and commuting.
- 10.3.83Field signs of otter were common along the Coom Burn and three resting sites were recorded, as shown in Figure 3 and summarised in Table 11.

Table 11: E-G Otter Resting Sites

Resting Site Type	Context and Description
Holt	On the steep banks of the Coom Burn, on the southern edge of Hag Wood, three separate resting sites were located within a 100m stretch. Sprainting was evidence throughout the area, including both aged and fresh spraint. Resting sides included: <ul style="list-style-type: none">One holt in an abandoned badger sett. Spraint and print evident.One holt comprising a deep, two chambered cavity under a tree. Fresh spraint present.One holt comprising at least three used entrances. The holt, which was marked by fresh and aged sprainting, was located in the bank, in the cavities created by a large oak tree.
Holt	
Holt	

Water Vole

- 10.3.84Despite numerous watercourses within the Study Area, no suitable habitat was identified for water vole. Watercourses were either wide and fast-flowing, or lacking in bankside vegetation due to livestock poaching. No evidence of water vole was recorded during surveys.

BG Deviation

Pine Martin and Red Squirrel

- 10.3.85The survey identified no suitable habitat for these species within the BG Deviation Study Area. While the Study Area supports an area of plantation broadleaved woodland, the Black Bank Wood, this was an immature, recently planted feature.
- 10.3.86No evidence of either species was recorded during surveys.

Bats

- 10.3.87With the exception of the area where tower R-BG-102 is located, the connection is of negligible potential to support roosting bats. There are a number of trees suitable to support roosting bats around Glenlee substation. Two buildings were recorded as having potential to support roosting bats. Bat surveys were undertaken to inform a separate EIA for proposed works at the Glenlee substation and these are reported elsewhere (see https://www.spenergynetworks.co.uk/pages/glenlee_substation.aspx) .
- 10.3.88Generally, the route is not well connected to suitable roosting, foraging or navigating habitat. However, it is likely that bats are using the tree line which follows Craigshinnie burn (south-east of the connection) and connects to a larger block of plantation forest.

Otter

- 10.3.89Suitable habitat for otter was limited to the Craigshinie Burn, a tributary of the Water of Ken, which lies in the south-east of the Study Area. The north bank of the burn is dense vegetated with broadleaved woodland and offers opportunities for shelter and foraging.
- 10.3.90Evidence of otter was limited to spraint, which was recorded at five locations along the burn. Spraint ranged in age from fresh to old, suggesting that the water course is regularly used by the species.

Water Vole

10.3.91The Study Area did not support suitable habitat for water vole. The Craigshinie Burn was considered too fast-flowing and did not support the food plant species required by the species. No evidence of water vole was recorded during surveys.

Glenlee to Tongland Including Removal of R Route (south)

10.3.92The existing R Route (south) deviates from the main G-T line at Glenlee substation, before re-joining nearer the south, at tower no 127(R). Due to the routes being largely geographically distinct, survey findings are discussed for each separately.

Pine Martin and Red Squirrel

G-T

10.3.93Extensive areas of suitable habitat for both species were identified during surveys. Large, mature and well-connected coniferous plantations, particularly around the central part of the Study Area, offered many opportunities for shelter, foraging and dispersal. Southern sections of the Study Area, which largely comprised intensively managed agricultural land, were considered suboptimal.

10.3.94Existing records, provided by FES, highlighted extant populations of both species with the Bennan, Laurieston and Slogarie forests. Records included direct observations of animals, field signs and pine marten den boxes, erected by FES as part of conservation efforts.

10.3.95Pine marten were recorded at camera/feeding station locations F, G, I, J, K, L, M and N, as marked on Figure 2. The prevalence of records over such a large area suggests a viable and wide-spread population.

10.3.96Other evidence of the species included records of fresh scat throughout the Study Area.

10.3.97Although no dens were recorded during surveys, this is most likely a consequence of a dense and high canopy, obscuring opportunities for direct observation. The absence of evidence of dens is not taken as an indication of actual absence.

10.3.98Similarly, no red squirrel dreys were recorded, again a likely consequence of the dense and high canopy of the forest. However, evidence of red squirrel included direct sightings as camera/feeding station locations F, K and L. Further evidence, including foraging remains and direct sightings, was collected across the Study Area. This evidence was supported by historic FES evidence across the wider forest estate.

Removal of R Route (south)

10.3.99The R Route (south) Study Area comprises much more intensively managed agricultural habitats than G-T. Suitable habitat for pine marten and red squirrel was limited to small, often isolated, areas of plantation forestry, particularly around Glengunnoch Hill.

10.3.100 No camera/feeding station surveys were undertaken along the R Route (south), however walk-over surveys identified evidence of red squirrel foraging at localised locations, primarily Glengunnoch Hill forest and forest near Barend Bridge (refer to Figure 2). A single direct sighting of a red squirrel was **made near Lady’s Well Hill. When taken into consideration with historic FES data, it is assumed that the species is present along the R route.**

10.3.101 In contrast, no direct evidence of pine marten was recorded within the Study Area.

Bats

G-T

10.3.102 The Study Area supported a number of broadleaved woodlands, tree lines and individual trees in both a riparian and agricultural context. A number of these trees were identified as having bat roost potential (Figure 4), ranging from Low to High. Potential was significantly improved where trees were located adjacent to watercourses and/or linear vegetation that provided optimal foraging and commuting opportunities.

10.3.103 There are a number of trees suitable to support roosting bats around Glenlee substation. Two buildings were recorded as having potential to support roosting bats. Bat surveys were undertaken to inform a separate EIA for proposed works at the Glenlee substation and these are reported elsewhere (see https://www.spenergynetworks.co.uk/pages/glenlee_substation.aspx).

10.3.104 Static detectors were deployed at seven locations within the Study Area, as shown in Figure 4. All detectors recorded bats, with *Pipistrellus*, *Myotis*, *Plecotus* and *Nyctalus* recorded. Registrations were dominated by pipistrelle species. Detector location 5 recorded the highest levels of activity, with a maximum of 92.3 pipistrelle passes per hour recorded. Although *Myotis*, *Plecotus* and *Nyctalus* were recorded, the registrations suggest very low levels of localised activity. Refer to Figure 5 for spatial analysis, which also provides detailed numbers of passes per species.

10.3.105 Walked and driven transects, undertaken in the central areas of the Study Area (Figure 4), recorded limited evidence of pipistrelle.

Removal of R Route (south)

10.3.106 The R Route (south) Study Area also supported areas of broadleaved woodland and individual trees with potential to support roosting bats. Again, suitability was enhanced where trees were located adjacent to linear vegetation and watercourses.

10.3.107 A number of buildings were also identified during surveys and these were assessed for their bat roost potential. Buildings were generally concentrated at the western end of the route and ranged in their potential to support roosting bats, from low to moderate.

10.3.108 No active or passive bat activity surveys were undertaken along the R Route.

Otter

G-T

10.3.109 The G-T Study Area supported extensive suitable habitat for otter. The Study Area encompasses a large number of major and minor watercourses, which offer a wide range of sheltering, foraging and commuting opportunities for the species.

10.3.110 Extensive evidence was recorded along the following watercourses (Figure 3):

- Garrich/Coom Burn;
- Graigshinnie Burn;
- Kennick Burn;
- Knocknairling Burn;
- Black Water of Dee;
- Camelon Lane Burn; and
- Barstobrick Burn/Bargatton Lock.

10.3.111 Evidence extended to sprinting (all age classes) and occasional prints.

10.3.112 Four resting sites were recorded, as shown in Figure 3 and summarised in Table 12.

Table 12: G-T Otter Resting Sites

Resting Site Type	Context and Description
Hover	A hover was recorded on block work below a bridge on the Kennick Burn. Many mixed-age spraints were recorded at this location.
Couch	Three couches were recorded on the Camelon Burn, upstream of Bargatton Wood. All couches were located in bankside uprooted trees. Extensive mixed-age sprinting was recorded all along the watercourse.
Couch	
Couch	

Removal of R Route (south)

10.3.113 The R Route (south) Study Area also supported extensive suitable habitat for otter. In particular, the Water of Ken and its many tributaries flow through and across the Study Area. The Study

Area also includes a narrow section of Loch Ken. The various watercourses, highlighted in Figure 3, offer extensive opportunities for shelter, foraging and commuting.

10.3.114 Extensive mixed-age sprainting was recorded on the Garple Burn, close to its confluence with the Water of Ken. Spraints and prints were also identified on the southern bank of Loch Ken while, further south, sprainting was recorded on drainage ditches around Drumlane Cottage.

