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environmental consultants

2014 Phase 2 Habitat Surveys

Houghton Main Renewable Energy Park (REP) comprising a Timber Resource Recovery Centre and an Anaerobic Digestion Facility (AD) Including Associated Infrastructure

Peel Environmental Management (UK) Limited and Houghton Main Waste Limited

CRM.066.001

'Experience and expertise working in union'

enzygo.com

Contact Details:

Enzygo Ltd.
The Granary
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

tel: 01454 269237
fax: 01454 269760
email: chris.formaggio@enzygo.com
www: enzygo.com

Phase II Habitat Surveys

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Author:	Kirsty Rogers- Consultant Ecologist
Reviewer:	Chris Formaggia- Director of Ecology

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Enzygo Limited Registered in England No. 6525159
Registered Office Stag House Chipping Wotton-Under-Edge Gloucestershire GL12 7AD

Contents

Contents 2

Reptile Presence/likely-absence survey 3

Introduction 5

1.0 Reptile Survey 6

2.0 Badger Survey 17

3.0 Problematic Species Assessment 22

4.0 Additional Habitat Evaluation 27

Appendix 1 – British Reptiles and Legislation 32

Appendix 2 – Licensing 34

Appendix 3 – Reptile Identification 35

Appendix 4 – Methodology & Mitigation 39

Appendix 5- Positive Impacts 45

Appendix 6- South Yorkshire Badger Group 46

Appendix 7- Bat Conservation Trust Data Results 47

REPTILE PRESENCE/LIKELY-ABSENCE SURVEY

Executive Summary

i. As part of the Environmental Impact Assessment undertaken to support the application for a Renewable Energy Park at Houghton Main, a Preliminary Ecological Appraisal (PEA) was carried out. This assessed the ecological impacts of a proposed Anaerobic Digestion Facility and Timber Resource Recovery Centre on land located off Houghton Main Colliery Roundabout. The application was submitted in May 2014.

ii. The Phase 1 Survey of the site revealed areas of good quality habitat for reptile species (rough grassland, established hedgerows and scrub habitat). Further surveys were recommended in order to assess ecological impacts in more detail and at recommended time periods.

iii. Enzygo Ltd has conducted a full reptile presence/likely absence survey on the land located off Houghton Main Colliery Roundabout in May 2014. The survey was conducted under acceptable survey conditions and access to the site was unrestricted.

iv. A presence of common reptile species is confirmed. One common lizard (*Lacetra vivipara*), a grass snake (*Natrix natrix*) and an unconfirmed sighting of a second grass snake were seen on site, during the survey period.

v. During the repeated visits undertaken for the reptile survey, observations relating to nesting birds were also recorded.

vi. On the basis of the survey results recommendations have been made at the conclusion of this report. It will be necessary to remove reptile species from the construction footprint in advance of construction to comply with statutory legislation. It is recommended that a receptor site on an adjacent wildlife site be sought.

vii. A badger (*Meles meles*) survey was conducted for land located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley and the immediate peripheries.

viii. A number of field indicators for badger activity were considered during the survey effort. No badger setts, or field signs of badgers were seen on site or the peripheries during the survey period (and other visits). Recommendations have been made at the conclusion of the survey.

ix. A Problematic species survey was undertaken, with a particular focus on assessing the presence or absence of Japanese Knotweed and Himalayan Balsam. None were found on-site, though Himalayan Balsam was noted as present by the nearby River Dearne.

x. An additional habitat evaluation was also carried out.

Introduction

i. Enzygo Ltd was commissioned to conduct a Preliminary Ecological Appraisal (PEA) for a proposed erection of an Anaerobic Digestion Facility and Timber Resource Recovery Centre on land located off Houghton Main Colliery Roundabout in February 2014.

ii. The PEA recommended further survey work, which has been undertaken as follows:

- Reptile Survey (incorporating nesting bird observations);
- Badger Survey;
- Problematic Species Assessment; and
- Additional Habitat Evaluation

iii. Conclusions and recommendations are made in each chapter with respect to the specific subject.

1.0 REPTILE SURVEY

1.1. Introduction

1.1.1. Enzygo was commissioned to conduct a full reptile presence/likely absence survey at land located off the Houghton Main Colliery roundabout, Park Spring Road, Houghton Main, Barnsley.

Date of Survey

1.1.2. The optimal timing window for a reptile activity survey is April – May and September, however given optimal weather conditions and the support of regulators surveys may be conducted at any point from April to October.

1.1.3. This survey was conducted on 21st, 22nd, 23rd, 27th, 28th, 29th and 30th May 2014 and 2nd and 3rd June 2014, and was not constrained by adverse weather conditions.

Table 1.1: Summary of Weather Conditions is shown below:

Date	High/Low Temp (°C)	Wind/ Beaufort	Rain
21.05.2014 (pm)	14/12	0	None
22.05.2014 (am)	11/10	1	None
22.05.2014 (pm)	14/13	0	None
23.05.2014 (am)	11/9	0	None
23.05.2014 (pm)	16/14	1	None
27.05.2014 (am)	12/11	0	None
27.05.2014 (pm)	17/14	0	None
28.05.2014 (am)	11/10	0	None
28.05.2014 (pm)	14/13	1	None
29.05.2014 (am)	13/10	2	None
29.05.2014 (pm)	13/11	1	None
30.05.2014 (am)	11/9	0	None
30.05.2014 (pm)	15/14	0	None
02.06.2014 (am)	14/12	1	None
02.06.2014(pm)	18/16	0	None
03.06.2014 (am)	13/11	2	None
03.06.2014 (pm)	16/13	1	None

1.2. Location of Survey

1.2.1. The approximate site centre is located on National Grid Reference SE 41693 06444, at ~2.10km south of the village of Grimethorpe, South Yorkshire, and at the far south-eastern point of the former Houghton Colliery site. The nearest postcode available for the site is S71 5EX. The site was previously used for open cast mining between 1997 and 2001, however upon ceasing works; efforts were made for the site to be restored.

Figure 1.1: Red-line boundary of the proposed development site.

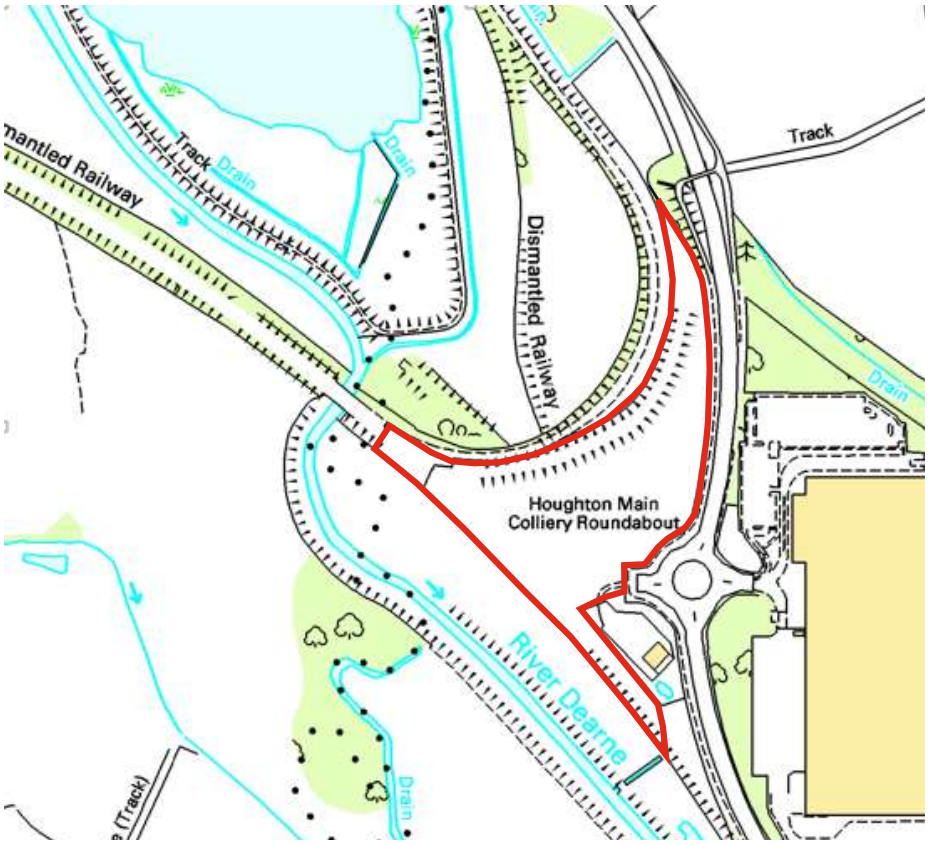


Figure 1.2: Aerial Photograph of the site and immediate surrounds.

1.2.2. The site is approximately 4.14ha in area, with the majority of the site comprised of restored semi-improved grassland and patches of more marshy grassland. The site is suffering from a level of encroachment of scattered scrub (predominantly silver birch, *Betula pendula*). There is around 0.12ha of broadleaved woodland situated at the top north western boarder of the site. The borders of the site are largely comprised of established species-poor hedgerow, along with a dismantled rail corridor (running across the northern border of the site) and the river Dearne riparian corridor (by which the site is well connected to the wider environment).

1.3. Name of Surveyor(s)

1.3.1. Christopher Formaggia BSc (Joint Hons) CBiol CEnv MBS MIEEM MBPR (aquatic) – Director of Ecology.

1.3.2. The Director has been a professional ecologist for 25 years both as an environmental regulator and consultant. He has been surveying herptiles for 24 years and is regularly called upon to survey and mitigate for schemes affecting reptiles.

