Report to: SSE Renewables Developments (UK) Ltd
Contract No: J509

Protected Species Survey at Gordonbush Extension Wind Farm: 2013 Survey Results

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Gordonbush Extension Wind Farm- Protected Species Survey.

Report November 2013 for NES ltd

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1. Introduction

HED Ltd was commissioned by Northern Ecological Services (NES) to undertake a protected species survey of the area associated with the proposed Gordonbush Extension Wind Farm (see Fig 1).The site lies to the south of the existing Gordonbush Wind Farm operated by SSE Renewables Developments (UK) Ltd. It is dominated by blanket bog and wet heath vegetation with a number of small tributaries of the Allt a' Mhuilinn to the west and the Allt Smeorail to the east. Both drain to the River Brora within 3km. The watercourses on site generally comprise of wet flushes dominated in places by Juncus (rush) species. Two watercourses, Allt nan Nathraichean in the north west corner and Ristocky Burn, tributaries of the Allt a' Mhuilinn and Allt Smeorail respectively, are more significant, reaching into the central area of the site.

The Coir 'an Eion Site of Special Scientific Interest (SSSI) lies to the north-west of the site within 500m and two Scots pine conifer blocks lie adjacent to the south east corner. These blocks have been recently thinned as part of the Gordonbush Estate Habitat Management Plan. The proposed extension site is traversed by an access track in the south, which provides access to the operational wind farm.

The area extends to 450ha and has a boundary of over 9 km. The centre of the site at the time of survey is NGR 284737, 913302.

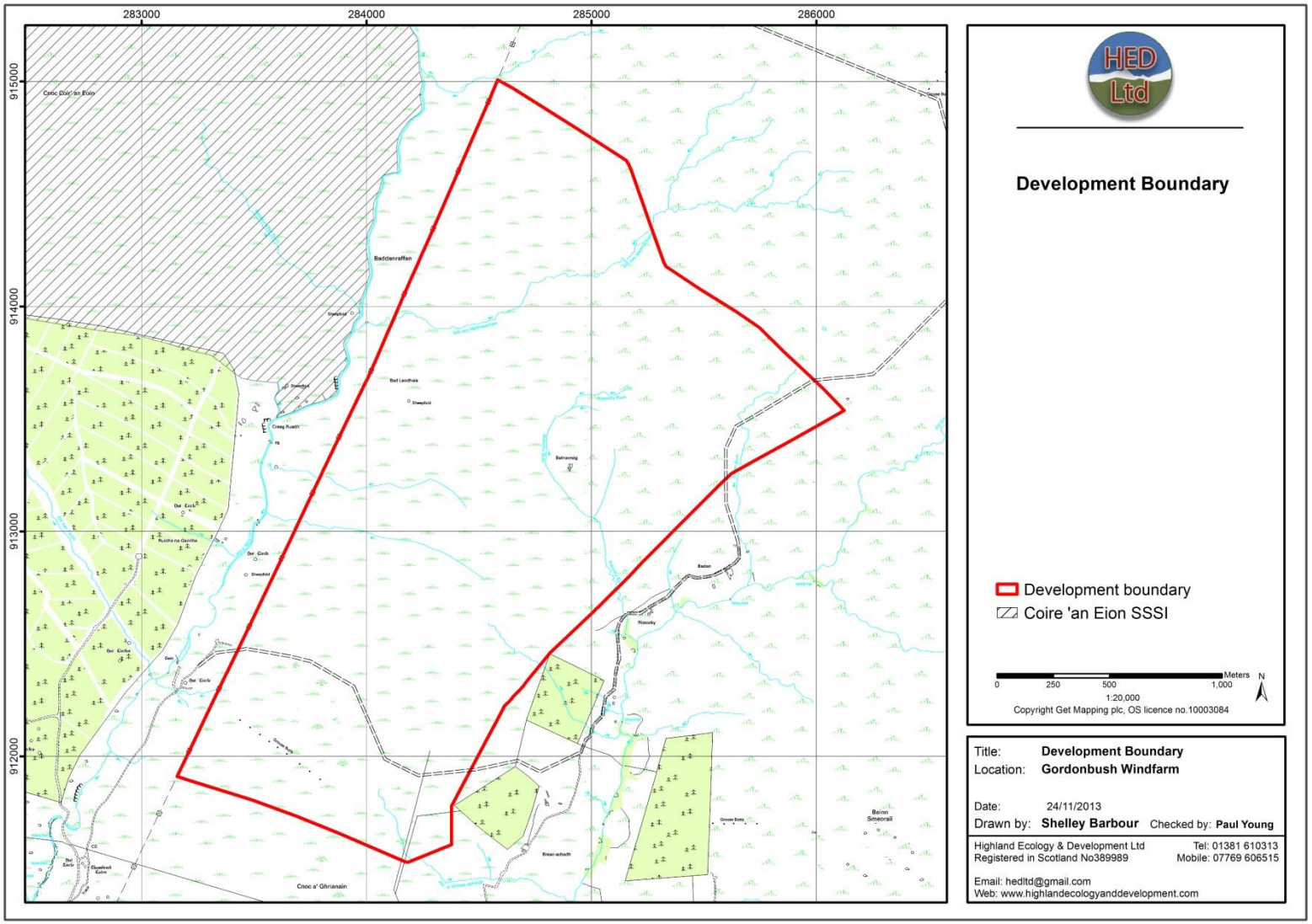


Fig 1GordonbushExtension Wind Farm core development boundary

This survey is an appraisal of protected species presence, distribution and activity levels across the development site and appropriate buffer distances beyond the site. The survey was undertaken during a seven month period from April to October 2013. The scope of the survey is shown in Table 1 below.

Table 1 Survey Specification

European Protected Species	Bat Otter Wild cat
Other species	Water vole Badger Pine marten Reptiles
Great Crested Newt	Following a data search and habitat review of the site this species was scoped out of the assessment.

The survey methodologies used were based on knowledge of the site, practical experience of undertaking similar surveys nearby and current best practice guidance in relation to protected species.

2. Bat Survey

2.1. Introduction

The aim of the bat survey was to assess the bat activity on site throughout the active period (May-September).

Bats are faithful to their roost and foraging sites and return to them year after year. There are approximately seven different species of bat in the north of Scotland. All 17 breeding species of bat that occur in the UK have suffered population declines over the past 100 years. Due to these declines all bats and their roosts are protected by European legislation.

2.2. Legislation

Bats are protected under the following legislation;

- 1981 UK Wildlife and Countryside Act (as amended)
- As 'European Protected Species', further protection is afforded to all UK bat species under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), referred to as the Habitat Regulations.

Amendments to the Habitats Regulations are implemented by The Conservation (Natural Habitat, &c.) Amendment (No.2) (Scotland) Regulations 2007

The combined legislation means it is a criminal offence to deliberately or recklessly;

- capture, injure or kill a bat;
- harass a bat;
- disturb a bat while it is occupying a structure or place used for shelter or protection;
- disturb a bat while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny a bat use of the breeding site or resting place;
- disturb a bat in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- disturb a bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and/or
- disturb a bat while it is migrating or hibernating

2.3. Scoping Survey

A scoping survey was undertaken prior to fieldwork to identify potential bat habitat on site and whether any known roosts are present on or near to the site to determine the likelihood of bats being present. This was undertaken by:

- data search to determine any bat roosts within 5km of the site;
- collation and review of information relevant to the project, including literature, maps and aerial photographs;
- data search to determine any designated sites within 10km of the site (SSSI or Special Area of Conservation (SAC)); and

- collation of data in relation to the construction footprint.

An initial walkover survey was carried out in April/May 2013 to confirm and add to the information gathered during the scoping survey.

The site was categorised as a low risk site due to the altitude and lack of ideal foraging habitat for bats. Ground elevations range from approximately 150m Above Ordnance Datum (AOD) in the south-west of the site to approximately 330m AOD in the north-east of the site with large areas of exposed and poor quality bog habitat within the site boundary. As a consequence, a minimum survey effort based on Bat Conservation Trust (BCT) Guidelines was deemed to be appropriate, as follows:

- desk study ;
- assessment of any structures on site, or adjacent, suitable to support a bat roost;
- three monitoring transects(two walked, one driven),per season(Spring, Summer and Autumn); and
- static ground monitoring surveys (minimum five nights per month).

2.4. Methodology

2.4.1. Desk survey

A search was made of the National Biodiversity Network (NBN) database for bat records in the vicinity of the site. These records are from a wide range of sources and are collated in a map based database and are publically available online.

2.4.2. Transects

Three monitoring transects were undertaken in and adjacent to the site three times each between April and September 2013 by experienced surveyors with Bat duet and Roland recorders and Songmeter EM3s.The location of the transects is shown in Appendix 1. The .wav files were downloaded and converted to zero cross files for analysis. The EM3 downloaded files were in .wav and zc file format (see Appendix 2).

2.4.3. Static detectors

The SM2 bat detectors were deployed initially at five locations across the site (see Appendix 1). They were located to provide a representative sample of the likely turbine locations and the range of foraging habitats present – including woodland edge, watercourse and open habitat. This provided survey information for a total of 90 survey nights spread over the five locations throughout the site. In June 2013 an additional detector was placed just off site near the old ruined cottage at Breac-achadh at GR 2847 9117 to assess bat activity in adjacent habitat assessed to be more suitable for bats, as a comparison.

SM2 and SM2+ detectors allow remote recording of bat activity in extreme environments. These detectors are programmed to start recording before sunset and continue recording until after sunrise. An ultrasonic microphone was used to monitor bats at each detector location and the information collated and downloaded. Information is stored on internal SD

Cards for easy in-the-field download using Panasonic Toughbooks or back at the office following retrieval.

Following the collation of the survey information the files were analysed. SM2 BAT full spectrum files ("*.wac") recorded in the field at static stations were converted to Anabat format using the software WAC2WAV version 3.2.4 (2008-2001 - Wildlife Acoustics, Inc.) with the default settings. Noise files were discarded. A zero crossing analysis (ZCA) was performed using AnalookW version 3.8m (Chris Corben, 2010) on the files potentially containing bat sounds. These files were inspected for the presence of echolocation calls, feeding buzzes and social calls. Files with at least two clear echolocation calls, or pulses, were identified to the species based on shape (graphical representation of frequency *versus* time), the characteristic frequency (Fc) and the minimum frequency (Fmin). If species identification was not possible, the calls were classified by genus, and failing that under the "unknown bat" category (see Appendix 10 for some examples of the analysis and sonograms generated using Analook).