10.3.115 Three resting sites were recorded, as shown in Figure 3 and summarised in Table 13.

Table 13: R Route Otter Resting Sites

Resting Site Type	Context and Description
Hover	A hover was recorded on the Garple Burn, in an area marked extensively with fresh spraint. The Hover was located less than 30m from the Garple Bridge.
Holt	An otter holt and adjacent couch were identified on the private pond of Drumlane Cottage, beneath a small footbridge and walkway. Sprating and anal jelly were recorded nearby.
Couch	









Water Vole

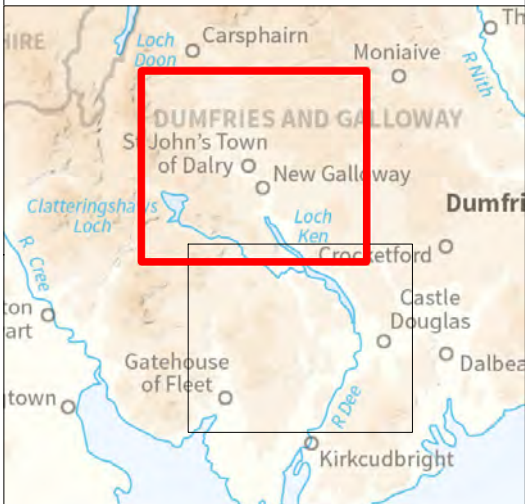
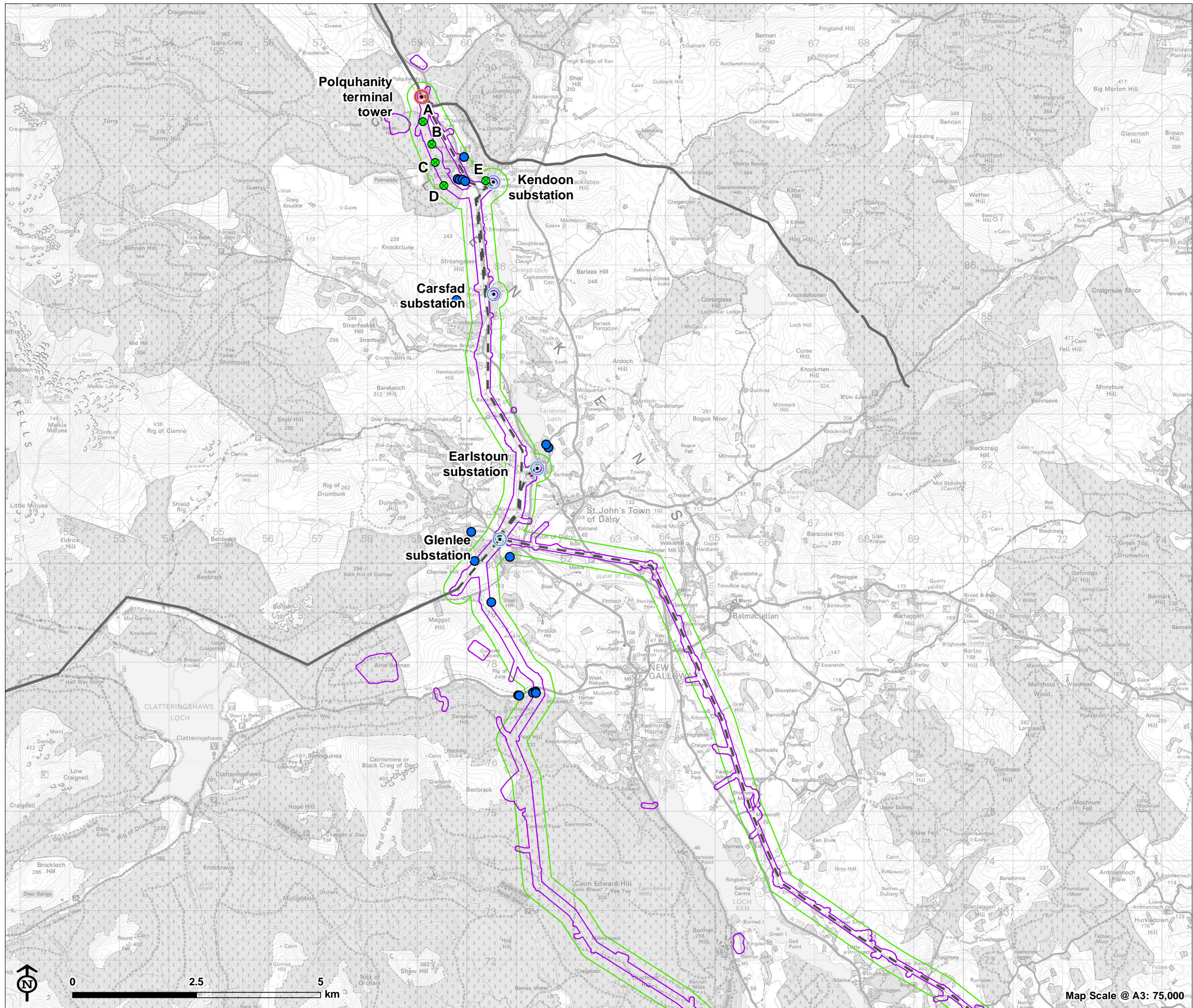
10.3.116 Both the G-T and R Route (south) Study Areas support suitable water vole habitat, however inspection of the watercourses identified them as being either too fast-flowing and spatey, or lacking in suitable bankside structure due to poaching and trampling. No evidence of the species was recorded during field surveys.

Annex 1
Figures

Technical Appendix 10.3: Protected
Species Survey

Figure 1: Study Area

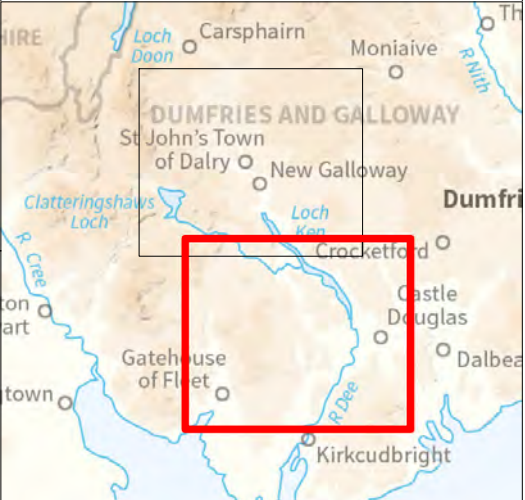
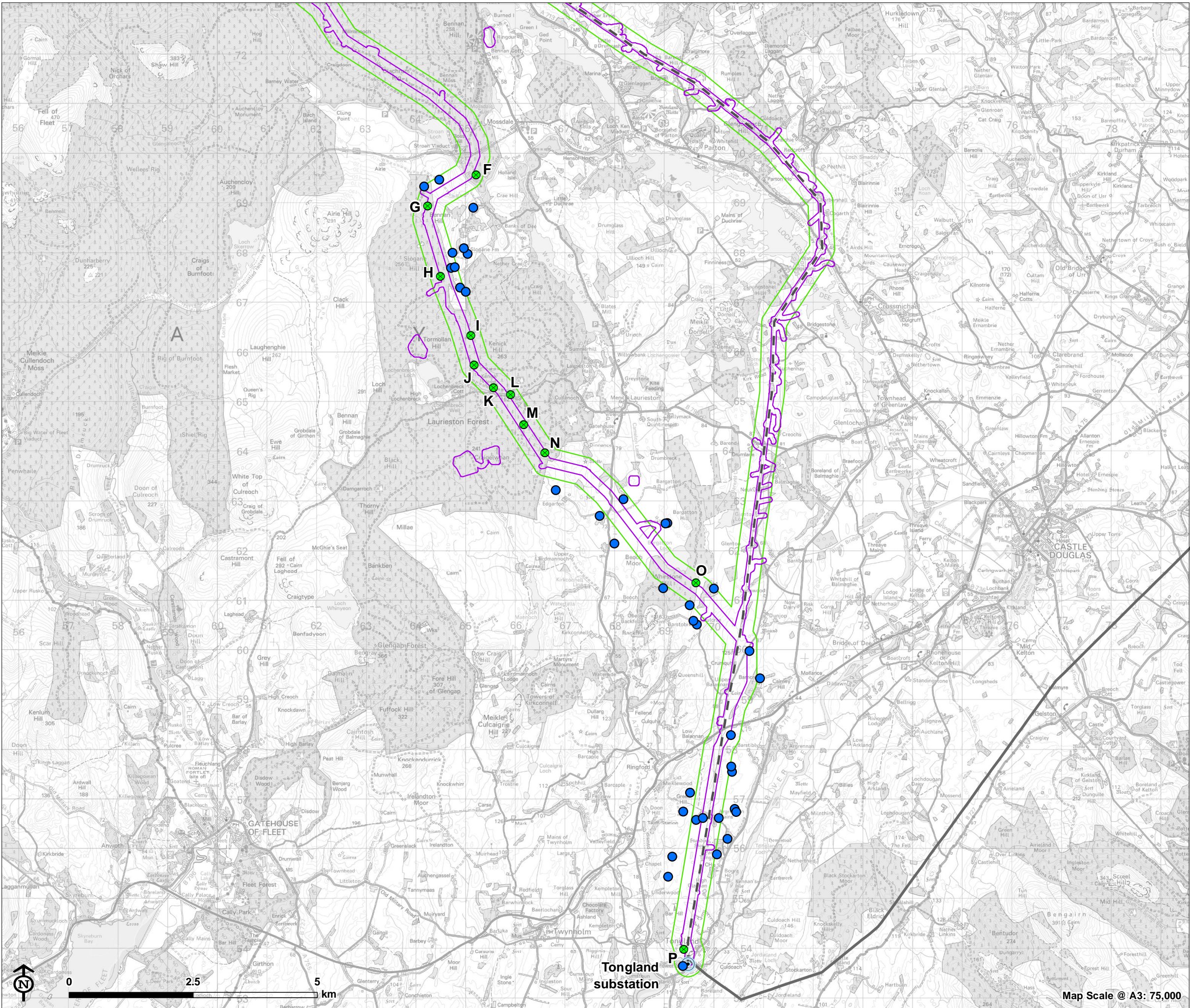
-  Polquhanity sealing end and terminal tower
-  Substation and hydro electricity generating station
-  Existing 132kV overhead line to be removed (following construction of the KTR Project)
-  Existing network
-  Study area for terrestrial protected species
-  Study area for aquatic protected species
-  Red squirrel/pine marten camera/bait station locations
-  Pond locations for greater crested newt survey