1.3.3. Kirsty Rogers MZoo, GradCIEEM – Ecological Consultant.

1.3.4. Three field assistants

Photograph 1: View across the site looking south east.

1.4. Method

Survey Techniques

1.4.1. A combination of checks of artificial refugia and standard walked transects were used to assess the presence/likely-absence of reptiles on the site.

1.4.2. Artificial refugia were deployed to the site to encourage any reptiles present to shelter under them and gain thermal advantage from them.

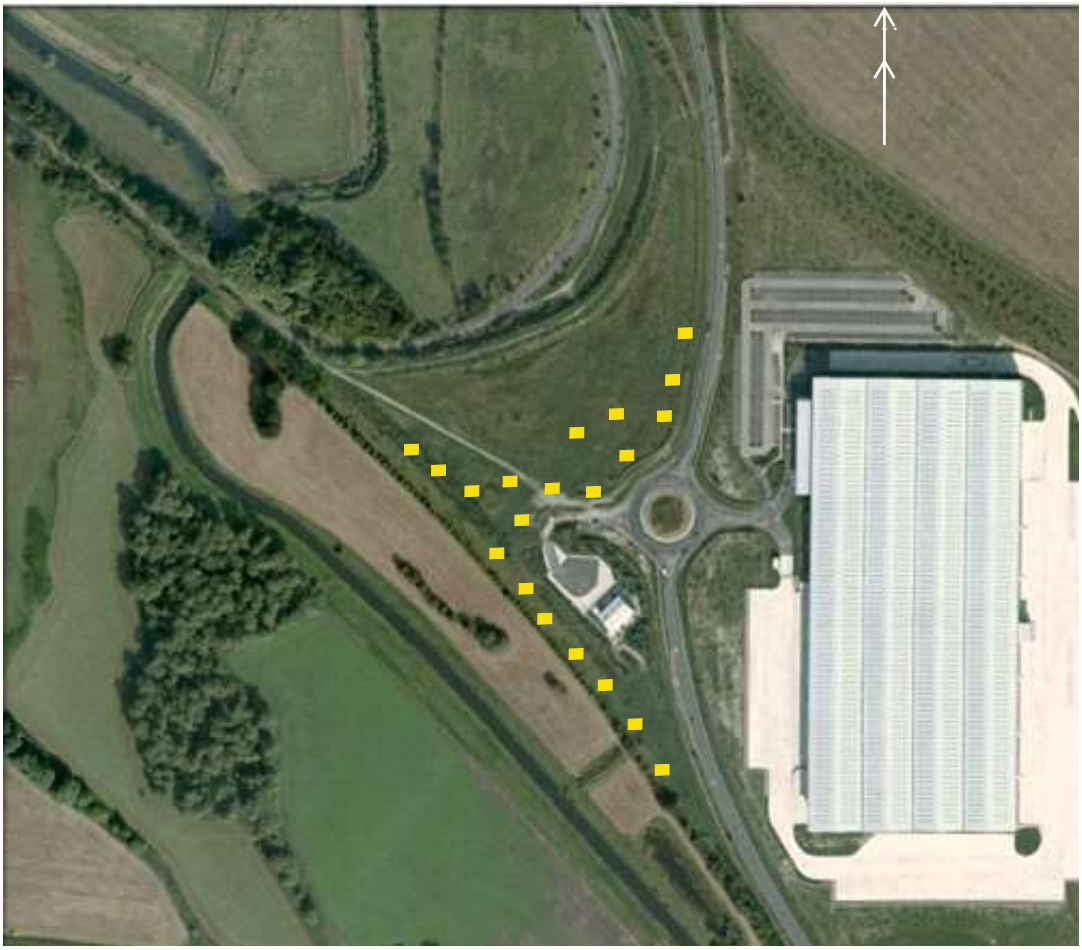
1.4.3. 20 artificial refugia (roofing felt and bricks) were deployed on the site (refer **Figure 2.1**, below). The refugia consisted of 0.5m^2 roofing felt sheets.

1.4.4. The refugia were set out 14 days (06.05.2014) (15 days is minimum survey standard) before survey work commenced. Due to the level and density of the scrub encroachment on site the refugia was limited to the areas of better reptile habitat. The refugia locations were recorded by GPS and mapped.

1.4.5. Refugia were checked by an experienced field-ecologist and assistants by manually lifting up the "tiles". 16 visits were made (evening checks conducted between 1800 and 2000 and morning checks between 0600 and 0800).

1.4.6. All reptiles found under the artificial refugia are recorded, and sexed where possible. Whilst travelling between the refugia fixed transects are walked. Any areas of shelter within 2m of the centre line of the transects are checked. Any basking reptiles are recorded.

Figure 2.1: View of the refugia layout on site.



1.5. Legal Aspects

1.5.1. There are six native reptile species in the UK. Four of these are relatively more common – the common lizard *Zootoca vivipara*; slow-worm *Anguis fragilis*; adder *Vipera berus* and grass snake *Natrix natrix*. These species enjoy limited protection under the Wildlife and Countryside Act 1981 by virtue of subsections 9(1) and 9(5) and as such are protected against killing injury and trading.

1.5.2. The two rarer native reptiles in the UK are the sand lizard *Lacerta agililis* and the smooth snake *Coronella austriaca.* These species are European Protected Species enjoying further protection under the Conservation Regulations. These two species are not known to be present in the South Yorkshire area and are generally found on sandy heathland and dunes in the south of England. However for the purposes of this survey their potential presence was not discounted.

1.6. Survey Objective

1.6.1. On the basis of the brief provided by the client, Enzygo Ltd has conducted a reptile presence/likely-absence survey to demonstrate whether reptiles are present on site and if so to find measures to protect them during and after construction to ensure that the client is compliant with domestic wildlife legislation.

1.7. Results

1.7.1. A summary of the survey results is set out in Table 3.1 below.

Table 3.1: Summary of Survey Results

Date	Species	Refugia No/Location	Notes
21.05.2014 (pm)	1x grass snake, 1x common lizard	5, 16	Juvenile grass snake, active and unable to sex. Lizard was basking on tile on approach.
22.05.2014 (am)	-	-	-
22.05.2014 (pm)	-	-	-
23.05.2014 (am)	-	-	-
23.05.2014 (pm)	-	-	-
27.05.2014 (am)	-	-	-
27.05.2014 (pm)	-	-	-
28.05.2014 (am)	-	-	-
28.05.2014 (pm)	-	-	-

29.05.2014 (am)	-	-	-
29.05.2014 (pm)	-	-	-
30.05.2014 (am)	-	-	-
30.05.2014 (pm)	-	-	-
02.06.2014 (am)	-	-	-
02.06.2014(pm)	-	-	-
03.06.2014 (am)	-	-	-
03.06.2014 (pm)	1x grass snake	5	Extremely active, only saw the tail when lifting the tile.

1.7.2. No slow worms were recorded on the site at any of the seventeen survey visits under good survey conditions.

1.7.3. There were 2 juvenile grass snakes seen on site during the surveys, with the peak count on a single visit being only 1 individual.

1.7.4. A common lizard was also seen basking on top of a square of roofing felt during the survey, but moved undercover before it could be captured or sexed.

1.7.5. There were no other reptiles seen on site at any point during the setting up or survey sessions, and no mammals seen under any of the roofing felt during the survey or on the site at any time.

1.7.6. The Preliminary Ecological Appraisal confirmed that there are no surface water features on site capable of supporting great crested newt breeding populations. Only common species of amphibian were identified in the data search area – toad, frog and smooth newt. As such it is considered that no further assessment for great crested newt is necessary. Furthermore the installation of a herptile fence to isolate the construction footprint will be equally effective in preventing amphibian species entering the site. The planned reptile capture methodology is equally effective for capturing terrestrial phase amphibian species. As a matter of good practice any capture amphibians will be extracted and removed to safety."

1.8. Conclusions and Recommendations

1.8.1. The survey was conducted under good survey conditions and was not limited or restricted in any way.

1.8.2. The grassland available to survey was restricted to around 60% of the site; however this area was deemed the most suitable for any reptiles utilising the site and was not considered to restrict or limit the survey or the survey results.

1.8.3. There were 3 reptiles seen on site during the surveying effort, where 2 of the individuals were confidently identified as a common lizard and a grass snake, the final animal could not be confidently identified, however it was believed likely to be a juvenile grass snake.

Table 3.2: Key Reptile Sites criteria.
"The figures refer to the maximum number of adults seen by observation or under tins (placed at a density of up to 10 per hectare), by one person in one day".

Species	Low Population	Good Population	Exceptional Population
Grass Snake	<5	5-10	>10
Common Lizard	<5	5-20	>20
Slow Worm	<5	5-20	>20

Recommendations

1.8.4. In order to develop the site it will be necessary to ensure that reptiles within the construction footprint are not harmed or injured. The normal methodology to ensure this would be to seal the construction footprint with herptile fencing and remove the reptile population by systematic trapping to a receptor area either elsewhere on site or off-site.

1.8.5. This process would be undertaken prior to but as close as possible to construction commencing. However as it will be necessary to undertake substantial ground contamination investigations on the site which will be intrusive the reptile removal will be synchronised to be in advance of that operation (which in itself would have the potential to pose a risk to the reptile population).