When files were not clear in ZCA analysis, e.g. as a consequence of a weak or poor signal, or when there was the need to confirm the presence of feeding buzzes (a rapid series of pulses as a bat approaches potential prey; Kalko, 1995, Schnitzler et al. 2003) and/or social calls (communication calls, used to attract mates, to warn off competitors for resources, at maternity roosts, etc.; Pfalzer& Kusch, 2003), they were reanalysed using full spectrum sonograms. Spectral analysis was performed in BatSound version 1.0.0.2 (Pettersson, Elektronik AB, 1997) on "*.wav" files converted by WAC2WAV from the original "*.wac" files.

A bat pass corresponds to a series of echolocation calls produced by one bat, typically the calls detected by a bat detector during a single pass of one bat by the detector. For the purposes of this work, bat passes were defined as different files, or alternatively distinct sequences of pulses within the same file separated by at least one second of silence. Bat passes can be used as a proxy for bat activity in a certain area, and therefore the number of bat passes was summarised per sampling night per location and site for each species. Number of files with social calls (potentially indicative of roosts or mating, etc.), or with feeding buzzes (indicative of feeding activity) were summarised in the same fashion.

Full-spectrum analysis and zero-crossing are the most commonly used methods for processing bat echolocation calls, but they provide very different interpretations of acoustic signal content. While zero-crossing extracts the basic time-frequency content of a signal, full-spectrum adds the dimension of amplitude changes within bat calls, and in contrast to zero-crossing that only retains the dominant frequency at any time, full-spectrum data retains simultaneous multiple frequency content of a signal at any time to interpret the full acoustic soundscape.

Zero-crossing analysis can only detect the dominant, i.e., strongest, frequency content of any signal. Any other signals in the soundscape remain invisible to zero-crossing analysis. Full-spectrum analysis can access multiple frequency content to reveal the entirety of bat calls even when the signal strength of all or part of the call falls below other signals in the soundscape.The time-amplitude information from full-spectrum data does enhance species identification and discrimination. The greater benefit of full-spectrum data comes from the

higher quality and higher resolution time-frequency analysis it provides compared with that from zero-crossing and this further enhances confident species identification.

2.4.4. Roost assessment and survey

A number of potential roost sites were identified within 5km of the site. There are some records from the south and east of the site at roost features previously collected by HED ltd. The conifer woodlands immediately to the south-east offered few suitable roost features although the ruined cottage at Breac-achadh to the south east of the site (Fig 2), the public road bridge on the Allt Smeorail and occupied buildings within 5km offered good potential. Effort focused on the old cottageas the nearest significant structure offering bat roost potential.

The building was surveyed on 24th September and 21st October 2013 from the ground both inside and outside for features capable of supporting bat roosts and any evidence of bats. This was done with the aid of a strong torch light and where required with an endoscope to inspect inaccessible areas.

Areas around windows, sills, doorways, walls, cracks and crevices were searched for bat droppings and access holes examined for signs of staining. Most evidence of bats on exterior walls is likely to have been washed away following recent heavy rain, although significant accumulations of droppings inside the building would have been detected.

Two activity surveys were carried out at dusk by two experienced bat surveyors on 24th September and 21st October 2013. The survey commenced one hour before dusk and continued until one and a half hours after dusk.

Fig 2 Ruined cottage to south east of site

2.5. Results

2.5.1. Desk survey

NBN Gateway records show three feeding roosts recorded from derelict buildings near Gordonbush Lodge in 2008 and a Daubenton's roost and a pipistrelle roost are known to be present within the same location (NES 2013).

2.5.2. Transects

A single Common pipistrelle bat (*Pipistrellus pipistrellus*) pass was recorded during the transect surveys (Table 2 below). This indicates very low bat activity on the site.

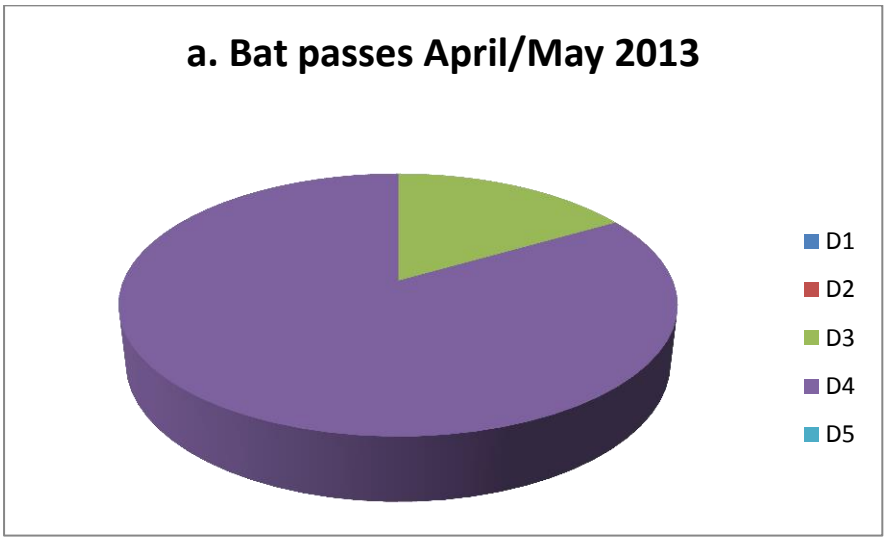
Table 2 Monitoring Transects undertaken 2013

Transect	Length	April/May	June/July	August/September
Transect 1	**3.34km**	**0 bat passes**	**1 bat pass** 1 Common pipistrelle	**0 bat passes**
Transect 2	**3.28km**	**0 bat passes**	**0 bat passes**	**0 bat passes**
Transect 3 (Driven)	**8.4km**	**0 bat passes**	**0 bat passes**	**0 bat passes**

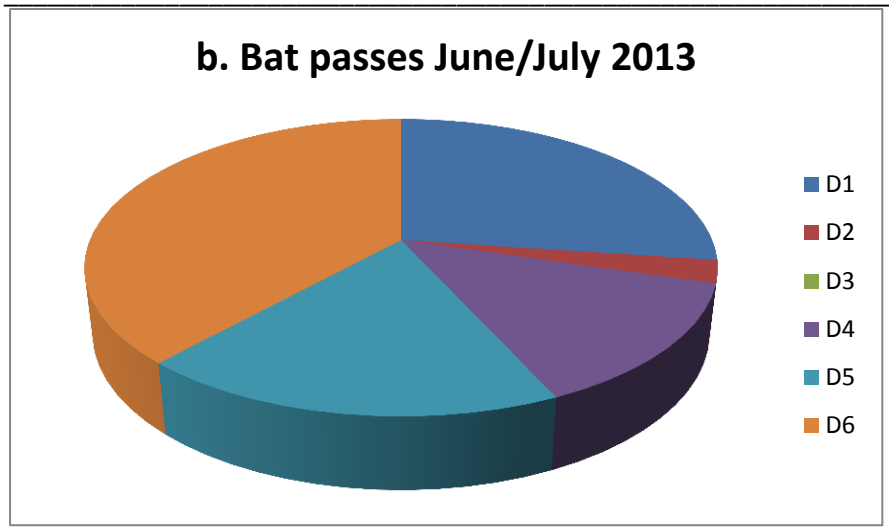
2.5.3. Static detectors

The static detector records are represented below in Fig 3 a-c.

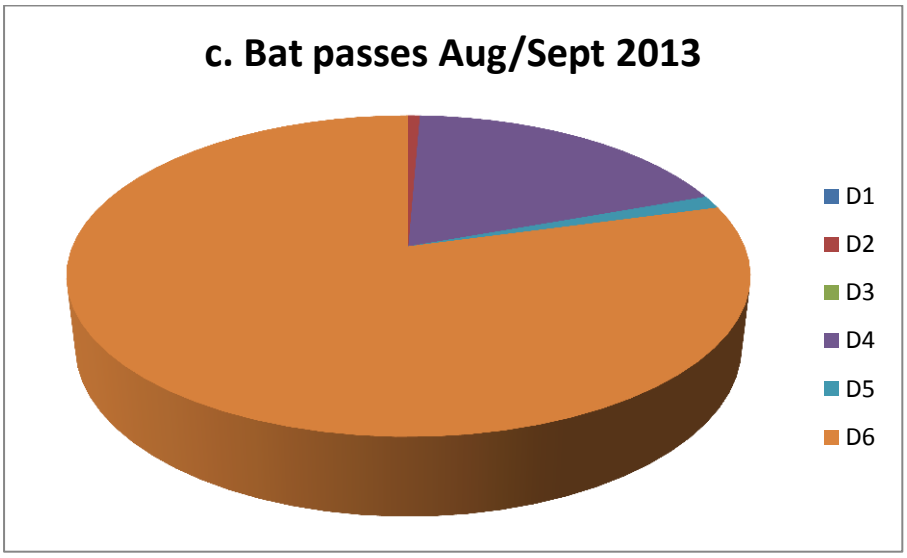
Fig 3 Bat passes recorded by static detectors during the active period in 2013



Location	PASSES
D1	0
D2	0
D3	7
D4	35
D5	0



Location	PASSES
D1	22
D2	2
D3	0
D4	11
D5	15
D6	31



Location	PASSES
D1	0
D2	1
D3	0
D4	29
D5	2
D6	122

Only 277 bat passes were recorded with over half of them recorded at D6, the additional detector, placed just off site near the old ruined cottage at Breac-achadh. D4, which was located near to woodland edge on the south east of the site and a watercourse, recorded the second highest number of bat passes. Activity during the April/ May 2013 season was poor as the spring had been very wet and cold and bats were late in becoming active.

Four species of bats were recorded by the static detectors - Soprano and Common pipistrelle bat (*Pipistrellus pipistrellus and P. Pygmaeus),* Daubenton's bat (*Myotis daubentonii),*and Natterer's bat *(M.nattereri)* – see Appendix 1 and 2 for the full results. (Whilst 100% positive identification of bat species by sonogram analysis is difficult, the recordings were of such good quality that it allowed for confident analysis of results).These species are relatively common and widespread, although there are few records nearby to compare the results with.