Technical Appendix 10.3: Protected
Species Survey

Figure 1: Study Area

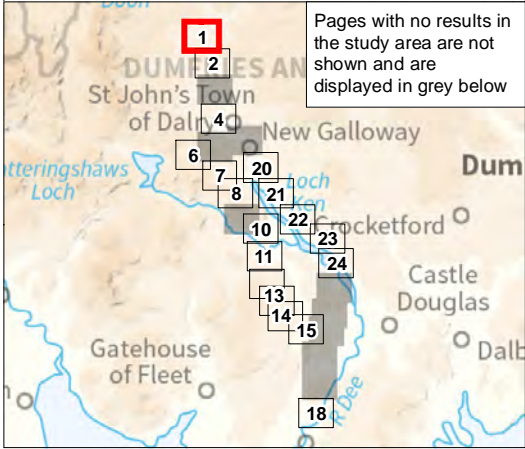
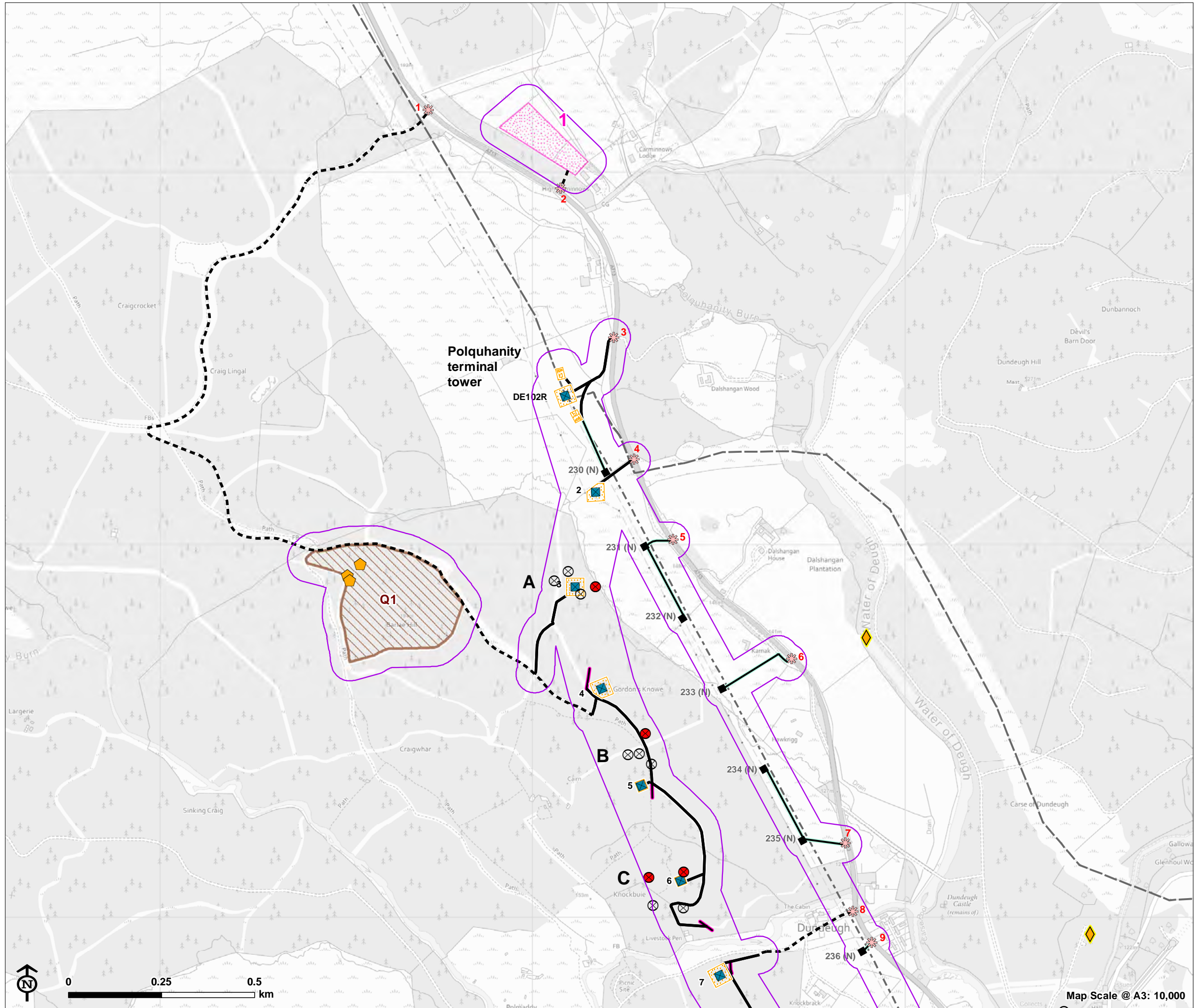
- Substation and hydro electricity generating station
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Existing network
- Study area for terrestrial protected species
- Study area for aquatic protected species
- Red squirrel/pine marten camera/bait station locations
- Pond locations for greater crested newt survey



Technical Appendix 10.3: Protected
Species Survey

Figure 2.1: Terrestrial Protected Species

- Overhead line infrastructure**
- Polquhanity to Glenlee via Kendoon (steel lattice tower)
 - Existing tower for removal
 - Existing 132kV overhead line to be removed (following construction of the KTR Project)
 - Existing network
 - Access point
- Access to proposed towers**
- Existing access
 - New access
 - Timber extraction spur
- Access to towers for removal**
- New access
- Working area**
- Working area
 - Construction compound
 - Potential quarry working area
- Terrestrial Protected Species Survey**
- Study area
- Camera/feeding station results**
- Red squirrel
 - No species seen
- Red squirrel field sign**
- Foraging remains
- Forestry Enterprise data (now Forestry and Land Scotland)**
- Red squirrel field sign**
- Sighting



Technical Appendix 10.3: Protected
Species Survey

Figure 2.2: Terrestrial Protected Species

Overhead line infrastructure

- Polquharity to Glenlee via Kendoon (steel lattice tower)
- Carsfad to Kendoon (wood pole)
- Gantry
- Existing tower for removal
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Access point