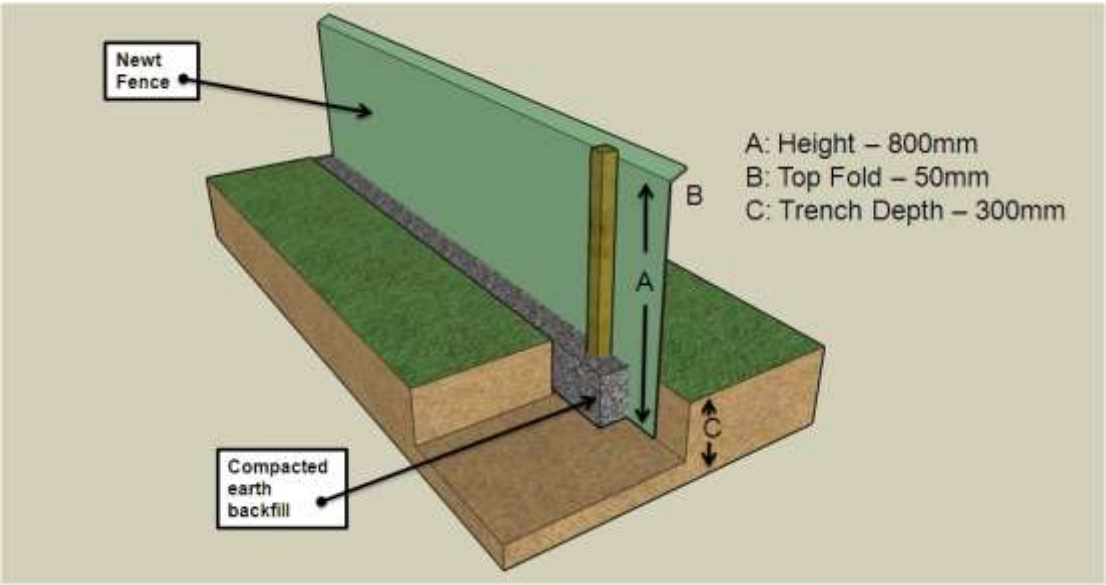
1.8.6. As a result of the protected status of the reptile and amphibian species present on the site semi-permanent exclusion fencing will be required to protect the animals and to remove them from the affected areas within the quarry during the quarry restoration programme.

1.8.7. A solid barrier will be required around the areas where animals are to be translocated from and for the receptor areas where animals will be released.

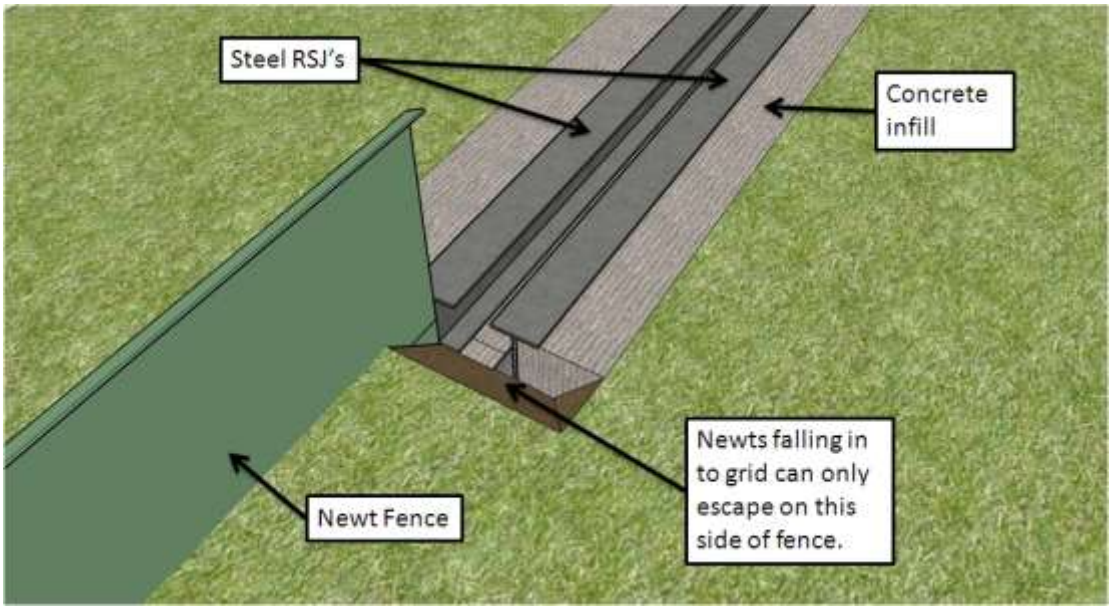
1.8.8. A semi-permanent fence will be used to protect the reptile translocation and receptor areas.

1.8.9. The semi-permanent reptile fence consists of a 1x850mm sheet of recycled HDPE plastic. In normal ground conditions, the plastic is buried to a depth of 200mm. The plastic sheet is scored 100mm in from the base to allow for the creation of a 100mm underground return. Alternatively the plastic can be buried vertically to 300mm with no underground return. The plastic sheet is semi rigid so requires support. In normal ground conditions this is provided by

50x50x1000mm tanalised timber stakes. The sheet is fixed to the stakes using 35mm screws (3 No. per post). The plastic is scored 50mm in from the top edge. This allows for folding and the creation of an overhang to further prevent the passage of amphibians. See attached drawing of newt fence installation



1.8.10. Where access is required into the trapping area, a newt grid shall be installed to allow the free passage of vehicles. This consists of two 5metre RSJs set into a concrete beam with a gap between them. Exit points are provided at the end of the grids to allow any animals that fall into the void between the two RSJs to escape. See attached drawing of newt grid.



1.8.11. The following methodologies will be used:

- Pitfall traps will be constructed from 10l plastic containers/buckets with snap-on lids sunk into the ground along the inner perimeter of the translocation areas. The containers will

be sunk flush to the ground level and with their outer edge flush against the UPVC fencing. The traps will be set at 1 trap per 10m length of fence where it is possible to do so. If necessary, small carpet tile refugia will be used where pitfall traps cannot be placed.

- All pitfall traps will be designed to minimise any impacts upon animals that may fall into them. Vegetation will be provided as cover in the bottom of the trap and drainage holes will be created to avoid a build-up of water in the trap that could lead to drowning of animals.
- Mammal ladders will be positioned in the trap to allow any small mammals captured an escape route. A small piece of timber, stick or plant stem may be used.
- All pitfall traps will be checked regularly during a 24 hour period and will be checked at least twice a day between 0600 and 1100 hrs and 1700 and 1900 hrs.

1.8.12. In addition, Artificial refugia will be deployed in areas to be trapped in locations assessed as being most likely to attract animals (i.e. breaks in the habitat matrix and near to obvious topographical features.

1.8.13. Reptiles can often be found under debris that is exposed, or partially exposed, to the sun (Gent & Gibson, 1998). A practical objective of reptile translocation surveys is to find them basking, when there is least disturbance to the animal and sufficient time to capture the animal. Refugia (squares of corrugated tin [painted black with “hammerite” paint and roofing felt sheets) will be placed in areas of suitable habitat. A ration of 2 tin to 8 roofing felt “tins will be used at the site. The refugia will be deployed at an initial density of 10 “tins” per ha. However this density will be varied and adjusted to maximise catch across the site as the experience of the conditions at the site increases. In practice the metal sheets are found to be more effective in capturing snake species and therefore a deployment of a mix of materials gains a better catch across the species.

1.8.14. The refugia will be checked periodically in suitable weather conditions (low ambient air temperature but with the sun shining, and little, or no, wind). This method has advantages as they can be left stationary and checked repeatedly throughout the translocation period, they can be surveyed in cloudy weather and they will be used by reptiles through the warmer months of the summer.

1.8.15. A “reasonable effort” must be expended in order for the client to be able to comply with the statutory obligations and planning conditions with respect to protecting common reptile and amphibian species upon the site.

1.8.16. Existing guidelines suggest a trapping effort of between 2 months and 2 years depending upon the assessed levels of populations. The work conducted in support of the EIA has suggested generally low-level populations of reptiles and amphibians at the site and that their distribution may be somewhat patchy across the site.

1.8.17. The current intention is to utilise an open-ended approach to trapping effort. It is considered that this approach is reasonable and that it favours the variable conditions that will be encountered on the site. The open-ended approach has the benefit of allowing areas to be opened for work as quickly as possible where areas are clear of animals and yet provides for increased trapping effort where the animal numbers so demand it.

1.8.18. The current proposal is to trap areas for 30 “good” (i.e. where weather conditions are favourable) days and then for as many trapping days as are necessary to achieve 10 clear days where no animals are captured.

1.8.19. A running record of species caught with some basic animal data (size, sex, weight etc) will be kept throughout the works. This data will be supplied in annual trapping reports that will be produced for the Local Authority and Natural England Teams.

1.8.20. It is proposed that an off-site receptor area be utilised. The reasons for this are that the amount of suitable reptile habitat will be significantly restricted after construction and therefore the potential of holding reptiles on site and then releasing them after the build to disperse back over site is discounted. It is considered that the best approach will be to identify a suitable translocation area with the RSPB who are co-ordinating a sequence of local wildlife reserves and biodiversity improvements in the wider locale including two sites in close proximity to the proposals.

1.8.21. It is currently envisaged that habitat enhancement measures will be carried out in receptor areas to increase their holding capacity for reptile and amphibian species – to take into account both any animals that may already be present in the areas and the artificially elevated densities of animals that will be concentrated into these areas. Depending on catch numbers the need to extend receptor areas or open new ones shall be constantly evaluated by the ecologists.

1.8.22. Site enhancement measures will include:

- Part-buried rubble hibernacula will be created in the receptor area.
- The mosaic nature of the habitat will be strengthened through scrub and grassland planting.