2.5.4. Roost assessment

Table 3 Bat species recorded during activity survey

Date	Bat species	Number	Location
24.09.13	Common pipistrelle	1	Outside building
21.10.13	Common pipistrelle	1	Emerged from building

A single Common pipistrelle bat was recorded on two occasions around the derelict building and on one of the surveys it was seen to emerge from a mortar gap in the stone work on the southern aspect of the building (Fig 4). The roost is likely to comprise a single male and there was no evidence that large numbers of bats are utilising the building as a roost.

Fig 4 Bat roost on ruined cottage

2.5.5. Discussion and conclusion

The site offers only limited foraging habitat for bats, which were recorded in very low numbers across the site. Bats are, however, foraging on the edge of the site close to the woodland areas and along stream sides, which provide corridors for foraging into the site (see Potential Foraging Routes map in Appendix 4). Whilst only a single bat was found to be roosting nearby, there are a number of buildings within 2-3 km that have the potential to support bat roosts (see Appendix 3). The ongoing habitat improvements as part of the Gordonbush Estate HMP woodland planting adjacent to the site will improve foraging habitat for bats in the medium to long term.

3. Badger Survey (*Meles meles*)

3.1. Legislation

Badgers are protected under the Protection of Badgers Act 1992 (as amended by the Nature Conservation Scotland Act (2004).

The protection of Badgers Act (1992) makes it a criminal offence to:

- Kill, injure or take a Badger;
- Interfere with a sett by damaging or destroying it;
- Obstruct access to, or any entrance of, a badger sett; and / or
- Disturb a badger when it is occupying a sett.

A badger sett is defined in the legislation as "any structure or place which displays signs indicating current use by a badger" and this is taken by Scottish Natural Heritage (SNH) to include seasonally used setts. It is therefore important that a survey is undertaken prior to construction to ensure no badger setts are present on the site or within 30m. Badgers are also listed in Schedule 6 of the Wildlife and Countryside Act 1981.

3.2. Methodology

The site and surrounding area within 100m of the site was surveyed for badger evidences, as follows;

- Setts – usually either a concentration of holes and tunnels or single hole.
- Faeces – typically badgers use latrines close to the setts and dung pits to mark their territory.
- Paths or trails leading to and from foraging areas – well trodden paths leading from setts.
- Other field signs – footprints, scratches on trees or posts, hairs and snuffle holes (feeding signs).

3.3. Results

No evidence was found of badger using the site.

4. Otters (*Lutra lutra*)

4.1. Legislation

Otters are known to be active in the vicinity of the site. Under Part lll of the Habitats Regulation (as amended in Scotland 2007) it is an offence to deliberately or recklessly;

- Disturb an otter while it is at a resting place;
- Disturb an otter when it is caring or rearing young;
- Obstruct access to an otter breeding or resting place; and / or
- Damage or destroy any otter breeding or resting place;

Any activity which may result in an offence under the above legislation requires to be licensed through a European Protected Species (EPS) license (this usually applies to works being undertaken within 30m of a known otter resting place or couch, or 100m from a natal holt).

4.2. Methodology

The watercourses and land within 250m of the site were searched for signs of otter, based on the methodology by Chanin (2003), which included spraints, footprints, lying-up sites, potential holts or couches, and meal remains. The area of the Allt a' Mhuilinn was investigated by the same survey team earlier in the year for a different project (Gordondush Dam removal assessment), and was therefore not covered in this survey effort, with the intention that findings from both reports will be used in the Environmental Statement (ES).

4.3. Results

The results are shown in Table 4 below and Appendix 5 Activity map, with target notes for otter evidence given in Appendix 9.

Table 4 Otter signs

Date	Species	Target note	Description	Easting	Northing
19.4.13	Otter	Holt	4 entrances, 2 plus chambers fresh spraint at entrance and inside	284374	913888
19.4.13	Otter	Spraint	30m south of nearby Beauly to Dounreay tower near water vole colony	283842	913380
19.04.13	Otter	Spraint	On tussock in the Allt nan Nathraichean burn where small burn joins from south	284562	913928
19.04.13	Otter	Pot. Couch	Alongside the Allt nan Nathraichean burn, north side	284748	914091
13.9.13	Otter	Spraints	3 spraints on rock by old hut circle	283322	912704
13.9.13	Otter	Prints	Otter prints in sand	283333	912700
13.9.13	Otter	Spraint	Spraint on rock beside Allta'Mhuilinn	283547	913179
13.9.13	Otter	Couch	Fresh and old spraints under overhanging rock by stream 50m west of Beauly-Dounreay tower	283918	913718
13.9.13	Otter	Couch	Couch in rock by Allt a' Mhuilinnbank	284257	914965
13.9.13	Otter	Couch	Couch under bridge 80m from tower	283998	913920
27.9.13	Otter	Pot couch	Potential couch under rock	285144	911844
27.9.13	Otter	Spraints	Spraint on rock beside Allt Smeorail	285153	912289
27.9.13	Otter	Pot couch	Pot couch under tree	285199	912486
27.9.13	Otter	Spraints	Spraints on rock	285411	912673

Otters are utilising the Allt a' Mhuilinn and the Allt Smeorail to the west and east of the site respectively, plus the Allt nan Nathraichean (tributary of the Allt a' Mhuilinn) in the north west of the site, with evidence of sprainting, couches and holts found. It is likely that the couch and holt on the Allt nan Nathraichean will be used intermittently or seasonally, perhaps in the spring. During this period otters are known to range into upland sites along smaller water courses in search of amphibians.

5. Pine marten (*Martes martes*) and Wildcat (*Felis silvestris grampia*)

5.1. Legislation

Pine Marten

The pine marten is listed as a protected species in Appendix III of the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats. It is also included in Annex V of the European Community's Habitat and Species Directive of 1992, as a species of Community interest whose taking in the wild and exploitation may be subject to management measures.

In the UK, the pine marten is protected under the Wildlife and Countryside Act of 1981, which in Scotland is amended by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2011 - it cannot be trapped, disturbed or sold without a specific licence from the relevant government conservation agency - in Scotland this is SNH.

Wildcat

Wildcats in Scotland are given protection under the Conservation (Natural Habitats, & C.) Regulation 1994 (as amended) as a European Protected Species. Licences are available for certain purposes to permit actions that might otherwise constitute an offence in relation to wildcats.

The following provides a summary of the offences in the Conservation (Natural Habitats, & C.) Regulation 1994 (as amended) in relation to wildcats.

It is an offence to deliberately or recklessly:

- capture, injure, kill or harass a wildcat;
- disturb a wildcat in a den or any other structure or place it uses for shelter or protection;
- disturb a wildcat while it is rearing or otherwise caring for its young;
- obstruct access to a den or other structure or place wildcats use for shelter or protection or to otherwise deny the animal use of that place;
- disturb a wildcat in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species;
- disturb a wildcat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.
- It is also an offence to: damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence); and/or
- keep, transport, sell or exchange or offer for sale or exchange any wildcat or any part or derivative of one (if obtained after 10th June 1994).

5.2. Methodology

Scat survey and camera trapping was undertaken. Suitable location for camera traps were selected following a search of the area for wildcat and pine marten signs (footprints, scats, dens and scrape marks), and rabbit or hare signs (burrows or latrine sites) (see Appendix 6). Wildcats have very similar habitat preferences to pine martens. Two camera traps, each with two cameras, were set up 1.5km apart; one on the edge of the small plantation block on the east side of the study area and the other placed in tributary valleys on west side of the study area. Each station was baited on a post 20-150cm off the ground.

5.3. Results

Evidence of pine marten was recorded on the edge of the site near the Allt Smeorail burn to the east of the site and on a camera trap at the plantation edge (See Table 5 below and Appendix6: Pine marten activity map). No evidence of wildcat was recorded.

Table 5 Pine marten signs

Date	Species	Target note	Description	Easting	Northing
13.5.13	Pine marten	pine marten eating pheasant bait	pine marten caught on camera trap	284814	912440
27.9.13	Pine marten	scat	scat mainly rowan berries	285144	911844
27.9.13	Pine marten	scat	scat	285182	912027
27.9.13	Pine marten	scat	scat	285160	912278
27.9.13	Pine marten	scat	2 scats on rock	285209	912489

As pine marten are woodland animals, it is not expected, given the extent of open habitat across the Development, that the development area will be used in any significant way as foraging habitat.

6. Water vole(*Arvicola amphibious)*

6.1. Legislation

Water voles are partially protected under the Wildlife and Countryside Act 1981 (as amended) by the Nature Conservation (Scotland) Act 2004, which makes it an offence to damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection. It is also an offence to disturb water voles while they are using such a place.

Fig 5 Watervole using latrine at Gordonbush Windfarm site (PY and RK Photo 2011)

6.2. Methodology

All pools, streams and ditches that flow into and around the site within 100m were surveyed. Water vole signs including burrows, runs, footprints, feeding stations, latrines, and faeces were recorded.

6.3. Results

The presence of water vole was confirmed in three locations on the periphery of the site, see Table 6 below and Appendix 7: Water Vole Activity map. These areas all comprise watercourses relatively high up on respective tributary catchments.

Table 6 Water vole signs

Date	Target note	Description	Easting	Northing
19.4.13	Tunnels	Tunnel and burrow partially flooded	283893	913354
19.4.13	Latrine	Latrine and tunnels under line 20m south of a Beauly to Dounreay OHL tower	283859	913370
19.4.13	Latrine	Latrine and tunnels under line 20m south of a Beauly to Dounreay OHL tower	283848	913376
19.4.13	Latrine	Latrine and tunnels under line 20m south of a Beauly to Dounreay OHL tower	283845	913378
19.4.13	Latrine	In wet flush	283826	913224
19.4.13	Tunnels	In stream bank 30m west of a Beauly to Dounreay OHL tower	283856	913202
19.4.13	Latrine	Latrine and tunnels by track	285865	913654
6.6.13	Latrine	Latrine and tunnels near turbines	285905	913695
6.6.13	Slide	Water vole slide into stream	285894	913685
21.10.13	Latrine & holes	Latrine & numerous holes	284218	911534
21.10.13	Burrow & run	Burrow & run in peat with latrine	284253	911536
21.10.13	Slide	Slide into water	284360	911424

7. Reptile Survey

7.1. Legislation

All native reptiles are protected under the Wildlife and Countryside Act (1981, as amended) and the Nature Conservation (Scotland) Act (2004) against intentional or reckless killing, injury and sale (or advertising for sale).