Access to proposed towers

- Existing access
- New access
- Timber extraction spur

Access to towers for removal

- New access
- Working area
- Construction compound

Terrestrial Protected Species Survey

- Study area

Camera/feeding station results

- Red squirrel
- No species seen

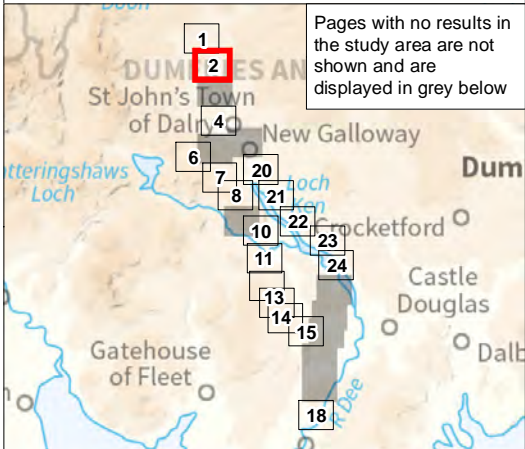
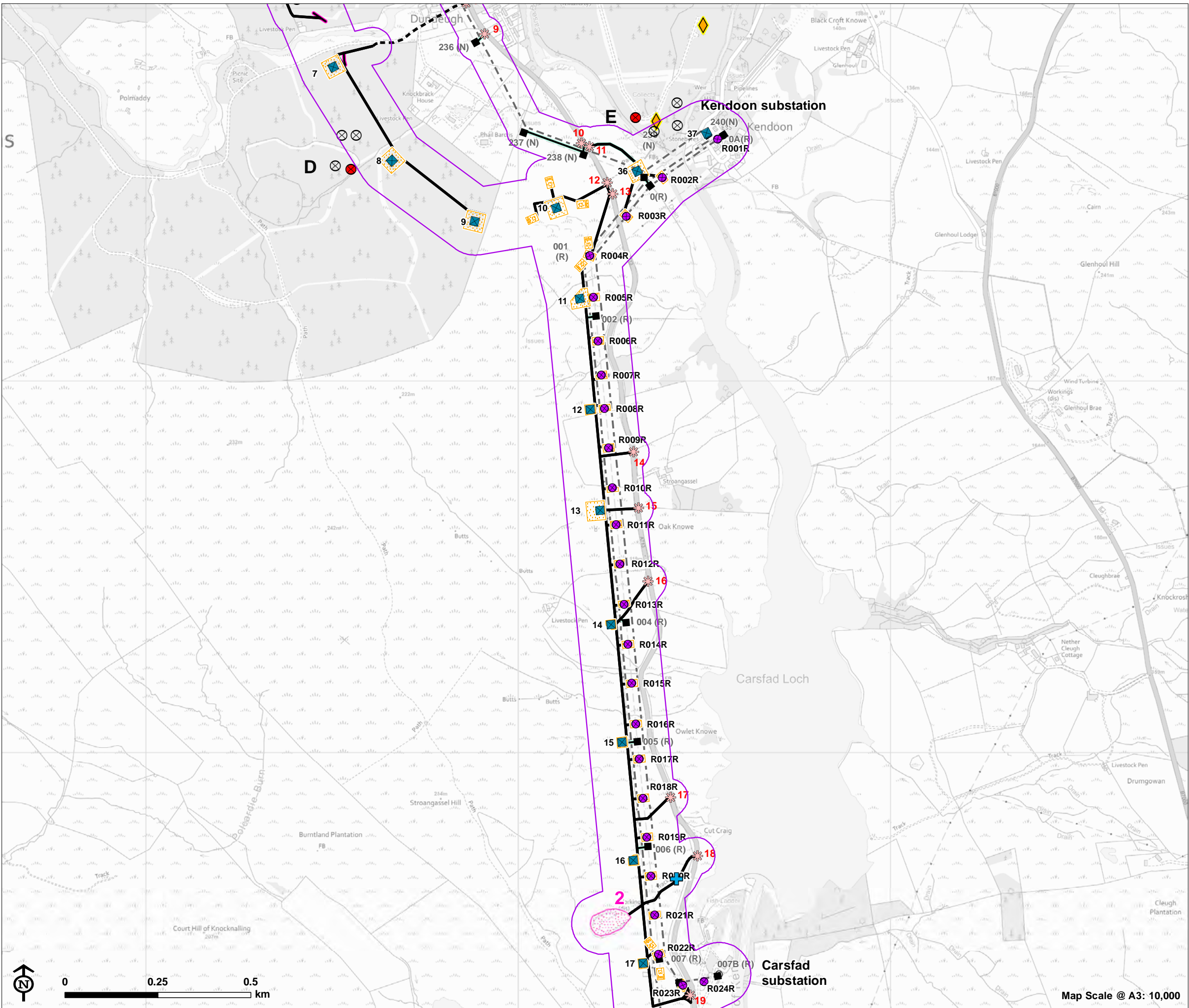
Reptile field sign

- Sighting, slow worm

Forestry Enterprise data (now Forestry and
Land Scotland)

Red squirrel field sign

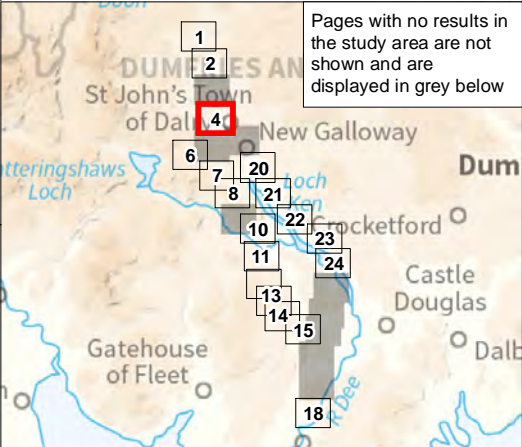
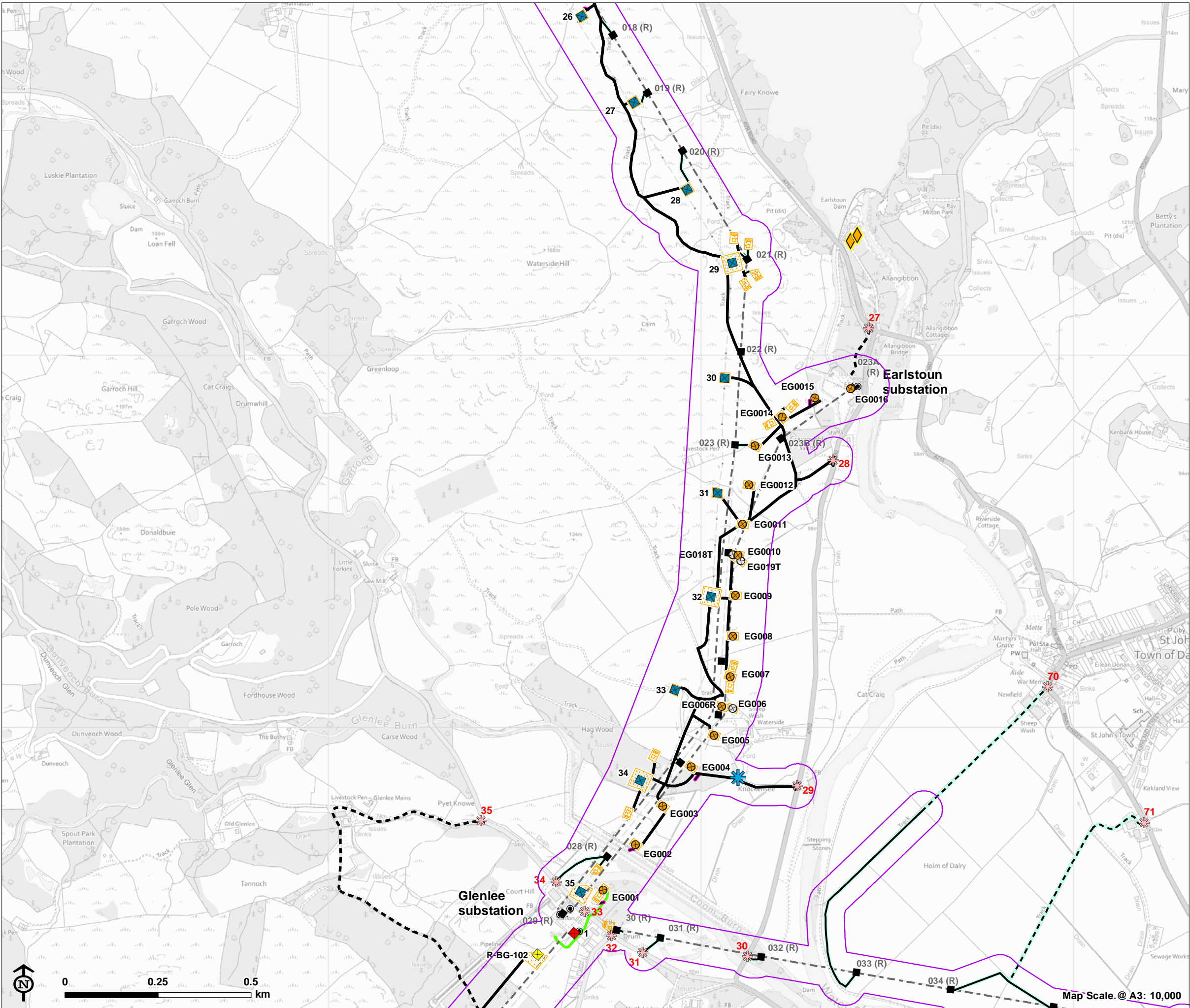
- Sighting