- Vegetation mounds – arisings from cleared vegetation mounds are to be placed to form nesting habitat for grass snakes.

1.8.23. Prior to construction a detailed scheme showing reptile fencing and receptor location and manipulation and detailing the above mitigation process will be submitted to the LPA for approval.

Nesting Bird observations, conclusions and recommendations

1.8.24. During the visits undertaken to check for reptiles the ecology team checked for nesting bird activity. The site contains minor nesting habitat. Bird activity was observed on all occasions but it was clear was very limited and generally comprised of common woodland and garden bird species.

1.8.25. The following is a potted summary of observed birds on site:

- Grey heron *Ardea cinera* (flying only); buzzard *Buteo buteo* (flying only); black-headed gull *Larus ridibundus*; herring gull *Larus argentatus* (flying only); lesser black-backed gull *Larus fuscus* (flying only); wood pigeon *Columba palumbus* (~2-4); wren *Troglodytes troglodytes* (max 4 on peripheries only); dunnock *Prunella modularis* (1 only on peripheries); robin *Erithacus rubecula* (~4-6 on site and on peripheries); Song thrush *Turdus philomelos* (~2 on peripheries on south of site); blackbird *Turdus merula* (~4-6 on site and on peripheries); great tit *Parus major* (~4 on peripheries); blue tit *Cyanistes caeruleus* (~10 on peripheries); long-tailed tit *Aegithalos caudatus* (single bird on southern edge on 19th Feb); Magpie *Pica pica* (~4-6 on site and on peripheries); jay *Garrulus glandarius* (~2 in woodland to north of site); jackdaw *Corvus monedula* (~12 on site and on peripheries); carrion crow *Corvus corone* (~10 on site and on boundaries); house sparrow *Passer domesticus* (~4 -6 on peripheries); chaffinch *Fringilla coelebs* (~6 on peripheries).

1.8.26. It is not considered that the site is ornithologically valuable and in particular relative to the broader locale which has some significant ornithological sites.

1.8.27. Inevitably there is some nesting activity on site but it is considered that this can be sensibly be dealt with by planning condition that will restrict vegetation removal to outside the nesting season of March to August or failing that ensure that it is conducted under the direct supervision of an ecologist to ensure that birds, eggs and nests are not harmed or disturbed.

2.0 BADGER SURVEY

2.1. Introduction

2.1.1 Enzygo Ltd was commissioned to conduct a badger (*Meles meles*) survey for land located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley and the immediate peripheries.

Badger Protection

2.1.2 The European badger (Meles meles) is known to occur within 2km of the site. The species is protected by The Protection of Badgers Act, 1993. Under the 1993 Act, it is a criminal offence to:

- Wilfully kill, injure, take or possess or cruelly ill-treat a badger, or attempt to do so;
- Interfere with a sett by damaging or destroying it;
- Obstruct access to, or any entrance of, a badger sett;
- Disturb a badger when occupying a sett.

2.1.3 The legislation to protect badgers arises from a desire to control persecution of the species rather than for nature conservation purposes - the native badger population is not under any threat as such.

2.2 Methodology

Physical Survey

2.2.1 A walkover survey for badgers was conducted across the site. This includes a search for a number of characteristic field signs of badgers and most importantly a search for any badger setts on the site in all accessible areas beyond the site. In this case the site is taken to mean anything within the red-lined boundary (see **Figure 1.1,** above) and the site's immediate peripheries out to 30m.

2.2.2 The field signs searched for are as follows:

a. **Badger Setts**

2.2.3 Most badger holes/tunnels also have a distinctive shape as well as size, being generally wider than they are tall, with a flattened bottom. This gives them a "D" shape (on its side). Tunnels excavated by foxes or rabbits tend to be rounder or oval in shape, and taller than they are broad. However, there is a lot of variability and in some cases holes are used by more than on species. The tunnels excavated by badgers are approximately 30cm in diameter, certainly no smaller than 25cm in diameter. Rabbit burrows, on the other-hand can be quite large at their

entrances, soon narrow to a diameter of about 15cm. In Britain, the badger is well studied and, several categories of setts have been determined. Every badger family group ("clan") has one main sett. These are occupied continuously and are used for breeding; they are usually large, well-established setts which have been excavated by several generations of badgers and are vital to survival of that clan. These setts can become very substantial over time: setts with a dozen to 20 or more entrances are fairly normal but can grow up to setts with 50-100 entrance holes. Below ground there are hundreds of metres of networked tunnels, created by the excavation of many tonnes of earth.

2.2.4 In addition to the main sett, most clans also have one or more additional secondary setts within their territories. These secondary setts fall into three categories - annexe setts, subsidiary setts, and outlier setts. Secondary setts are less important to the badgers than main setts, but they are useful nonetheless, especially if the main sett is disturbed. Disused setts may be taken over by rabbits or used by foxes; both of these species will also co-habit with badgers in occupied setts.

2.2.5 Badgers are extremely powerful diggers and the nature of excavated material at sett entrances is often diagnostic. Badgers are able to excavate much greater quantities of material than rabbits and foxes and the nature of the excavated material is often much coarser even containing rocks. Sometimes softer rocks are even physically marked by the badger claws. Spoil is excavated out backwards from the hole and fresh excavations are a sign of occupation. In clay soils the excavated material often contains badger hairs.

2.2.6 On occasions the bones of badgers, that have presumably died underground, are found in the excavated material.

b. **Bedding Material**

2.2.7 Badgers use various types of plant material for bedding material within their setts.. Characteristic field signs associated with bedding material include old bedding material cleaned out of the sett; bundles of fresh material stored by the sett (a very clear indication of occupation) trails of bedding material dropped on the way to the sett.

c. **Tracks and badger paths**

2.2.8 Badger footprints are diagnostic. They consist of a broad, kidney-shaped pad with five toes lined up in front. The prints of the front feet are larger than those of the back feet, and the imprints of the ends of the claws are further away from the toes of the front feet as the claws are much longer than those on the hind feet. Sometimes the fifth does not show up on a print but the orientation of the other four toes is still rather characteristic. A typical adult print is

about 5.5 cm (+/- 1cm) wide and the hind paws are slightly narrower. On clear ground there will often be an overlap between the front and rear paw print – characteristic of the badger's walk.

2.2.9 Badger paths are usually fairly obvious and represent regularly walked paths by the badger to a point that vegetation is suppressed. Other field signs are often associated with these paths and at certain times of year it is possible to get an idea of if they have been recently used by signs such as freshly crushed plants or new footprints.

d. **Scratching Posts**

2.2.10 Badger setts are usually associated with scratching posts-typically trees but often also artificial structures such as fence posts, the bases are criss-crossed with badger claw marks.

e. **Badger hairs**

2.2.11 The hairs from the badger's backs and sides are very diagnostic and cannot be confused with other native mammals. They are white or whitish (although may be stained yellow in sandy areas), with a black band towards the tip. They are approximately 7 - 10 cm long. The black band measures 1 - 2 cm and the white tip is also approximately 1cm in length. The hairs can be straight or quite curly. The hairs are quite coarse unlike those of foxes or rabbits. They are oval in cross section and do not roll smoothly between finger and thumb of a surveyor. Hairs are often found trapped on wire fences where badgers cross between land parcels.

f. **Signs of foraging**

2.2.12 Badgers typically make "snuffle" marks where they are winning soil invertebrates. These are conical holes about 10 -14cm wide with spoil generally in all directions. They are often just off badger paths. It is sometimes hard to distinguish badger holes from larger rabbit scrapes. Badgers also excavate ant and wasp nests, particularly in the late summer. They will also excavate rabbit holes in order to obtain young rabbits.

g. **Dung and latrines**

2.2.13 Badger droppings tend to look like those of dogs in size and shape, but they are more variable in appearance because of their varied diet. When the diet is principally composed of earthworms the droppings are quite soft and muddy; while other foods leave more clearly identifiable traces such as the wing cases of beetles, the husks of grain, and the stones or pips of fruits and berries such as yew berries and blackberries – dung is often very purple when blackberries are in fruit.

2.2.14 Badger latrines are small pits (often referred to as dung pits), which in appearance are not unlike snuffle holes. Badger latrines are very diagnostic. No other native animal in Britain deposits its droppings in pits in the same manner as badgers. Felines dig pits for their droppings, but they cover them up after use, while badgers leave their droppings exposed. Foxes conversely site their droppings on prominent places such as tussocks, stumps etc.

2.3 Survey objectives

2.3.1 On the basis of the brief provided by the client, Enzygo Ltd has conducted survey work to fulfil the following needs:

- Determine the presence/likely-absence of badgers within the construction footprint and any activity at or near the site.
- Determine the suitability of any entrance holes to support badgers and locate any setts present or near the construction footprint.

2.4 Constraints

2.4.1 It is not considered that the badger survey was constrained, and unrestricted access was granted the entire site.

2.4.2 The survey was undertaken in June during the optimal survey window by the Director of Ecology and a field assistant. The survey effort was two-person days.

2.5 Results

Data Search Results

2.5.1 A standard 2km data search around the boundary of the site was commissioned from Barnsley Biological Records Centre (**BBRC**), and revealed no records of badgers or badger setts within the search buffer zone. The local badger group has also been asked to check for any pertinent records, the results show that there are no record of badger setts within a 2km radius of the application site.

Site Results

2.5.2 The walkover survey was conducted on 1st June 2014 under favourable survey conditions. During the walkover no badger setts were located on site, or on any of the immediate peripheries.

2.5.3 The survey did not reveal any indicators or field signs of badger activity on site (see **Method**, above) or on any of the immediate peripheries out to 30m.