7.2. Methodology

An initial walkover of the site assessed any suitable habitat and refuge for reptile species, followed by a focussed survey to establish presence/absence of reptiles and species present. This involved a search of existing refugia such as sheep pens, dykes and rubble. As there were few existing refugia on the site, artificial refugia were located on site and inspected for reptiles over the animals' active season (see Fig 6), which is in line with British Summer Time, from April to October. The timing of the searches coincided with the daily temperature window, which is typically between 09.00 and 11.00, and between 16.00 and 19.00.

Fig 6 Example of corrugated tin refugia

Reptiles spend a lot of time basking when the air temperature is low but the sun is shining, therefore April, May and September are the key months for reptile sightings.

During June, July and August reptiles are active and, because the air temperature is higher, they do not need to spend so much time basking, but instead move about freely often in deep vegetation so are more difficult to find. Reptiles favour south facing slopes and will hibernate in disused rabbit burrows and other hollows and sunny banks and gullies. Reptiles have a well known affinity for hiding under debris exposed or partially exposed to the sun, so will use cover if it is available. Corrugated tin and bitumous backed carpet tiles are commonly used to assist in reptile surveys. Both were used as artificial refugia in this survey.

Fig 7 Male common lizard found on site

The artificial refugia were put out in April 2013 in suitable habitat and were anchored down to prevent them being blown away. A mixture of corrugated tin and bitumous carpet tiles were

used as recommended by Herpetofauna Workers Manual (Richard A. Griffiths and Howard Inns JNCC 2003).

The refugia were checked throughout the season and any reptiles seen under or nearby the refugia were recorded.

7.3. Results

No reptiles were found under the refugia, although an adder was recorded near refugia 6, inside an old disused sheep pen. Reptiles were however recorded on site while carrying out other survey work. Results are shown in Table 7 below and Appendix 8: Reptile Activity map.

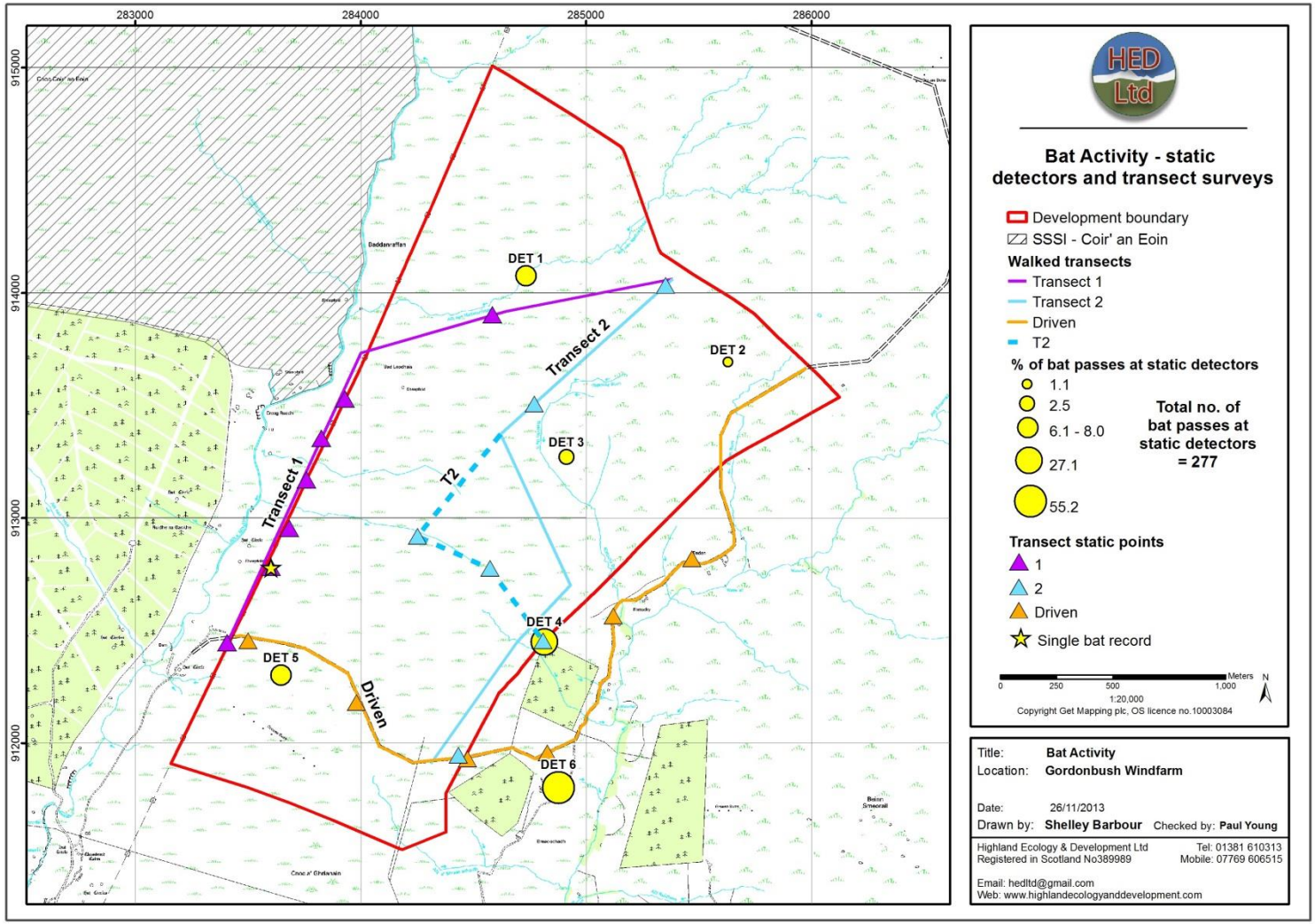
Table 7 Reptile records

Species	date	notes	easting	northing
Adder*(Vipera berus)*	22.7.13	By refugia	284185	913560
Common lizard (*Lacerta vivipara)*	22.7.13	Basking	284500	913013
Common lizard	19.4.13	In heather	283870	913380
Common lizard	19.4.13	Basking	284919	914129
Common lizard	19.4.13	Basking	285247	914311

Lizards and adders are present in low numbers on site. April and May were exceptionally wet and cold months in 2013. 'April showers' weather is excellent for reptile basking if there are good spells of sunshine between showers (sunshine after cloudy wet days is ideal reptile sighting weather, whereas prolonged periods of sunshine mean the animals reach their active temperature and then move off). The continuous wet and windy weather that was prevalent during most of Spring 2013 could have resulted in fewer recordings of reptiles than in normal years.

The reptiles found were fairly widespread (see Appendix 8: Reptile activity map) and were not confined to specific areas. The best refugia on site is the old sheep pen which should be kept intact and not disturbed.

Appendix 1: Bat transects and activity



Appendix 2: Static d etector analysis

April/May 2013

		Gordonbush (records)							
DAY	**Location**	PPIP	PPYG	UPIP	Myotis	UBAT	FBUZ	SCAL	TOTAL
22.5.13	D1	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0
	D3	**7**	0	0	0	0	0	0	**7**
	D4	**2**	0	0	**1**	0	0	0	**3**
	D5	0	0	0	0	0	0	0	0

		Gordonbush (records)							
DAY	**Location**	PPIP	PPYG	UPIP	Myotis	UBAT	FBUZ	SCAL	TOTAL
23.5.13	D1	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0
	D4	0	0	**1**	0	0	0	0	**1**
	D5	0	0	0	0	0	0	0	0

		Gordonbush (records)							
DAY	**Location**	PPIP	PPYG	UPIP	Myotis	UBAT	FBUZ	SCAL	TOTAL
24.5.13	D1	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0
	D4	0	0	0	0	0	0	0	0
	D5	0	0	0	0	0	0	0	0

		Gordonbush (records)							
DAY	**Location**	PPIP	PPYG	UPIP	Myotis	UBAT	FBUZ	SCAL	TOTAL
25.5.13	D1	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0
	D4	0	0	0	0	0	0	0	0
	D5	0	0	0	0	0	0	0	0

		Gordonbush (records)							
DAY	**Location**	PPIP	PPYG	UPIP	Myotis	UBAT	FBUZ	SCAL	TOTAL
26.5.13	D1	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0
	D4	**30**	0	0	**1**	0	0	0	**31**
	D5	0	0	0	0	0	0	0	0

June/July 2013

Gordonbush

DAY	Location	PPIP	PPYG	UPIP	UBAT	MYOTIS	FBUZ	SCAL	TOTAL
17.7.13	DET 1	**11**	0	0	0	0	0	0	**11**
	DET 2	**1**	0	0	0	0	0	0	**1**
	DET 3	0	0	0	0	0	0	0	0
	DET 4	**4**	0	0	0	**1**	0	0	**5**
	DET 5	**5**	**1**	0	0	0	0	0	**6**
	DET 6	**11**	0	0	0	**1**	0	**2**	**12**

Gordonbush

DAY	Location	PPIP	PPYG	UPIP	UBAT	MYOTIS	FBUZ	SCAL	TOTAL
18.7.13	DET 1	**5**	0	0	0	**3**	0	0	**8**
	DET 2	0	0	0	0	0	0	0	0
	DET 3	0	0	0	0	0	0	0	0
	DET 4	**1**	0	0	0	0	0	0	**1**
	DET 5	**4**	0	0	0	0	0	**1**	**5**
	DET 6	**6**	0	0	0	0	0	**4**	**10**

Gordonbush

DAY	Location	PPIP	PPYG	UPIP	UBAT	MYOTIS	FBUZ	SCAL	TOTAL
19.7.13	DET 1	0	0	0	0	0	0	0	0
	DET 2	0	0	0	0	0	0	0	0
	DET 3	0	0	0	0	0	0	0	0
	DET 4	**1**	0	0	0	0	0	0	**1**
	DET 5	**3**	0	0	0	0	0	**1**	**3**
	DET 6	**5**	0	0	0	0	0	0	**5**