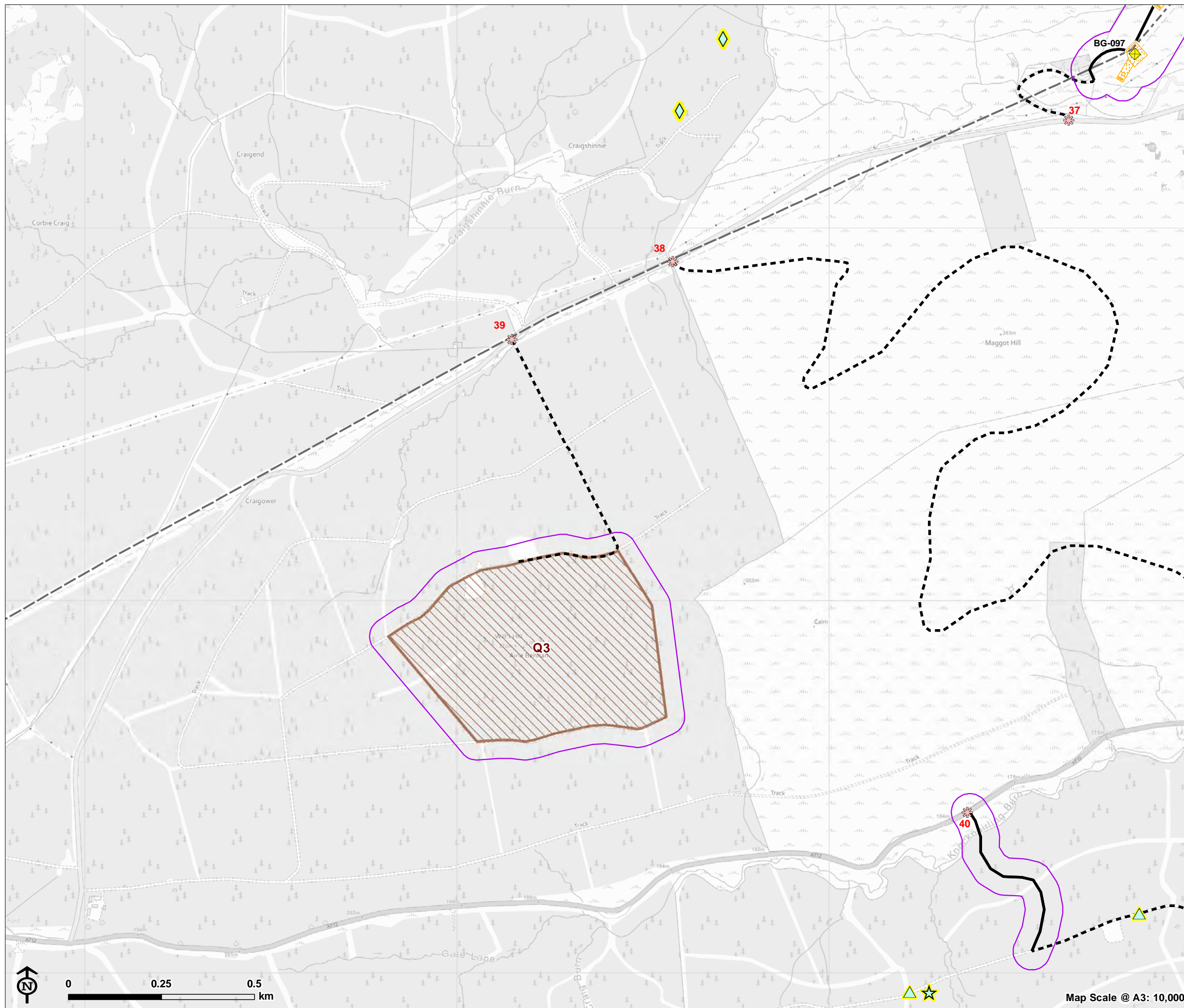


Technical Appendix 10.3: Protected
Species Survey

Figure 2.4: Terrestrial Protected Species

- Overhead line infrastructure**
- Polquharity to Glenlee via Kendoon (steel lattice tower)
 - Earlstoun to Glenlee (wood pole)
 - Earlstoun to Glenlee (temporary wood pole)
 - Glenlee to Tongland (steel lattice tower)
 - BG route deviation (steel lattice tower)
 - Gantry
 - Existing tower for removal
 - Existing 132kV overhead line to be removed (following construction of the KTR Project)
 - Underground cable
 - Access point
- Access to proposed towers**
- Existing access
 - New access
 - Timber extraction spur
- Access to towers for removal**
- Existing access
 - New access
 - Working area
- Terrestrial Protected Species Survey**
- Study area
- Reptile field sign**
- Potential hibernacula
- Forestry Enterprise data (now Forestry and Land Scotland)**
- Red squirrel field sign**
- Sighting





KTR Project EIA Report

Technical Appendix 10.3: Protected Species Survey

Figure 2.6: Terrestrial Protected Species

Overhead line infrastructure

- BG route deviation (steel lattice)
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Existing network
- Access point

Access to proposed towers

- Existing access
- New access
- Working area
- Potential quarry working area

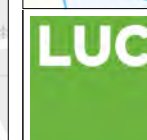
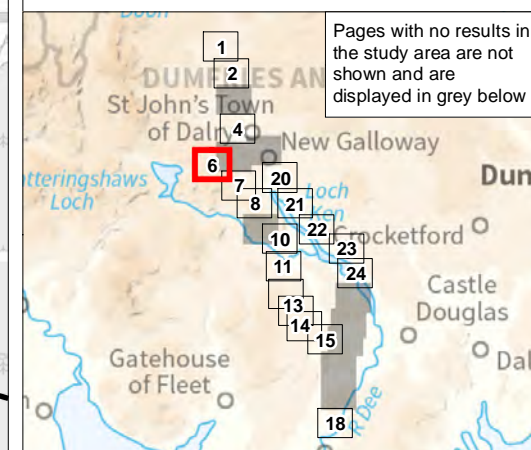
Terrestrial Protected Species Survey

- Study area

Forestry Enterprise data (now Forestry and Land Scotland)