2.5.4 There are some patches of impenetrable vegetation on site that could not be fully inspected.

2.6 Conclusion

2.6.1 The data search commissioned by BBRC revealed no badgers or active/historical badger setts within 2km of the site.

2.6.2 The badger survey revealed no signs of badger setts or badger activities within the site or along the immediate peripheries.

2.7 Recommendation

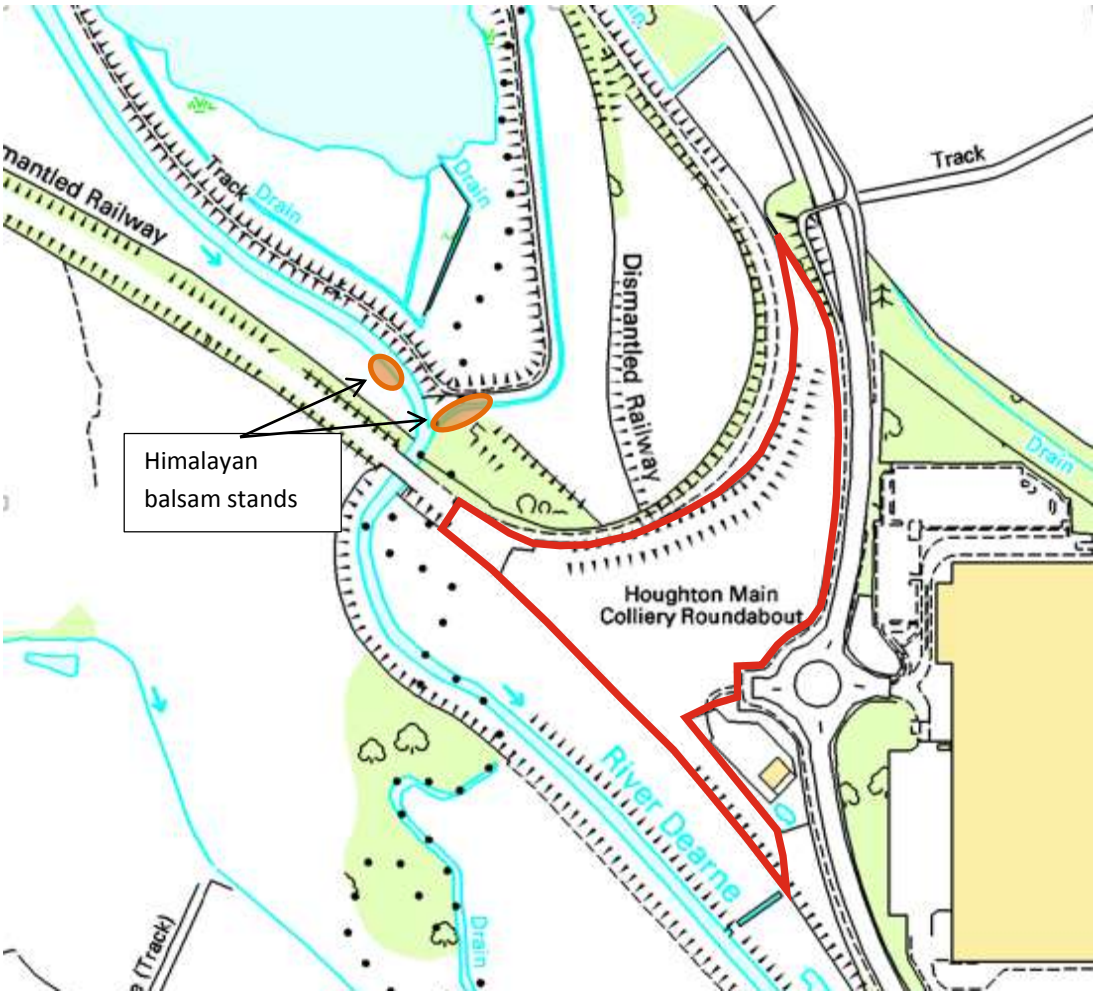
2.7.1 The survey revealed no evidence of badger setts or activities on site and it is assessed that it is not necessary to seek a disturbance licence for badgers from Natural England to continue with the development works. However, due to the restrictions encountered during the survey as a result of vegetation it is recommended that a suitably qualified ecologist is present on site during vegetation clearance to supervise works and supply alternative advice if any badger setts or fields signs are encountered.

3.0 PROBLEMATIC SPECIES ASSESSMENT

3.1 Introduction

3.1.1 The Director of Ecology surveyed the land at Houghton Main Colliery Roundabout (see **Figure 3.1**, below) on 21st May 2014 to evaluate the non-native plant species and any other problematic species on site. A previous assessment conducted by SLR in March 2012 identified an established stand of Himalayan balsam (*Impatiens glanduliffera*) along the banks of the river Dearne within the wider locale.

Figure 3.1: The sites red-line boundary and location of Himalayan balsam identified by SLR.



Biosecurity and Invasion Ecology

3.1.2 'Biosecurity' is the protection afforded from the risks posed by organisms to the economy, environment and public health; through exclusion, eradication, and control.

3.1.3 The International Union for the Conservation of Nature [IUCN] has stated that one of the major threats to native biological diversity is now acknowledged by scientists and

governments to be biological invasions caused by non-native species. The impacts of non-native invasive species are immense, insidious and usually irreversible. They may be as damaging to native species and ecosystems on a global scale as the loss and degradation of habitats.

3.1.4 Non-native species are a species introduced by human agency indirectly or directly, into a geographical region outside its natural range. The species has become established and self-maintaining.

The Wildlife and Countryside Act (as amended) 1981

3.1.5 Under the Wildlife and Countryside Act (as amended) 1981 there is provision that any person that releases or allows to escape into the wild any animal, which:

a) is of a kind which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state; or

b) is included in Part I of Schedule 9, shall be guilty of an offence.

Table 8.1 Plant Species currently on the Schedule include:

Common Name	Species Name	Common Name	Species Name
Californian Red Seaweed	*Pikea californica*	Japanese Knotweed	*Fallopia japonica*
Curly Waterweed	*Lagarosiphon major*	Japanese Rose	*Rosa rugosa*
Duck Potato	*Sagittaria latifolia*	Japanese Seaweed	*Sargassum muticum*
Entire-leaved Cotoneaster	*Cotoneaster integrifolius*	Laver Seaweeds (except native species)	*Porphyra* species
Hybrid Knotweed	*Fallopia japonica x Fallopia sachalinensis*	Montbretia	*Crocosmia x crocosmiiflora*
False Virginia creeper	*Parthenocissus inserta*	New Zealand Pigmyweed	*Crassula helmsii*
Fanwort	*Cabomba caroliniana*	Parrot's-feather	*Myriophyllum aquaticum, Perfoliate alexanders, Smyrnium perfoliatum*
Few-flowered Leek	*Allium paradoxum*	Purple Dewplant	*Disphyma crassifolium*
Floating Pennywort	*Hydrocotyle ranunculoides*	Red Algae	*Grateloupia luxurians*
Floating Water Primrose	*Ludwigia peploides*	Rhododendron	*Rhododendron ponticum*
Giant Hogweed	*Heracleum mantegazzianum*	Rhododendron	*Rhododendron ponticum x Rhododendron maximum*
Giant Kelp	*Macrocystis pyrifera, M.*	Small-leaved Cotoneaster	*Cotoneaster microphyllus*

	angustifolia, M. integrifolia, M. laevis		
Giant Knotweed	*Fallopia sachalinensis*	Three-cornered Garlic	*Allium triquetrum*
Giant Rhubarb	*Gunnera tinctoria*	Variegated yellow archangel	*Lamiastrum galeobdolon subsp. argentatum*
Giant Salvinia	*Salvinia molesta*	Virginia creeper	*Parthenocissus quinquefolia*
Green Seafingers	*Codium fragile*	Wall Cotoneaster	*Cotoneaster horizontalis*
Himalayan Cotoneaster	*Cotoneaster simonsii*	Water fern	*Azolla filiculoides*
Hollyberry Cotoneaster	*Cotoneaster bullatus*	Water hyacinth	*Eichhornia crassipes*
Hooked Asparagus Seaweed	*Asparagopsis armata*	Water lettuce	*Pistia stratiotes*
Hottentot-fig	*Carpobrotus edulis*	Water primrose	*Ludwigia grandiflora / Ludwigia uruguayensis*
Indian Balsam	*Impatiens glandulifera*	Yellow azalea	*Rhododendron luteum*
Japanese Kelp	*Laminaria japonica*	Wakame	*Undaria pinnatifida*
NOTE: Further all species of the genus Elodea (waterweeds) (including Canadian waterweed *Elodea canadensis* & Nuttall's waterweed *Elodea nuttallii*).			

Japanese Knotweed

3.1.6 Table 8.1 above lists the species listed The Wildlife and Countryside Act 1981, Schedule 9 Part II. This includes Japanese Knotweed (*Fallopia Japonica*).

3.1.7 Further legislation is directly relevant to the control and disposal of Japanese Knotweed. The Environmental Protection Act 1990 (**EPA 1990**) contains legal provisions concerning "controlled waste", which are detailed in Part II. Any plant material or soil contaminated with Schedule 9 Part II species that is discarded, intended to be discarded or is required to be discarded is likely to be classified as controlled waste.

3.1.8 Section 33 (1a) and (1b) makes it an offence to; keep, treat or dispose of controlled waste without a licence or to keep, treat or dispose of controlled waste in a manner likely to case pollution of the environment or harm or human health.