Gordonbush

DAY	Location	PPIP	PPYG	UPIP	UBAT	MYOTIS	FBUZ	SCAL	TOTAL
20.7.13	DET 1	**2**	0	0	0	0	0	0	**2**
	DET 2	0	0	0	0	0	0	0	0
	DET 3	0	0	0	0	0	0	0	0
	DET 4	**3**	0	0	0	0	0	0	**3**

	DET 5	1	0	0	0	0	0	0	1
	DET 6	3	0	0	0	0	0	0	3

Gordonbush

DAY	Location	PPIP	PPYG	UPIP	UBAT	MYOTIS	FBUZ	SCAL	TOTAL
21.7.13	DET 1	1	0	0	0	0	0	0	1
	DET 2	1	0	0	0	0	0	0	1
	DET 3	0	0	0	0	0	0	0	0
	DET 4	1	0	0	0	0	0	0	1
	DET 5	0	0	0	0	0	0	0	0
	DET 6	1	0	0	0	0	0	0	1

August/September 2013

Gordonbush

DAY	Location	PPIP	PPYG	COMM	UPIP	UBAT	MYOTIS	BLE	FBUZ	SCAL	TOTAL
20.9.13	D1	0	0	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0	0	0
	D4	0	0	0	0	0	0	0	0	0	0
	D5	0	0	0	0	0	0	0	0	0	0
	D6	5	1	0	0	0	0	0	0	1	6

Gordonbush

DAY	Location	PPIP	PPYG	COMM	UPIP	UBAT	MYOTIS	BLE	FBUZ	SCAL	TOTAL
21.9.13	D1	0	0	0	0	0		0	0	0	0
	D2	0	0	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0	0	0
	D4	0	0	0	0	0	0	0	0	0	0
	D5	0	0	0	0	0	0	0	0	0	0
	D6	21	0	0	0	0	0	1	0	13	22

Gordonbush

DAY	Location	PPIP	PPYG	COMM	UPIP	UBAT	MYOTIS	BLE	FBUZ	SCAL	TOTAL
22.9.13	D1	0	0	0	0	0	0	0	0	0	0
	D2	0	0	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0	0	0
	D4	7	0	0	0	0	0	0	0	0	7
	D5	0	0	0	0	0	0	0	0	0	0
	D6	12	2	1	0	0	0	0	0	4	15

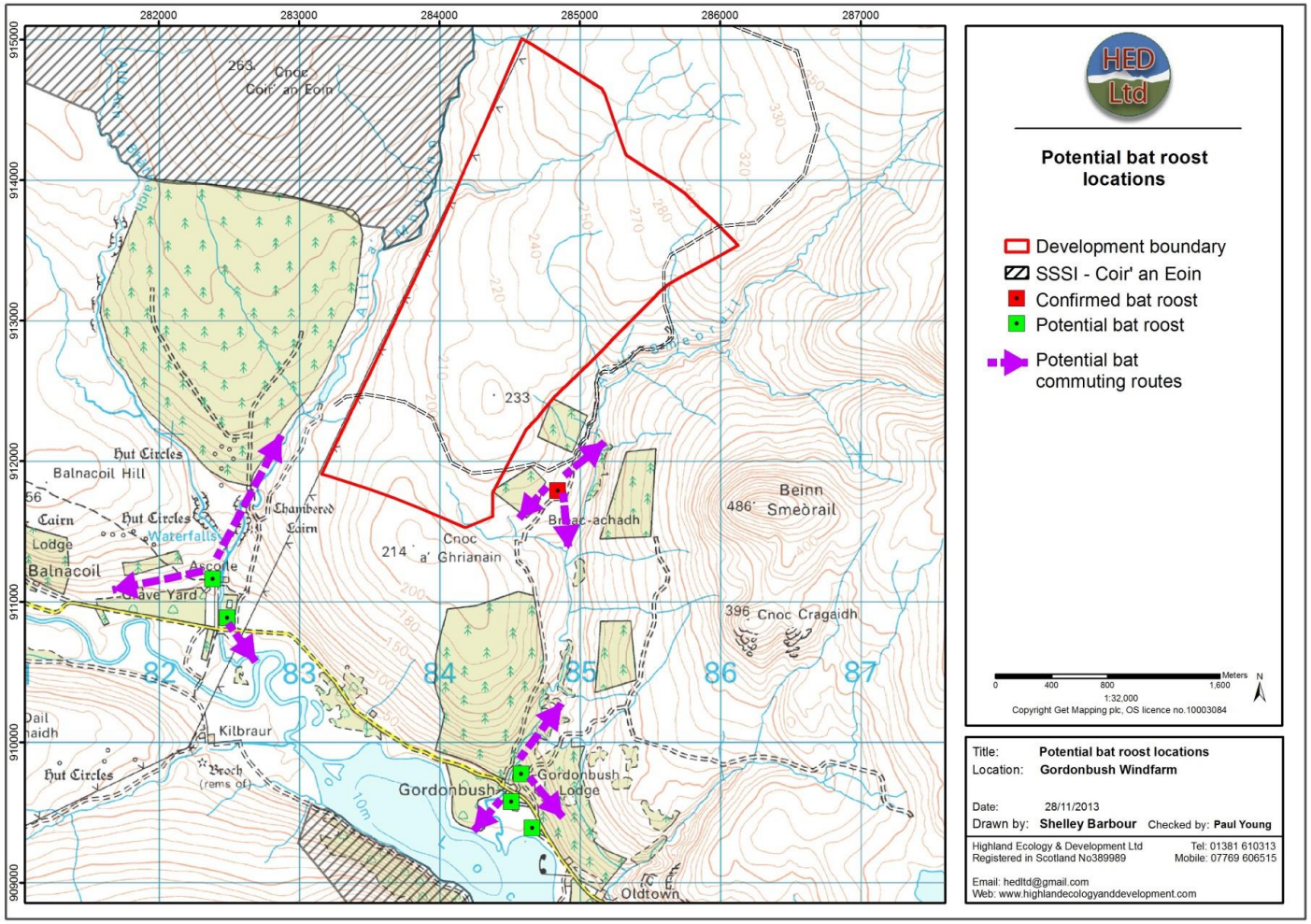
Gordonbush

DAY	Location	PPIP	PPYG	COMM	UPIP	UBAT	MYOTIS	BLE	FBUZ	SCAL	TOTAL
23.9.13	D1	0	0	0	0	0	0	0	0	0	0
	D2	**1**	0	0	0	0	0	0	0	0	0
	D3	0	0	0	0	0	0	0	0	0	0
	D4	**9**	**4**	**1**	0	0	0	0	0	0	**13**
	D5	**1**	0	0	0	0	0	0	0	0	**1**
	D6	**38**	**1**	**12**	0	0	0	**2**	0	**15**	**41**

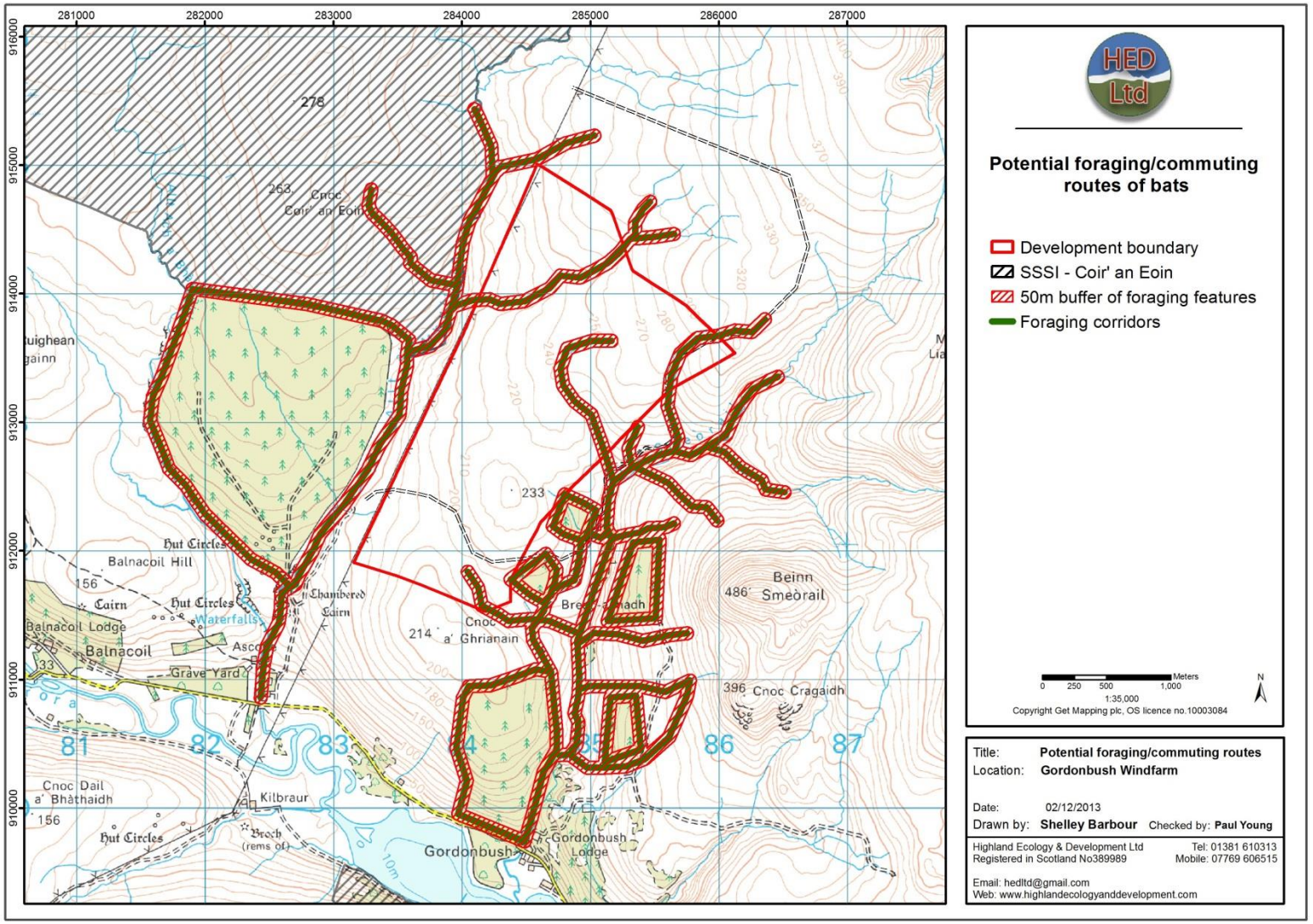
Gordonbush

DAY	Location	PPIP	PPYG	COMM	UPIP	UBAT	MYOTIS	BLE	FBUZ	SCAL	TOTAL
24.9.13	D1	0	0	0	0	0	0	0	0	0	0
	D2	**1**	0	0	0	0	0	0	0	0	**1**
	D3	0	0	0	0	0	0	0	0	0	0
	D4	**8**	**1**	**3**	0	0	0	0	0	0	**9**
	D5	**1**	0	0	0	0	0	0	0	0	**1**
	D6	**27**	**2**	**9**	0	0	0	0	0	**18**	**38**