Pine marten field sign

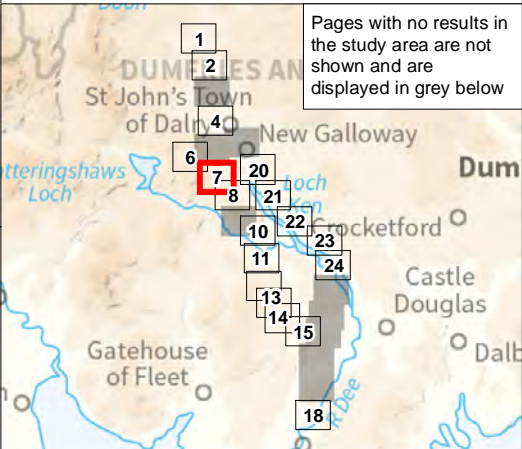
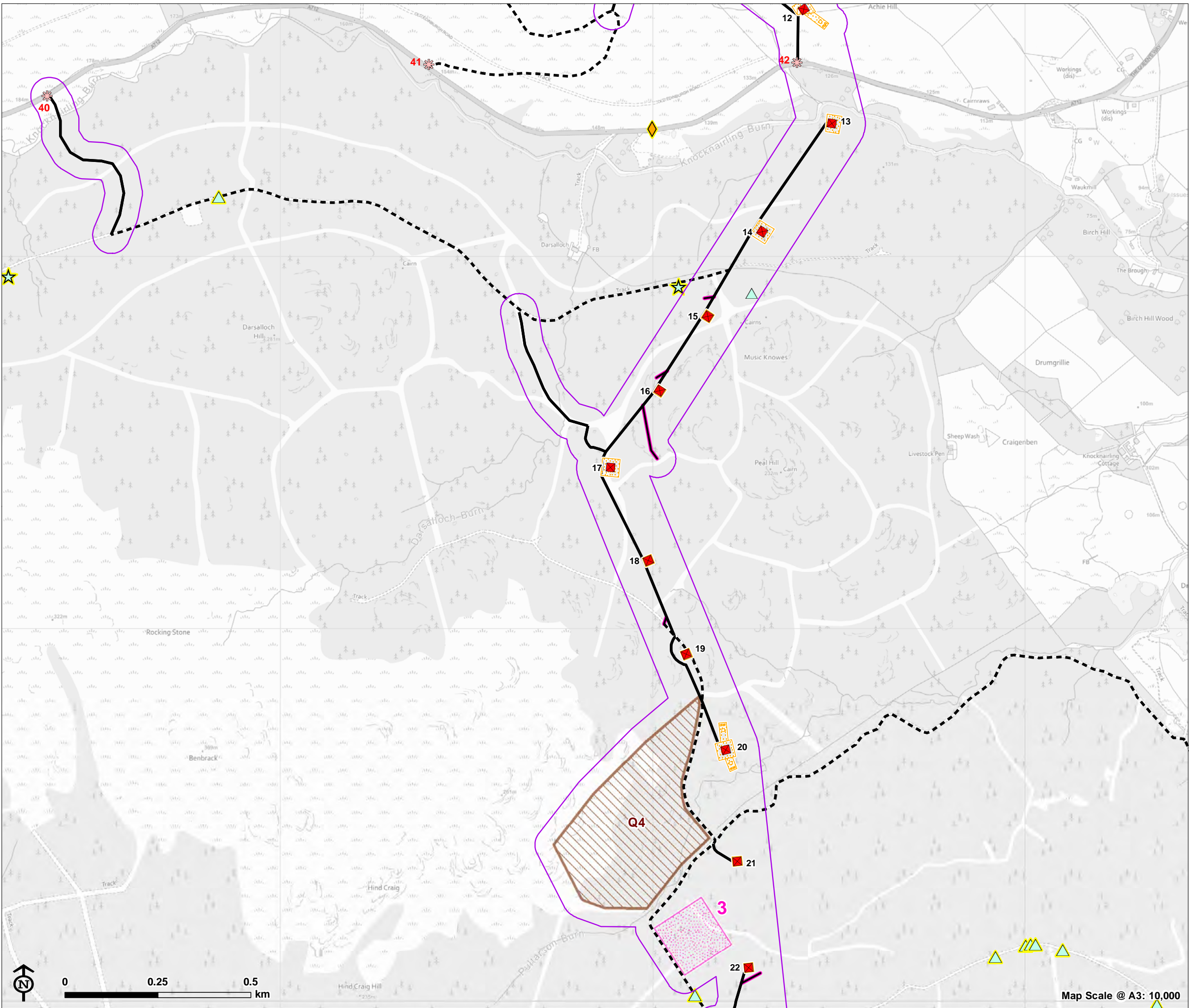
- Den box
- Historic sighting
- Scat



Technical Appendix 10.3: Protected
Species Survey

Figure 2.7: Terrestrial Protected Species

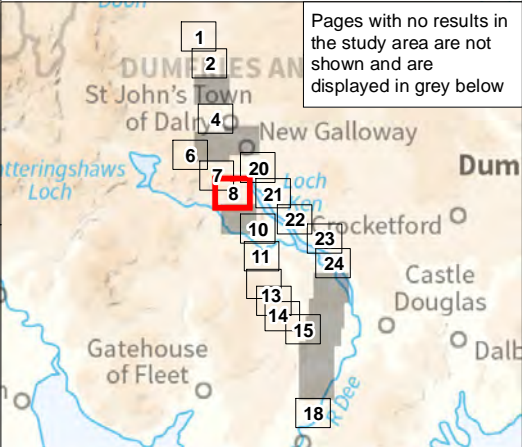
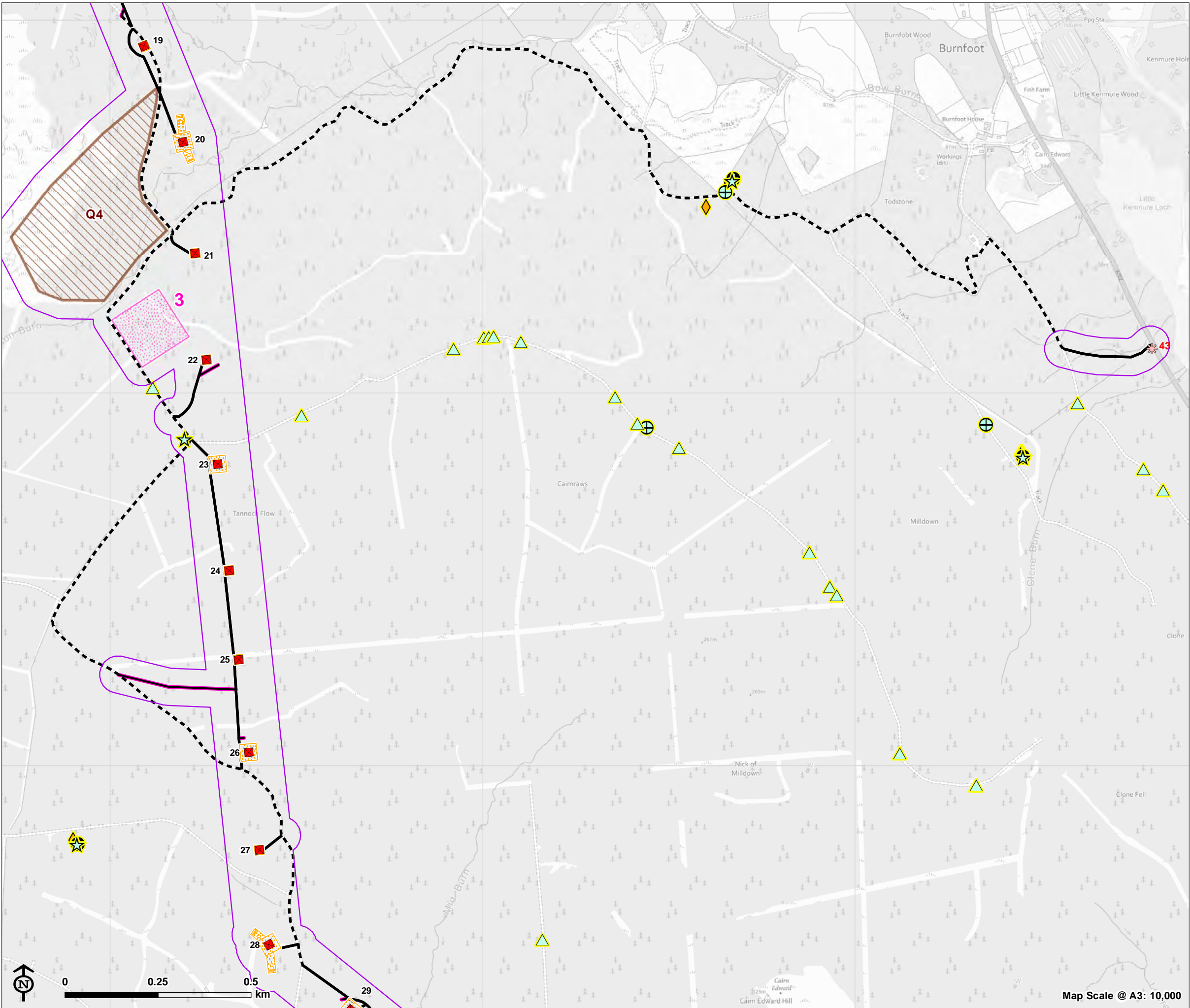
- Overhead line infrastructure**
- Glenlee to Tongland (steel lattice)
 - Access point
- Access to proposed towers**
- Existing access
 - New access
- Timber extraction**
- Working area
 - Construction compound
 - Potential quarry working area
- Terrestrial Protected Species**
- Study area
- Pine marten field**
- Scat
- Forestry Enterprise data (now Forestry and Land Scotland)**
- Red squirrel field**
- Sighting
- Pine marten field**
- Den box
 - Scat