3.1.9 Section 34 places duties on any person who imports, produces, carries, keeps, treats or disposes of controlled waste.

3.1.10 `Waste has to be handled responsibly and in accordance with the law at all stages between its production and final recovery or disposal. Waste must be transferred to an authorised person (a person who is either a registered carrier or exempted from registration by the **Controlled**

Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991. A waste transfer note has to be completed and signed and must include written description of the waste that enables the receiver of the waste to handle it in accordance with their own duty of care. The provisions concerning waste transfer notes are set out in the **Environmental Protection (Duty of Care) Regulations 1991** (as amended). Failure to comply with these provisions is an offence.

Himalayan Balsam

3.1.11 Himalayan Balsam (*Impatiens gladulifera*) is a non-native annual plant which colonises river banks and areas of damp ground. Originally introduced in 1839 as an ornamental garden plant, Himalayan balsam can grow to over 2m with distinctive "slipper" shaped flowers which bloom from June-August. When matured, the seed pods explode when touched or brushed which distributes the seeds, and are usually assisted by flowing water.

3.1.12 Himalayan balsam can be a vigorous grower, and will form dense impenetrable stands which can out compete many native pants for space, light and nutrient resources. During the autumn months when the plant dies back it can leave river banks bare and empty of supporting vegetation which can lead to erosion of the river banks which can lead to flooding in winter months.

3.1.13 It is possible to control Himalayan balsam effectively through both chemical and mechanical methods. However, due to its typically riparian position many stands can be inaccessible and the surrounding habitat too vulnerable which can severely restrict available treatment methods.

Photograph 2: Example of a flowing Himalayan balsam stand.

3.2 Results

3.2.1 No signs of any problematic species were found within the construction footprint and the site boundaries. The site was inspected at optimum growing time and when most species would be reasonably expected to be at peak growth – or certainly visible.

3.2.2 The survey is an above surface examination only.

3.2.3 Particular attention to patches of fly-tipped material present on site was made as these are often precursors of wider site contamination.

3.2.4 The Himalayan balsam within the Dearne riparian corridor appears to be still be restricted to that corridor and there are no current signs of it spreading towards the site – although there is nothing physically present to restrict the spread.

3.3 Conclusions

3.3.1 The site appears to be free from contamination by problematic species and therefore no further consideration of these needs to be given at this stage.

3.3.2 The nearest route for spread of contamination onto site is the balsam in the river corridor. It is recommended that the operator be vigilant to this risk and that their ground managers undertake period inspections of the boundaries and be prepared to use herbicidal spot-spraying if the site does become threatened by encroachment.

4.0 Additional Habitat Evaluation

4.1 Introduction

4.1.1 A walkover survey was conducted on site on 31st May 2014 to support the original Phase 1 Habitat survey produced by Enzygo Ltd in February 2014, which was conducted out of optimal surveying season because of project timescales.

4.1.2 The further survey was undertaken by the Director of Ecology and an assistant. The Director is a Royal Chartered Biologist and Chartered Environmentalist and has 25 years of practical experience of habitat evaluation.

4.1.3 When the habitat was assessed in February 2014 much vegetation would not be visible and therefore the conservation value could be underestimated.

The majority of the site is semi-improved grassland and scrub and these habitat blocks are assessed as not having nature conservation significance.

4.1.4 Sections of the centre of the site contain habitat that in February was coded as (**E2.1**) acid flush. These areas are probably best coded as (**B5**) marshy grassland although they possess characteristics of both habitat blocks. These are best-fit descriptions as these areas are likely to be reflections of previous site reclaimation work. It is assessed that when the site was previously reclaimed soils will have been compacted and this has resulted in local patches of land with perched water-tables which have come to take on the habitat structure associated with marshy grassland. Nonetheless this mosaic of wetter grassland does possess an intrinsic nature conservation value which is assessed to be notable at a local or county level.

These habitat blocks will be lost as a result of the proposals. However it is not considered that the marshy grassland present on site is sustainable anyhow. If the site were allowed to continue its ecological succession it will tend towards woodland very rapidly with a loss of all or the majority of this habitat block.

4.1.5 The presence of sphagnum mosses on site is also considered to be an artefact of artificial soil compaction and is not expected to be a sustainable flora on site which will dry and shade out through woodland development.

4.1.6 In May it was also noted that there were patches of orchid spikes along the track-ways on the south east end of the site.

Photograph 1 – emerging orchid spikes on the south east paths at site

4.1.7 It is recommended that an effort be made to save the best blocks of habitat on site through "cherry-picking" and within site translocation to to the margins around the proposed landscape pond.

4.1.8 It is recommended that turfs be cut from the most diverse sections of the marshy grassland and taken to the pond margins for immediate placement. A pre commencement protocol will be submitted to the LPA detailing the translocation protocol. Furthermore cores of orchid spikes will be rescued and translocated2 to this area and introduced into the planting zone by plug planting.

4.1.9 Whilst it may be possible to save a proportion of the better habitat present on site in this way the potential for on-site ecological preservation and enhancement is very limited.

4.2 Bat Activity Surveys

4.2.1 In order to gauge the baseline bat activity over the site a standard bat activity survey was undertaken in accordance with 2nd Edition BCT Survey guidelines. The initial site investigation had concluded that the site lacked any features that would be suitable for bat roosting.

4.2.2 The survey was undertaken by the Director of Ecology and an assistant. The Director is a Royal Chartered Biologist and Chartered Environmentalist and has 25 years of bat survey experience.

4.2.3 The survey utilised broadband bat detectors linked to GPS positioning equipment and night vision equipment to supplement the observations of the surveyors. The broadband detectors used were an EM3+ Eco Meter by Wildlife Acoustics and an Anabat II connected to a CF card reader.

4.2.4 The surveys were conducted on the 31st May 2014 and the 23rd June 2014. Surveys were commenced half an hour before sunset and completed two hours after sunset. Transects were walked and all bat activity was plotted and recorded.

Figure 9.1.16 – Bat Activity Transects

4.2.5 The surveys were conducted under favourable weather conditions as summarised in the following table. The weather was not a constraint. Sunset times were 2122 and 2123 respectively.

Table 9.1.17 Bat Activity Weather

Date	Temp at start/finish ºC	Relative Humidity %	Cloud/precipitation
31.05.2014	15/10	66.7%	3/8 Dry
23.06.2014	17/13	58.5	2/8 Dry

4.2.6 On both survey occasions bat activity was low. In May a total of 16 distinct detections were made. In June the total number of distinct passes was 21 (based on cross-referencing the different recorders.

4.2.7 Of all the bat detection records the majority were recorded on the transect extended beyond the site along the old railway line to the River Dearne railway bridge (and particularly within the section from NGR SE 41497 06460 to SE 41410 06531).

4.2.8 Only three bats were recorded over the site boundaries. Two of these were in May and one in June. All the bats detected on site have been analysed to be common pipistrelle bats *Pipistrellus pipistrellus* and were noted as commuting.

The three pipistrelle detections were at:

- SE 41651 06445 at 2138 31/05/14
- SE 41763 06461 at 2145 31/05/14
- SE 41769 06552 at 2201 23/06/14

4.2.9 On the extended section along the old rail track three species of bat were recorded. These were the common pipistrelle bat ; the soprano pipistrelle bat *Pipistrellus pygmaeus* and the Daubenton's bat *Myotis daubentonii.*

4.2.10 The Daubenton's bats and soprano pipistrelles were commuting along the Dearne riparian corridor and actively foraging around the railway bridge. It is estimated that ~5 bats of each species were foraging around the bridge.

4.2.11 The site is assessed as being a minor commuting area for relatively common bat species. No evidence of bat roosting was located and the activity across site is judged as very low compared with other sites.

4.2.12 The river Dearne is not surprisingly a bar corridor but the proposals are not expected to generate any light pollution that will impact on the corridor because of topographical shielding.