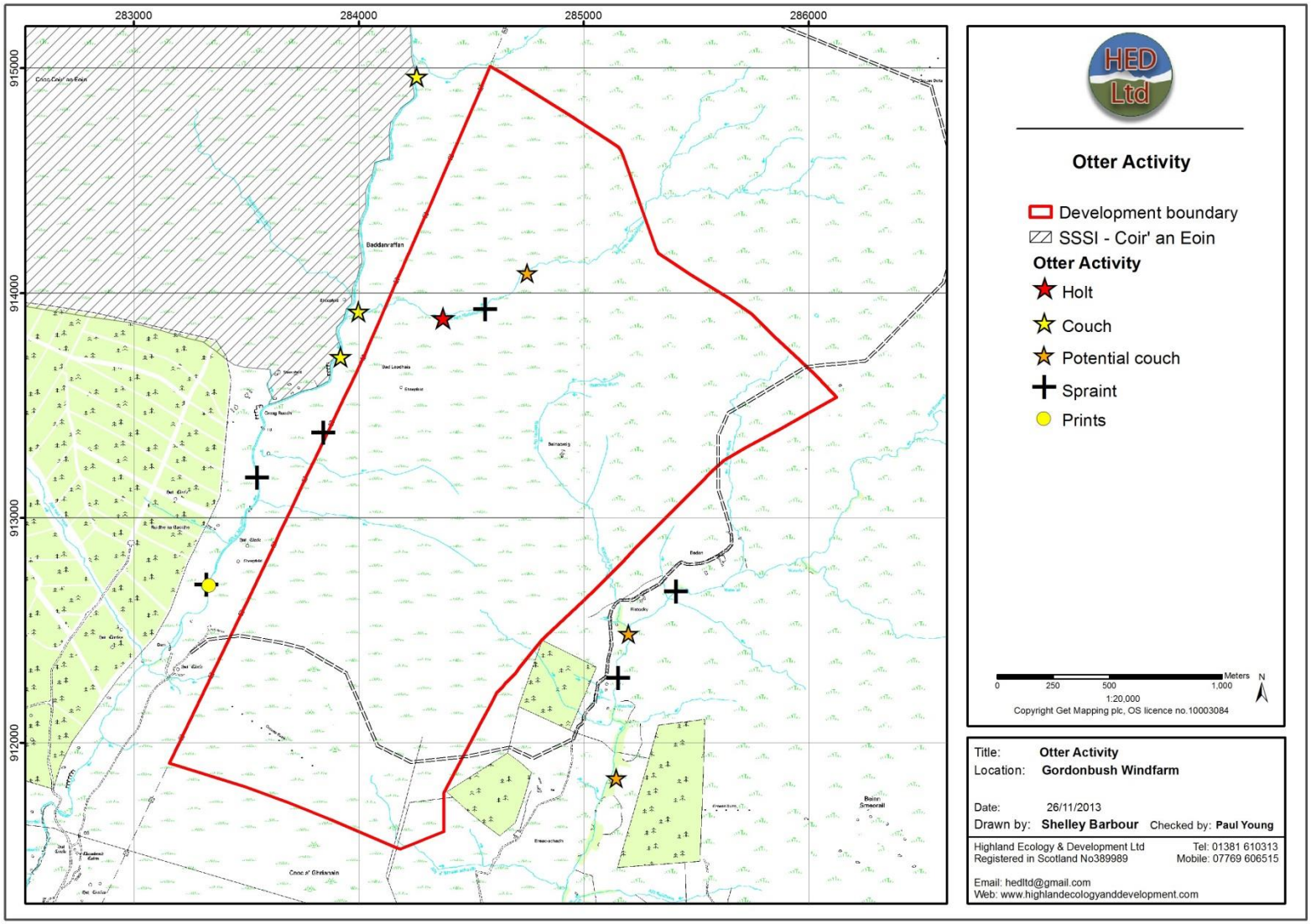
Appendix 3: Potential and identified bat roosts in the site vicinity



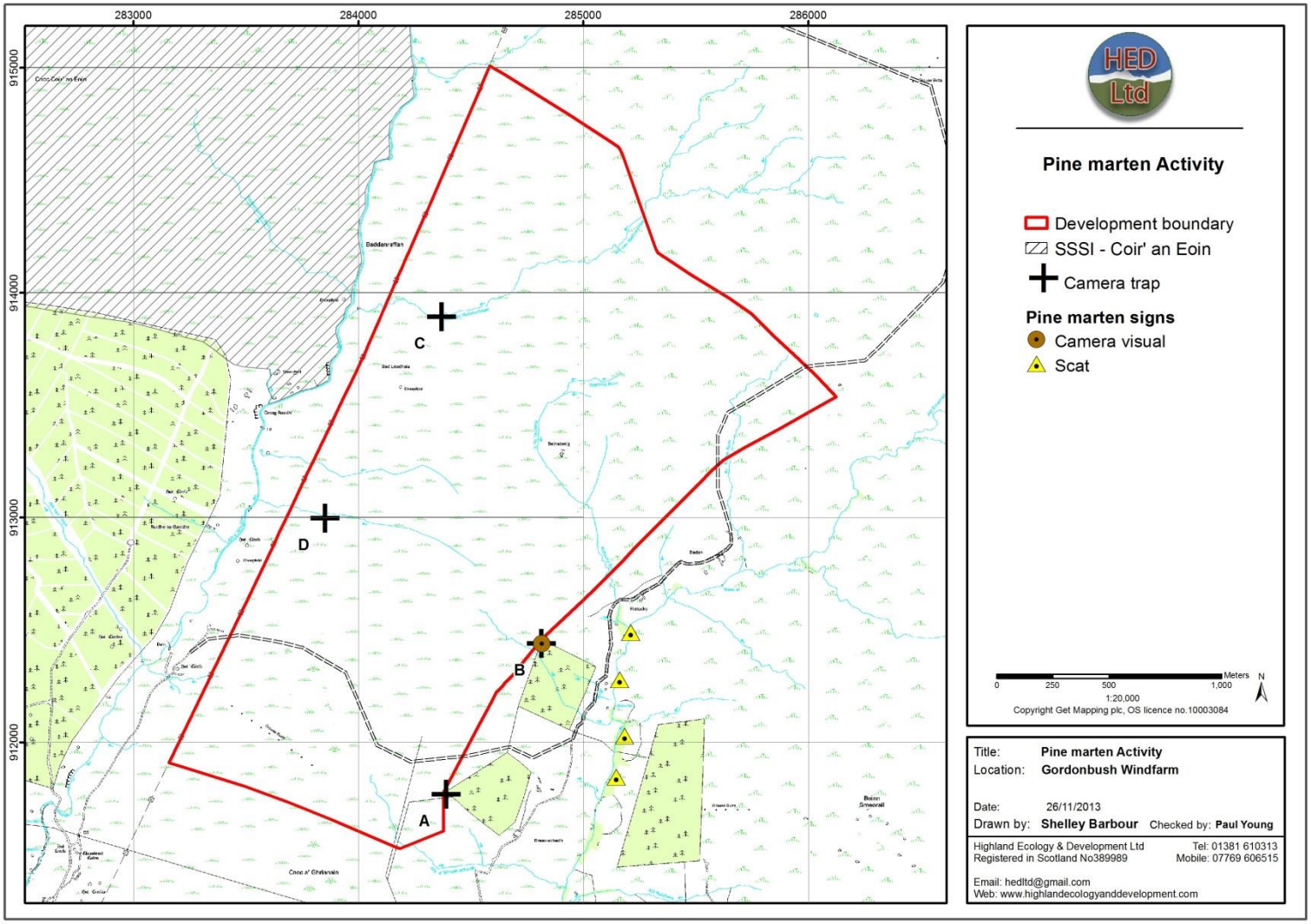
Appendix 4: Potential bat foraging routes