Technical Appendix 10.3: Protected
Species Survey

Figure 2.8: Terrestrial Protected Species

- Overhead line infrastructure**
- Glenlee to Tongland (steel lattice tower)
 - ✱ Access point
- Access to proposed towers**
- - - Existing access
 - New access
 - Timber extraction spur
 - Working area
 - Construction compound
 - Potential quarry working area
- Terrestrial Protected Species Survey**
- Study area
- Forestry Enterprise data (now Forestry and Land Scotland)**
- Red squirrel field sign**
- ◇ Sighting
- Pine marten field sign**
- ☆ Den box
 - ◇ Historic sighting
 - ⊕ Hair tube
 - ⊕ Live trap
 - △ Scat



Technical Appendix 10.3: Protected
Species Survey

Figure 2.10: Terrestrial Protected Species

Overhead line infrastructure

- Glenlee to Tongland (steel lattice tower)
- ✱ Access point

Access to proposed towers

- Existing access
- New access
- Timber extraction spur
- Working area
- Construction compound

Terrestrial Protected Species Survey

- Study area

Red squirrel field sign

- ◆ Sighting

Reptile field sign

- ◆ Sighting, adder

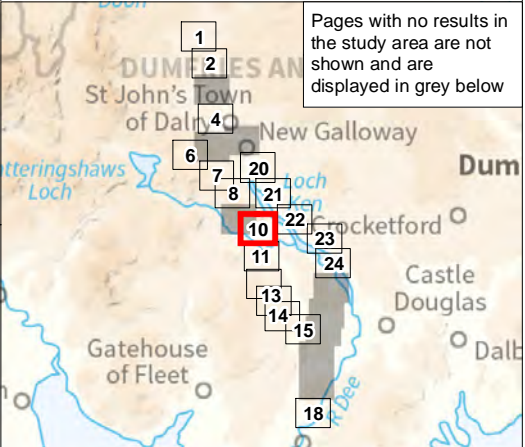
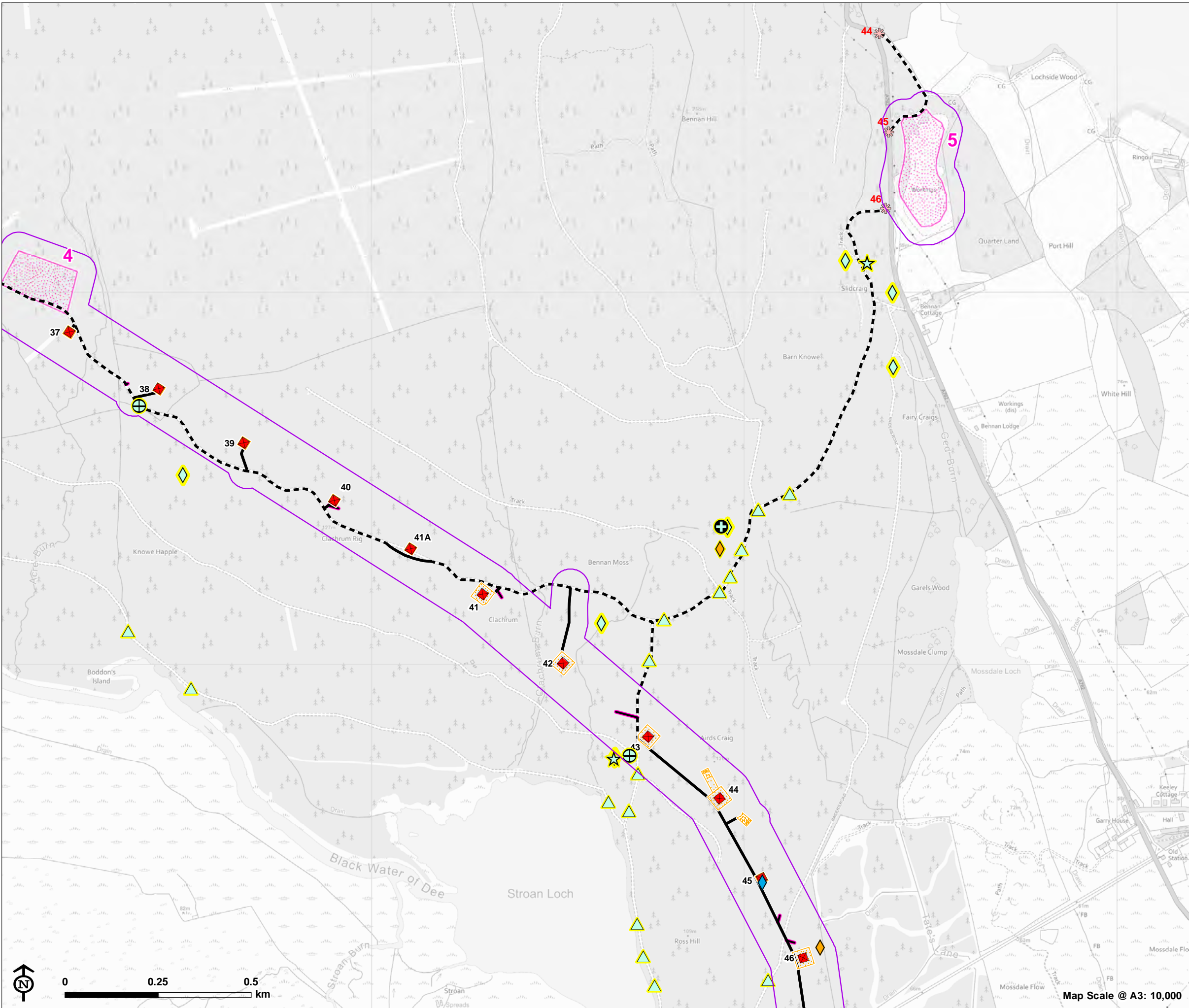
Forestry Enterprise data (now Forestry and
Land Scotland)

Red squirrel field sign

- ◆ Sighting

Pine marten field sign

- ★ Den box
- ◆ Historic sighting
- ⊕ Hair tube
- ⊕ Live trap
- △ Scat



Technical Appendix 10.3: Protected
Species Survey

Figure 2.11: Terrestrial Protected Species

Overhead line infrastructure
■ Glenlee to Tongland (steel lattice)

Access to proposed towers
- - - Existing access
— New access
— Timber extraction spur
■ Working area

Terrestrial Protected Species Survey
□ Study area

Camera/feeding station results
● Pine marten
● Pine marten and red squirrel
⊗ No species seen

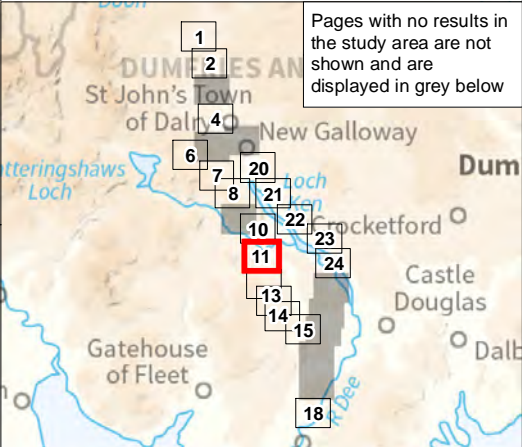
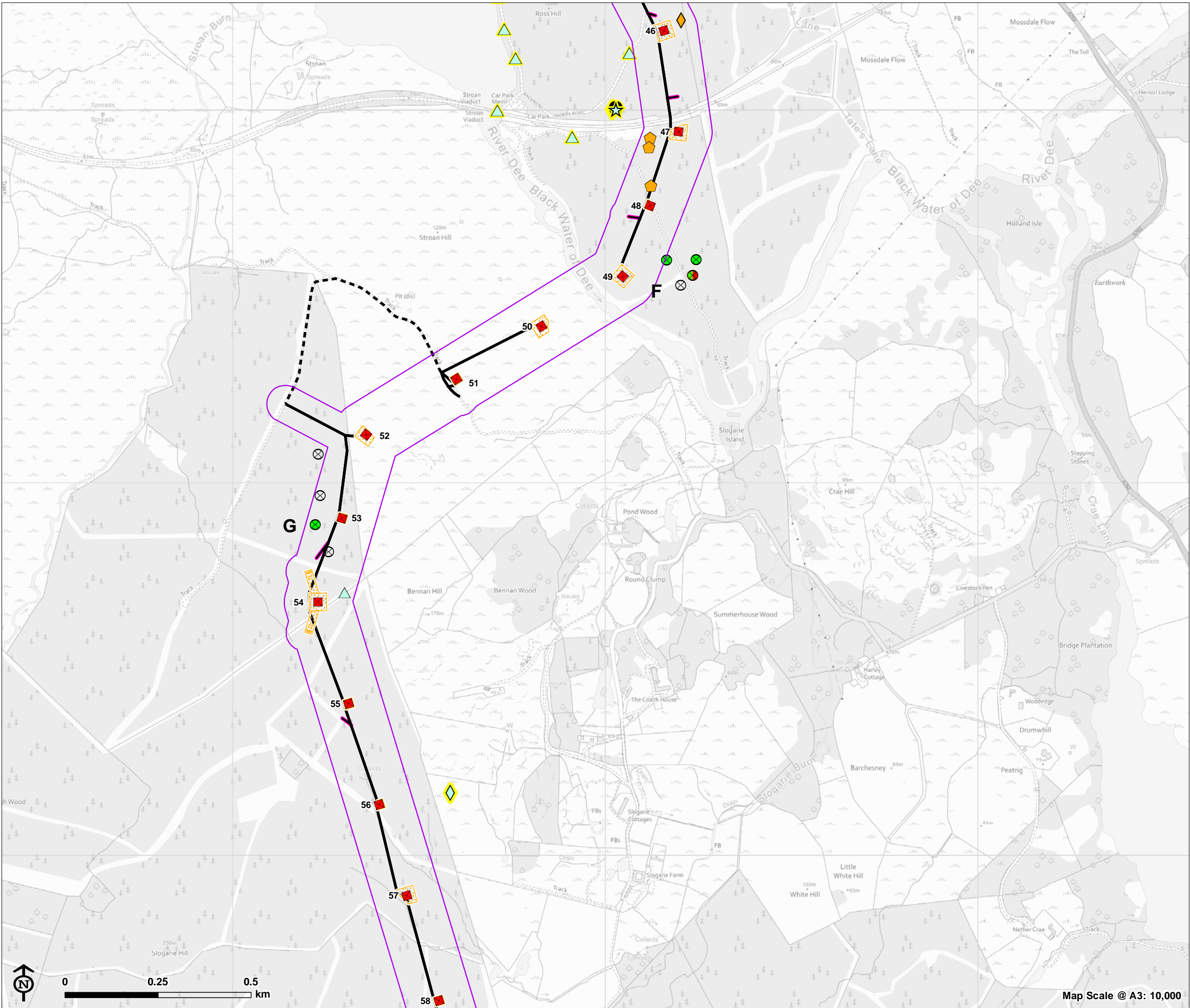
Pine marten field sign
▲ Scat