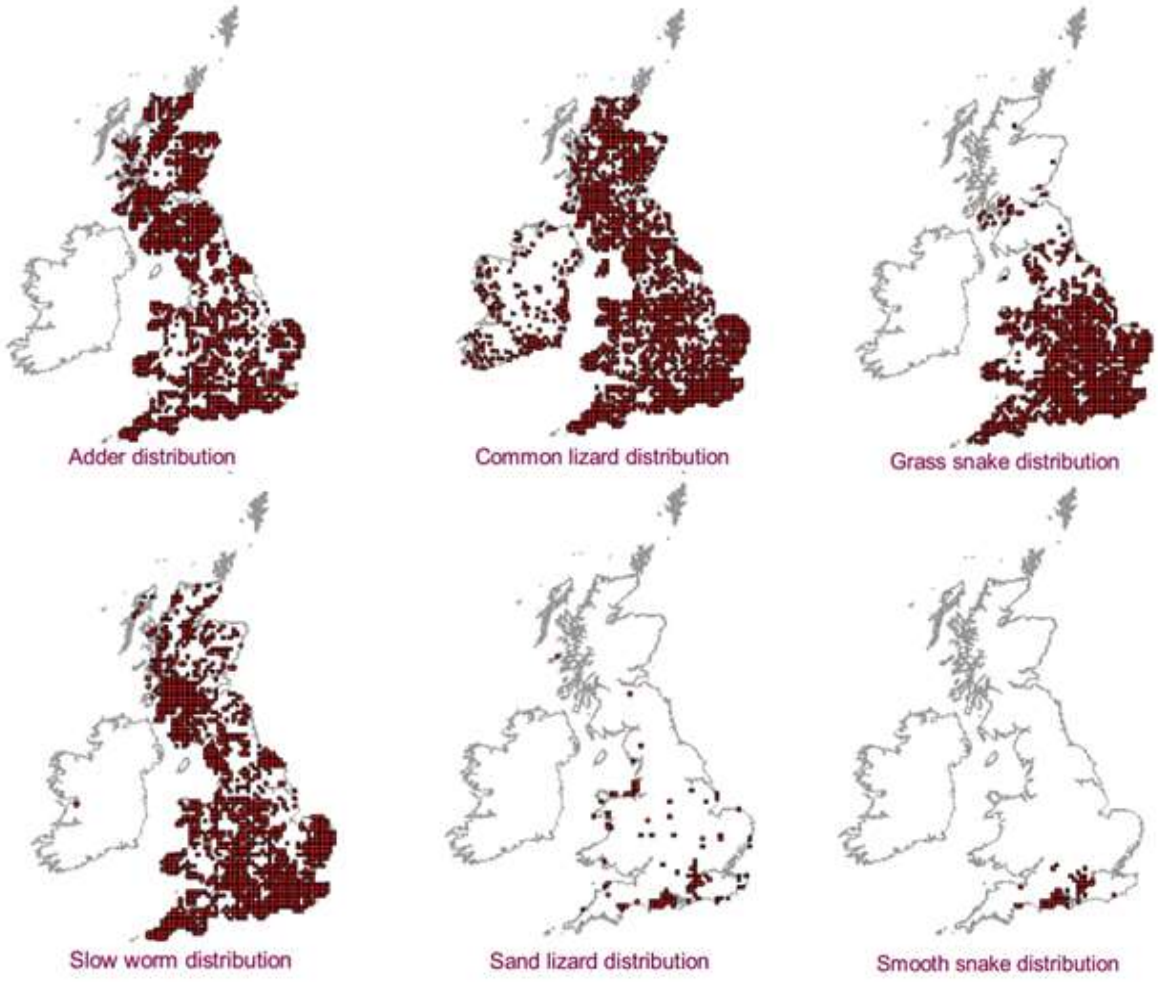
Appendix 1 – British Reptiles and Legislation

British Reptiles

There are six species of reptile found within the UK; grass snake (*Natrix natrix*), adder (*Vipera berus*), smooth snake (*Coronella austriaca*), common lizard (*Zootoca vivipara*), sand lizard (*Lacerta agilis*) and slow worm (*Anguis fragilis*). Typically reptiles can be found in rough grassland with plenty of south facing banks. Within the urban environment however, many reptiles will inhabitant compost heaps, brownfield sites, allotments and railway roads/embankments. Grass snakes will often choose wetland habitat close to ponds and sand lizards and smooth snakes will favour sandy heath and dune.

All six reptile species have shown some documented decline since 1970, which is largely due to loss of specialised habitat (such as sandy heath and dune) and various human activity. In order to stabilize current numbers and prevent further loss of populations, all reptiles in the UK have some level of protection.

Figure 1: Known distribution of British Reptiles.



Source: National Biodiversity Network

i. The Legislation

The Wildlife and Countryside Act 1981 (as amended) and the *Wildlife (NI) Order 1985,* protects all native British reptiles from deliberate killing and injury.

Additionally, *The Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Conservation of Habitats and Species Regulations 2010* (as amended) provide additional protection for the smooth snake and sand lizard by making it against the law to:

- *deliberately or intentionally kill, capture or injure sand lizards and smooth snakes*
- *deliberately or intentionally or recklessly* disturb sand lizards and smooth snakes*
- *deliberately or intentionally or recklessly* damage, destroy or obstruct a breeding site, resting place or other place used for shelter and protection*
- *take or destroy eggs*
- *keep, sell or exchange sand lizards or smooth snakes (or their eggs)*

*For **England and Wales**, the term recklessly was added as an amendment to *The Wildlife and Countryside Act 1981* as a result of the CRoW Act 2000.

In **England, Scotland and Wales**, slow-worm, common lizard, adder and grass snake are also protected against killing, injury and sale, barter or exchange, but their habitats or places of shelter are not specifically protected.

In **Northern Ireland**, the common lizard, receives full protection at all times under Schedule 5 of the Wildlife (NI) Order 1985 making it against the law to:

- *intentionally kill, capture or injure common lizards*
- *disturb a common lizard while it is occupying a structure or place which it used for shelter or protection*
- *damage, destroy or obstruct any structure or place used for shelter or protection*
- *possess ell or exchange common lizards*

All above legislation applies to all stages of life of reptiles e.g. eggs, juveniles etc.

Additionally any animal captured is protected by the UK animal welfare laws which prevent cruelty and abandonment.

The sand lizard is protected by the UK Biodiversity Action Plan and the smooth snake is included in English Nature's species recovery programme.

Local Biodiversity Action Plans may include any or all of the 6 reptile species.

England, Scotland and Wales

A European Protected Species development license (issued under Regulation 53(2)(e) of the Conservation of Habitats and Species Regulations 2010) must be sort by a developer and/or landowner prior to any activity which is likely to:

1. Result in the deliberate capture, injury or killing of a smooth snake or sand lizard,
2. Result in the deliberate disturbance* of smooth snakes or sand lizards,
3. Damage or destroy a breeding site or resting place used by smooth snakes or sand lizards.

**Disturbance to animals includes any particular disturbance which is likely too:*

a. Impair their ability too

i. Survive, breed, reproduce or rear or nurture their young; or

ii. In the case of animals of hibernating or migratory species, to hibernate or migrate: or

iii. Affect significantly the local distribution of abundance of the species to which they belong.

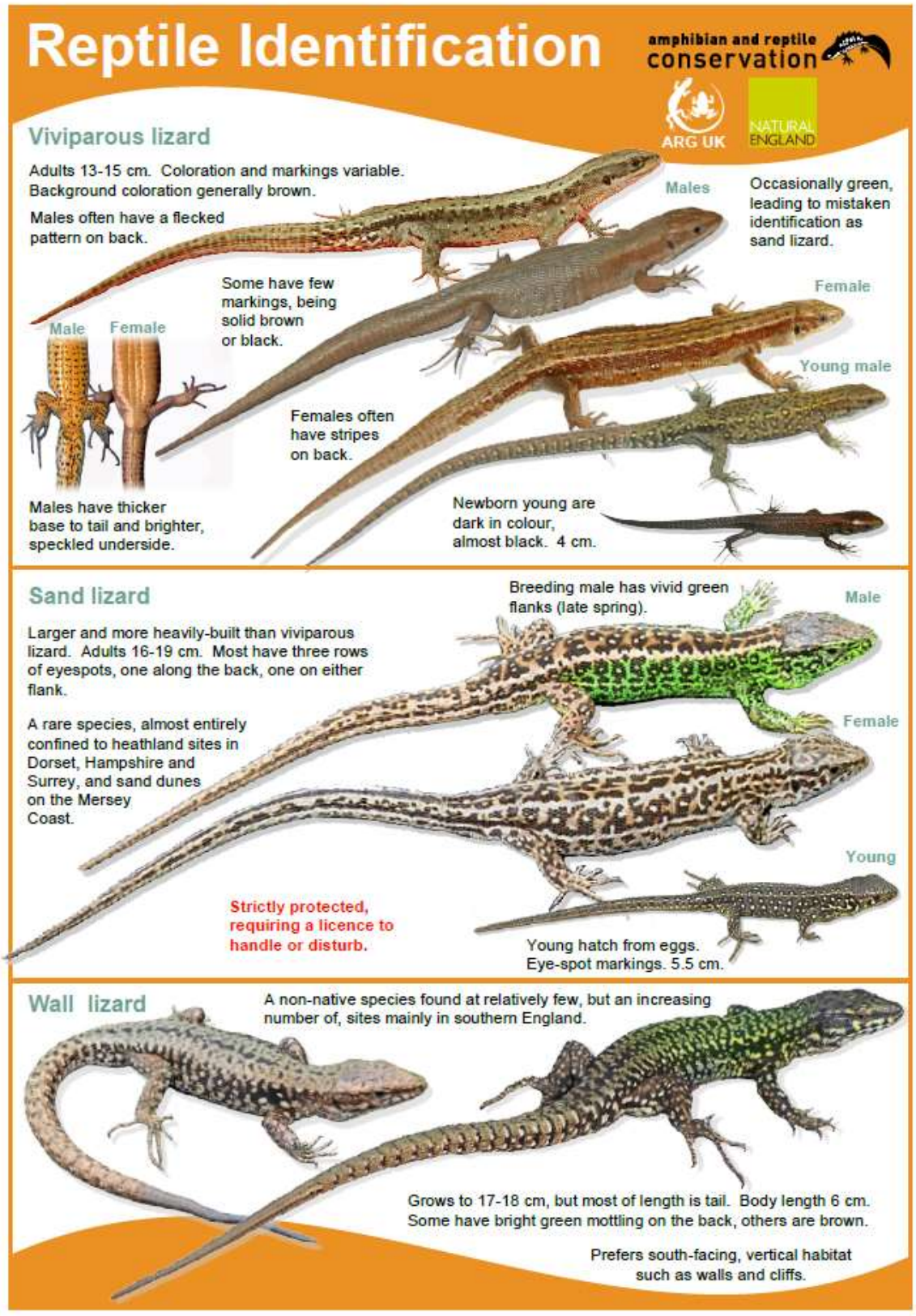
These licences will only be made available to those suitably qualified individuals and additionally will require the completion of relevant surveys and mitigation plans. Licences are not required for undertaking surveys or mitigation for common lizard, slow-worm, grass snake or adder.