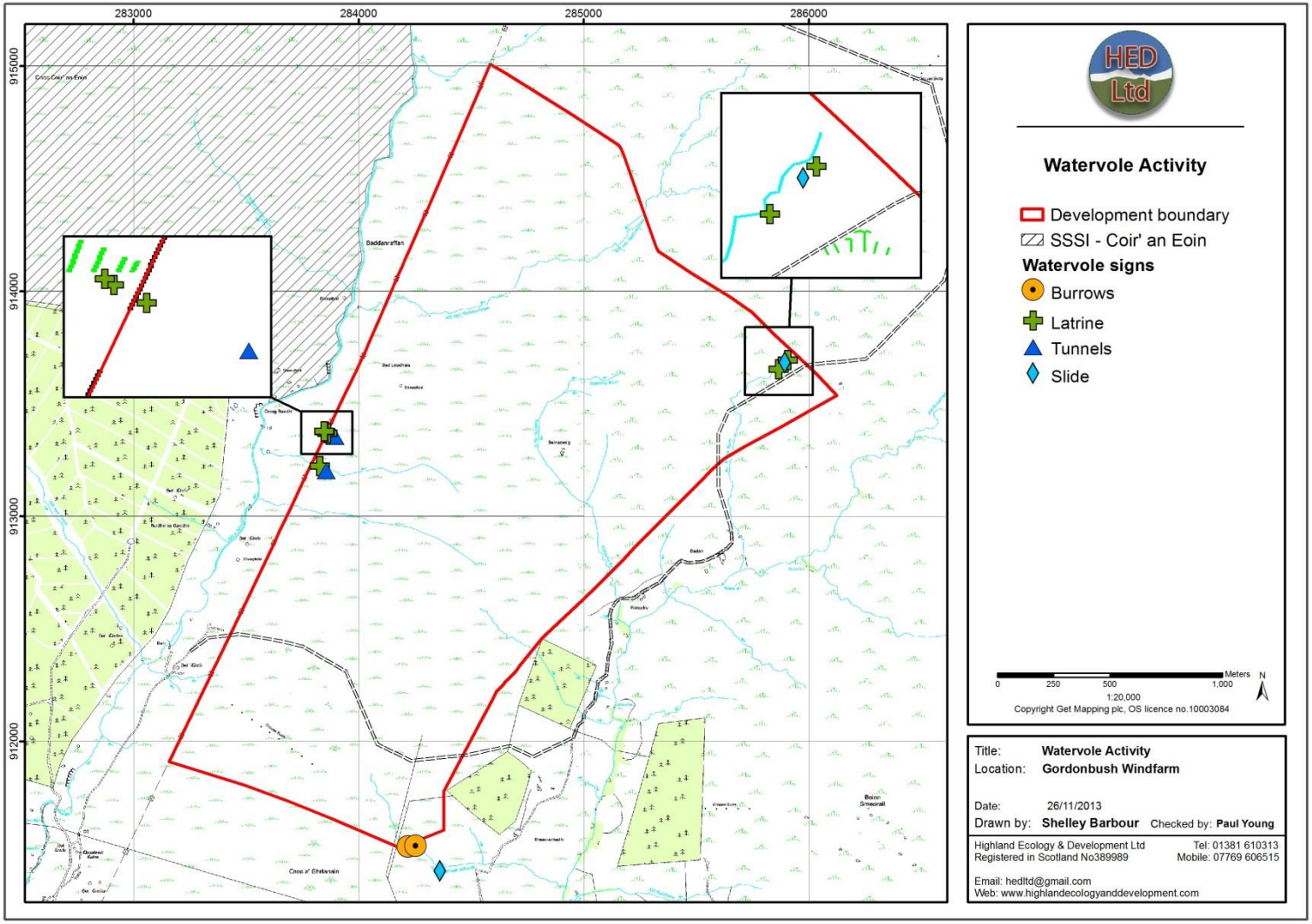
Appendix 5: Otter activity



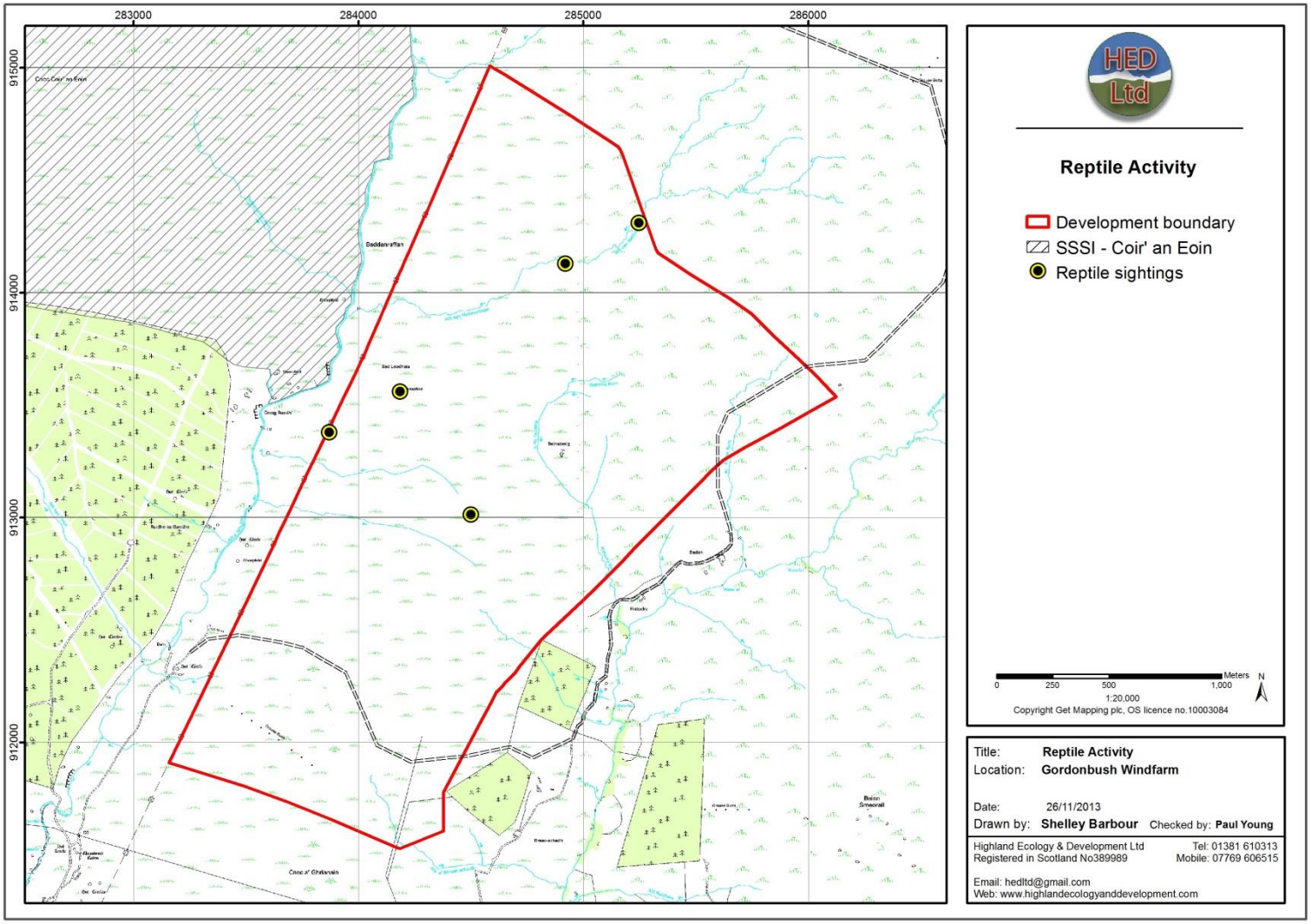
Appendix 6: Pine marten activity



Appendix 7: Water vole activity



Appendix 8: Reptile activity



Appendix 9: Target Notes

Target Note	Date	Description	Image/ location	Eastings	Northings
1	13.5.13	HED 2 Camera B - Corner of forest. Pine marten on pheasant bait		284814	912440
2	19.4.13	Refugia 1 by access track, 10mnorth of access track		283488	912373
3	19.4.13	Refugia 3, south of Beauly-Dounreay tower		283639	912823

4	19.4.13	HED 3 -Camera D Rabbit on stake in wet flush		283852	912997
5	19.4.13	Refugia 6 inside sheep pen		284186	913570
6	19.4.13	Holt fresh spraints inside and at entrance. 4 entrances at least 2 chambers. Tucked in amongst rocks beside stream.		284374	913888
7	19.4.13	HED 4 - Camera C on holt. Rabbit bait		284370	913892
8	19.4.13	Water vole habitat, flooded tunnels		283893	913354

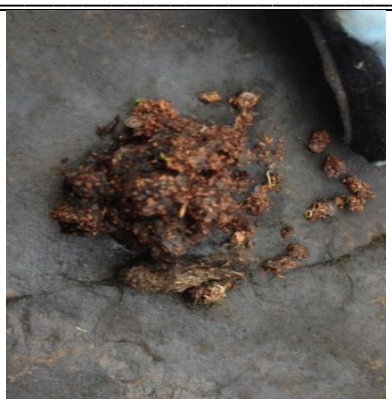
					
9	19.4.13	Lizard in grass 20m of Beauly-Dounreay tower		283870	913380
10	19.4.13	Otter spraint, amongst water vole colony, south of Beauly-Dounreay tower		283842	913380
11	19.4.13	Water vole latrine		283826	913224
12	19.4.13	Water vole tunnels in stream bank 30m north of Beauly-Dounreay tower		283856	913202
13	19.4.13	Refugia 9 near camera A, forest corner		284436	911846

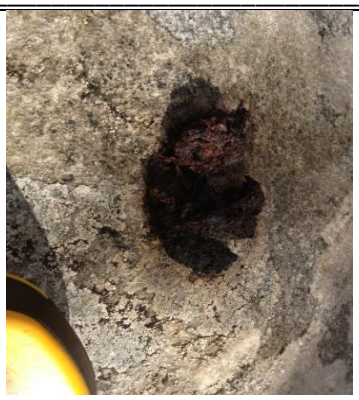
					
14	19.4.13	Water vole tunnel and latrine		285865	913654
15	19/04/13	Spraint - on tussock in the Allt nan Nathraichean where small burn joins from south side		284562	913928
16	19/04/13	Potential couch - alongside the Allt nan Nathraichean, north side		284748	914091
17	19/04/13	Common lizard	Sunning	284919	914129
18	19/04/13	Common lizard	Sunning	285247	914311
19	19/04/13	Dead spawning frog		285247	914311

					
20	6.6.13	Water vole latrine and slide		285905	913695
21	13.9.13	Spraint on rock by old hut circle		283322	912704
22	13.9.13	Otter prints in sand		283333	912700
23	13.9.13	Spraint on rock by stream		283547	913179