Red squirrel field sign
◆ Sighting
◆ Foraging remains

**Forestry Enterprise data (now Forestry and
Land Scotland)**

Red squirrel field sign
◆ Sighting

Pine marten field sign
★ Den box
◆ Historic sighting
+ Live trap
▲ Scat



Technical Appendix 10.3: Protected
Species Survey

Figure 2.12: Terrestrial Protected Species

Overhead line infrastructure

- Glenlee to Tongland (steel lattice)
- Access point

Access to proposed towers

- Existing access
- New access

Timber extraction spur

- Working area
- Potential quarry working area

Terrestrial Protected Species Survey

- Study area

Camera/feeding station results

- Pine marten
- Pine marten and red squirrel
- Red squirrel
- No species seen

Pine marten field sign

- Scat

Reptile field sign

- Sighting, adder

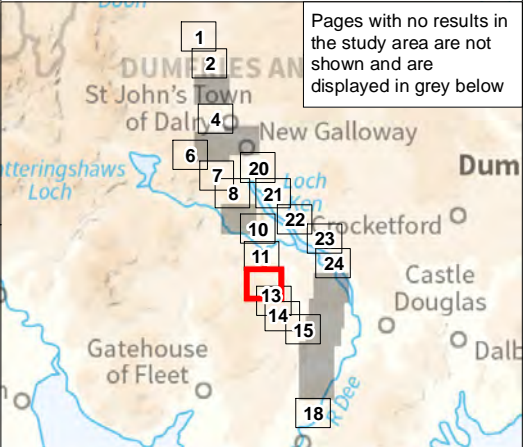
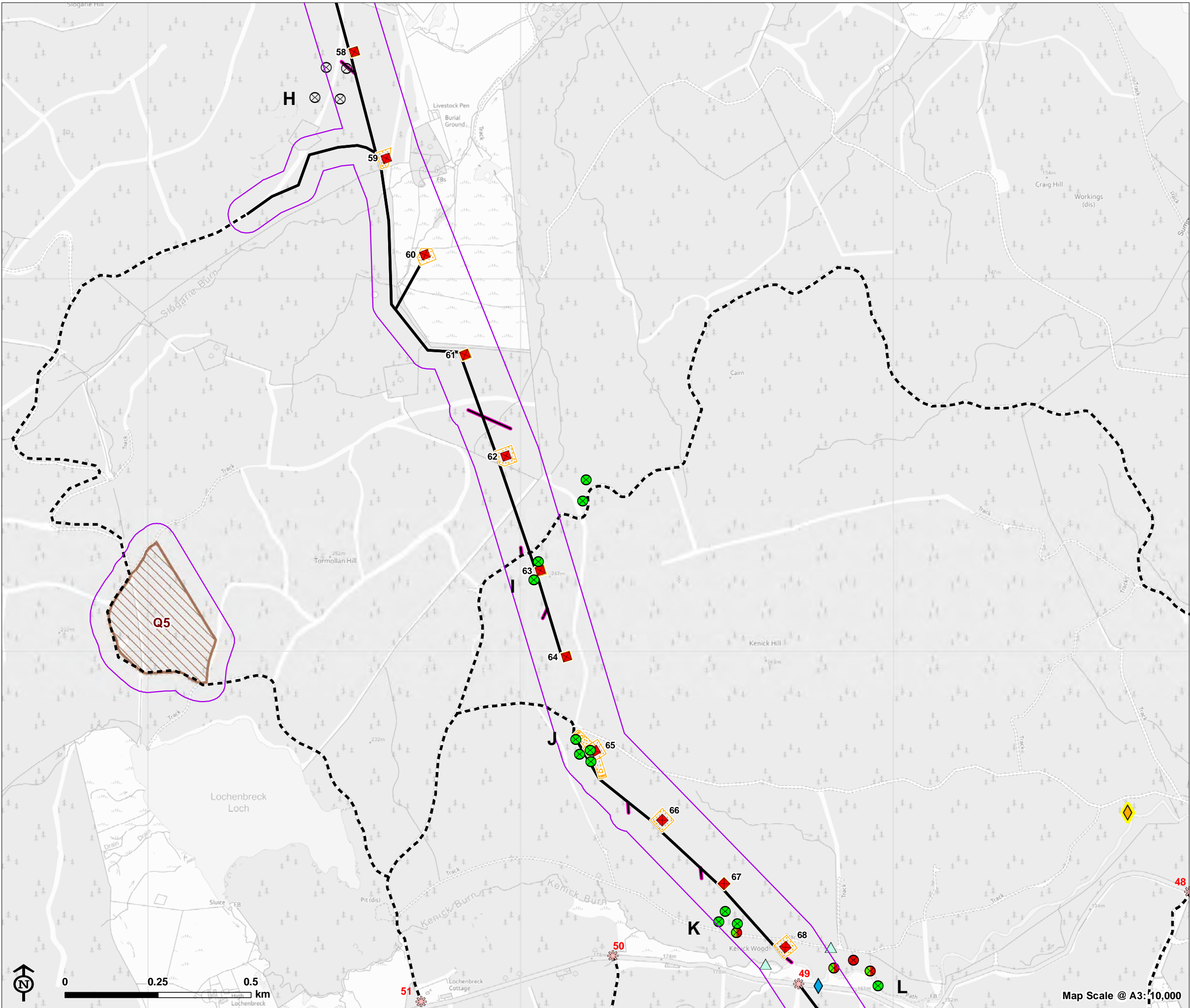
**Forestry Enterprise data (now Forestry and
Land Scotland)**

Red squirrel field sign

- Sighting

Pine marten field sign

- Historic sighting



Technical Appendix 10.3: Protected
Species Survey

Figure 2.13: Terrestrial Protected Species

Overhead line infrastructure

- Glenlee to Tongland (steel lattice)
- Access point

Access to proposed towers

- Existing access
- New access
- Timber extraction spur
- Working area
- Potential quarry working area

Terrestrial Protected Species Survey

Study area

Camera/feeding station results

- Pine marten
- Pine marten and red squirrel
- Red squirrel
- No species seen

Pine marten field sign

Scat

Red squirrel field sign

Foraging remains

Reptile field sign

- Sighting, adder
- Sighting, common lizard

**Forestry Enterprise data (now Forestry and
Land Scotland)**

Red squirrel field sign

Sighting

Pine marten field sign

Historic sighting