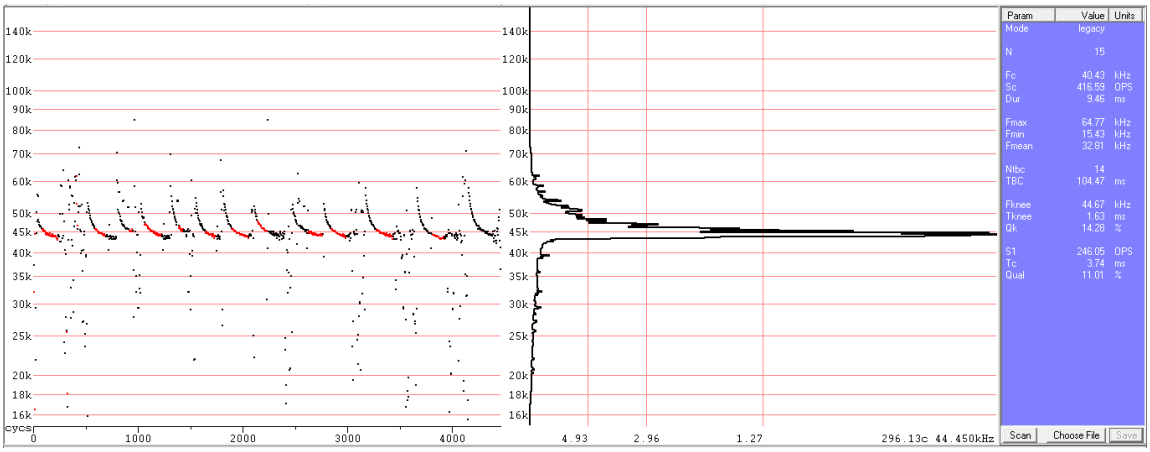
					
24	13.9.13	Couch fresh and old spraints under overhanging rock by stream approximately 50m west of Beauly – Dounreay tower		283918	913718
25	13.9.13	Pine marten scats on riverbank		284153	914757
26	13.9.13	Couch in river bank		284257	914965

27	13.9.13	Couch under bridge		283998	913920
28	27.9.13	Pine marten scat beside river		285144	911844
29	27.9.13	Potential couch beside river		285179	912040
30	27.9.13	Pine marten scat beside river		285182	912027

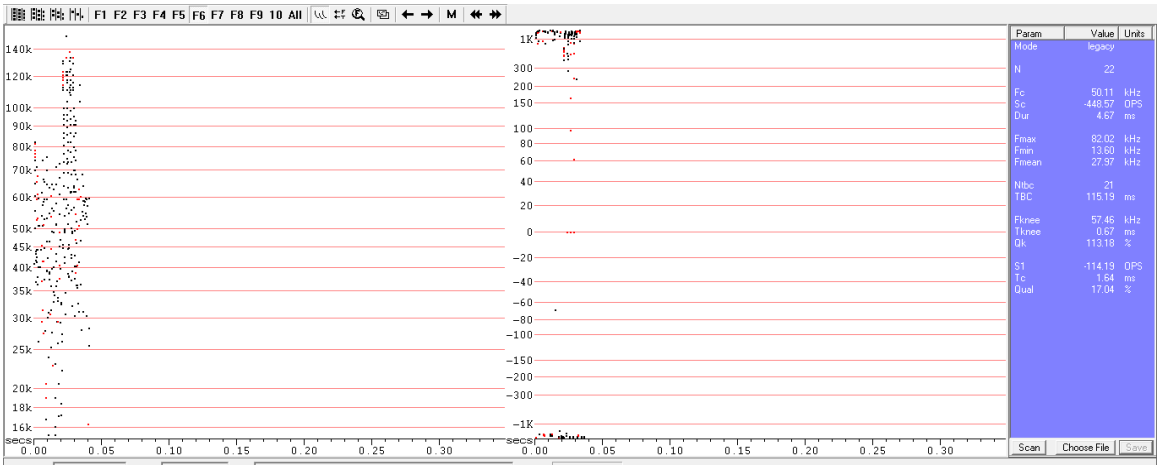
					
31	27.9.13	Pine marten scat		285160	912278
32	27.9.13	2 scats on rock		285209	912489
33	27.9.13	Potential couch under tree		285199	912486
34	27.9.13	Spraints on rock		285411	912673

					
35	27.9.13	Otter print on path		285682	912881

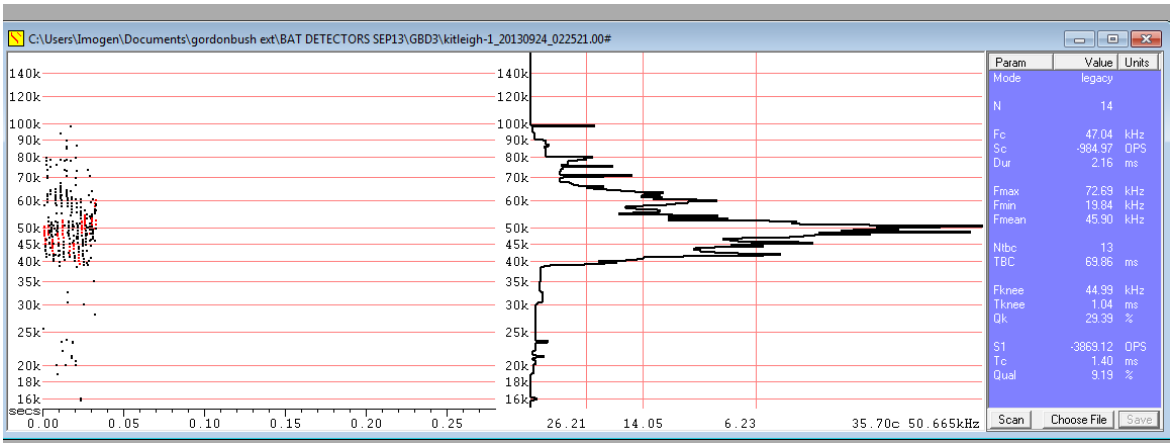
Appendix 10: Bat sonograms 2013



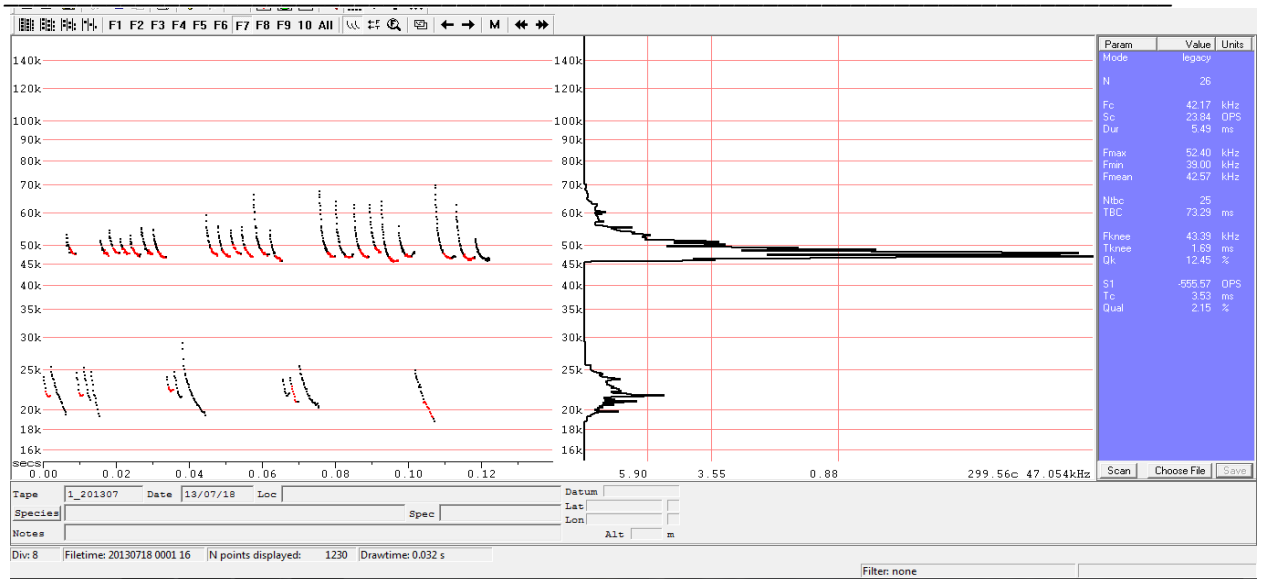
Common pipistrelle (*Pipistrelluspipistrellus*) at D4 location - 26.5.13



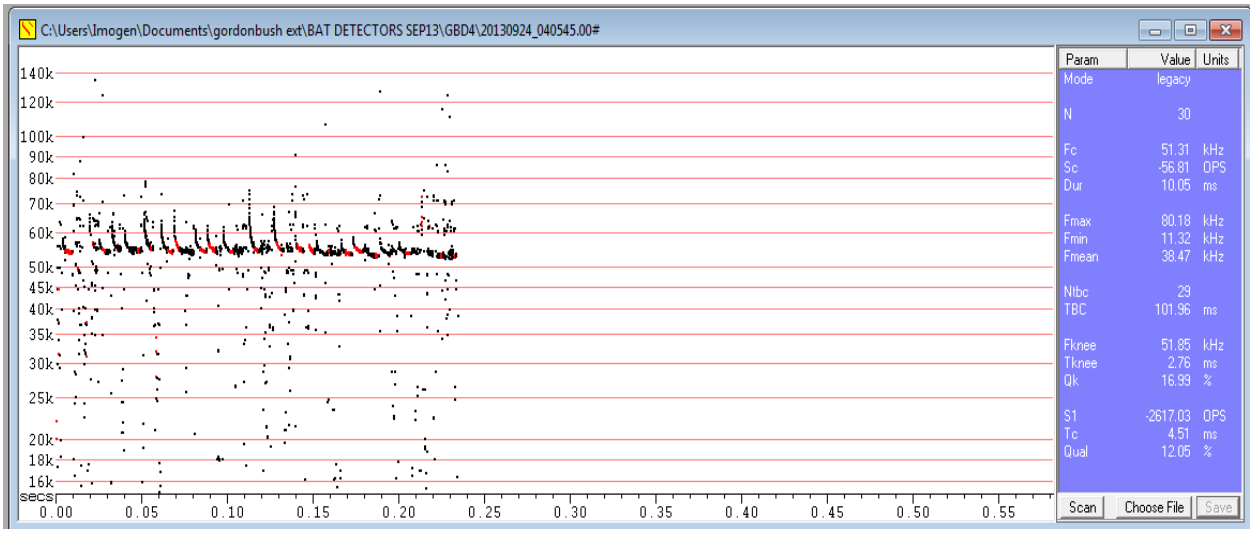
Sonogram showing characteristics of Natterer's(*MyotisNattereri)*bat at D1 location -18.7.13



Sonogram of probable Daubenton's (*Myotisdaubentonii*) bat at D3 location- 24.9.13



Sonogram of pips and social calls at D2 location - 17.7.13



Soprano pipistrelle (*Pipistrelluspygmaeus*) at D4 location - 24.09.2013

8. References &Further Reading

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