Northern Ireland

The common lizard is classed as a priority species here and therefore proof of appropriate surveys and mitigation is required in those instances where development could affect the animals or their environment. Put simply, evidence must be provided that all reasonable effort has been made to avoid breaking the law.

There is no provision for the Statutory Nature Conservation Organisation (SNCO) to issue a licence. Environment and Heritage Service (Natural Heritage) must be consulted to clarify if a conservation licence is in order.

Appendix 3 – Reptile Identification



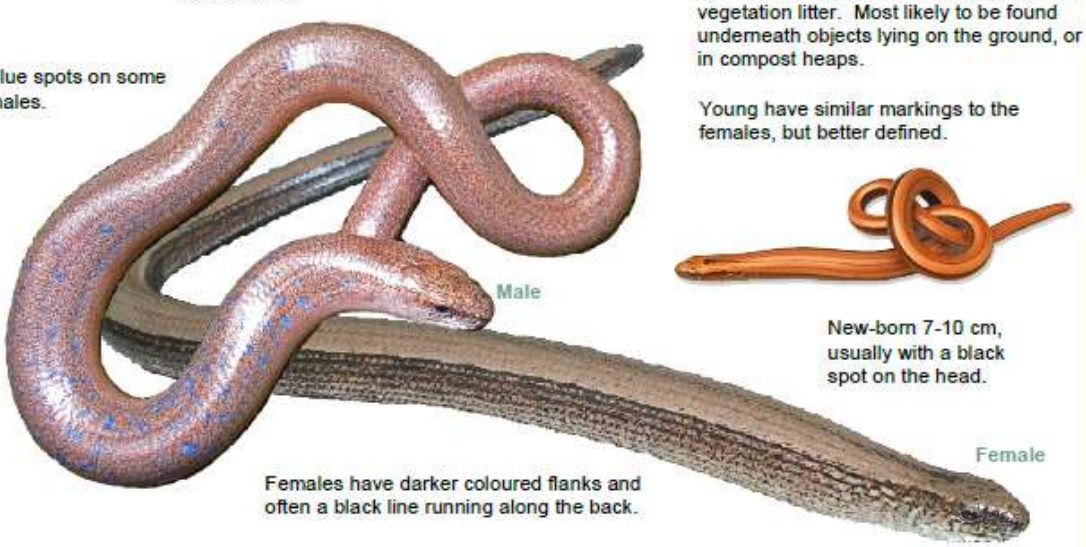
Slow-worm

Adults 35-40 cm. Generally grey or brown, very rarely black. Small, shiny scales, giving a metallic appearance.

The most common reptile in the UK, found in a variety of habitats, including gardens. Spends most of its time underground or in vegetation litter. Most likely to be found underneath objects lying on the ground, or in compost heaps.

Blue spots on some males.

Young have similar markings to the females, but better defined.

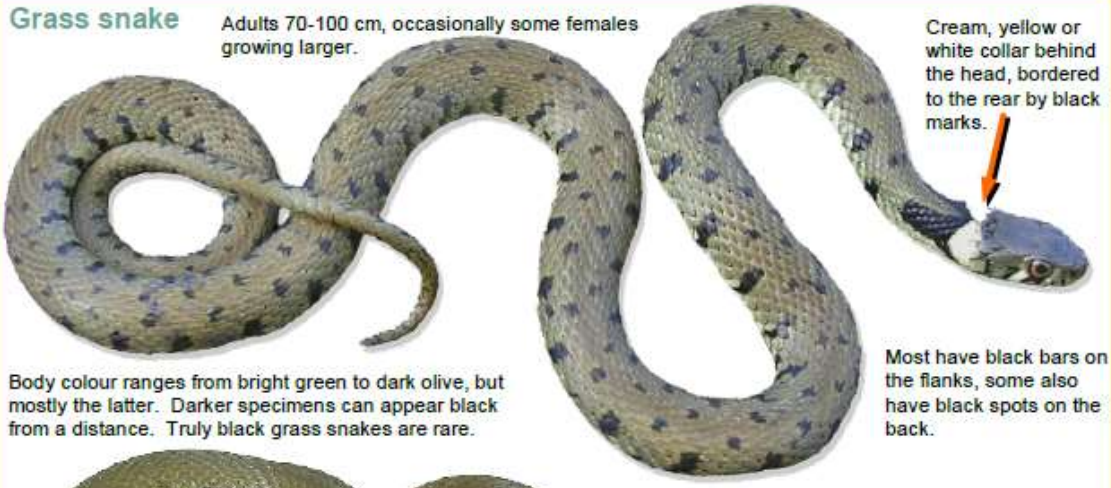


New-born 7-10 cm, usually with a black spot on the head.

Females have darker coloured flanks and often a black line running along the back.

Grass snake

Adults 70-100 cm, occasionally some females growing larger.



Cream, yellow or white collar behind the head, bordered to the rear by black marks.

Body colour ranges from bright green to dark olive, but mostly the latter. Darker specimens can appear black from a distance. Truly black grass snakes are rare.

Most have black bars on the flanks, some also have black spots on the back.

Eggs 2.5 cm long. Laid in clutches of 10-40, usually stuck together. Several females may leave eggs in the same place (usually in decomposing material such as a compost or manure heap).

May pretend to be dead as defensive behaviour. Note chequered black markings on pale underside.

Hatched egg shells. These are very persistent and may remain up to a year after hatching.

Hatchlings 16-20 cm with similar markings to adults. Appear late August to September.

Smooth snake

Restricted to heathlands in Dorset, Hampshire and Surrey. Males predominately brown, females grey. Dark butterfly shape on top of head. Pairs of spots, sometimes fused as bars, running along back. Black line running through eye.

Male

Female

Grows to 45-55 cm, slender.
Strictly protected, requiring a licence to handle or disturb.

Young 14-16 cm, resemble adults but with better defined markings.

Adder

Female

A stocky snake, adults 40-70 cm.

Male

Variable coloration. Males typically grey with a black zigzag stripe, females generally brown with a dark brown zigzag stripe.

New-born 16 cm. Some young are brick-red, others have similar coloration to adults.

Young

Black adders are found in some areas.

Wide distribution, but restricted to specific habitats (heathland, down, scrub, woodland edge, road and rail embankments).

Head profiles

Slow-worm

Grass snake

Pale collar

Smooth snake

Line through eye

Adder

Vertical pupil

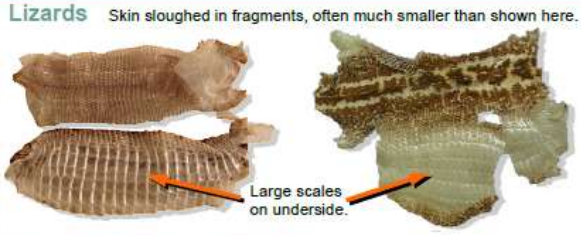
Many species of snake are kept as pets and so escaped or released non-native snakes are occasionally encountered.

Reptile sloughs

Reptiles periodically shed (slough) their skins, to allow for growth and to replace ageing tissue. The shed (sloughed) skins can be useful in identifying species.

Lizards

Skin sloughed in fragments, often much smaller than shown here.



Viviparous lizard (left) **Sand lizard** (right)

Dorsal (back) patterning evident. Small, bead-like scales on back. Large scales on ventral surface (underside) – but single scales not spanning the width of the body.

Slow-worm

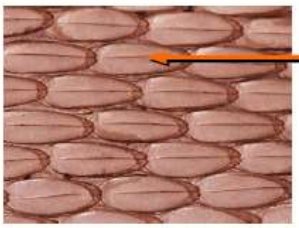
Fragments of skin may be rolled up, like a removed sock.

Uniformly sized scales on dorsal and ventral surfaces.

Snakes

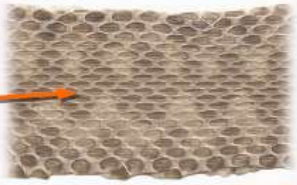
Large ventral scales (underneath), spanning the width of the body.

Underside of grass snake



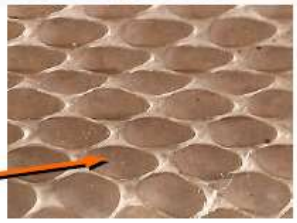
Grass snake

- Keel on dorsal scales.
- Divided anal/pre-anal scale.
- Large plates on head (e.g. behind eye).



Adder

- Dorsal zigzag pattern usually visible, especially when viewed on light background.
- Keel on dorsal scales.
- Large plates, but also small scales, on head (e.g. behind eye).
- Undivided anal/pre-anal scale.



Smooth snake

- No obvious markings on slough and no keel on dorsal scales.

Sexing snakes

Male snakes have relatively longer tails than do females – hence males have more ventral tail (sub-caudal) scales. These can be counted on sloughed skins.

Adder		Grass snake		Smooth snake	
Male	Female	Male	Female	Male	Female
32-46	24-38	61-73	49-64	50-64	43-57

Source: Beebee, TJC and Griffiths, RA (2000). *Amphibians and Reptiles. A Natural History of the British Herpetofauna*. The New Naturalist Library.

Further information Howard Inns (2009). *Britain's Reptiles and Amphibians*. WILDGuides.

Amphibian and Reptile Conservation & Fred Holmes (2013)
Revised with financial assistance from Natural England
Amphibian and Reptile Conservation www.arc-trust.org

amphibian and reptile conservation

ARG UK NATURAL ENGLAND

Appendix 4 – Methodology & Mitigation

i. Methodology

There are inherent problems when surveying reptiles and so the techniques employed must take into account the specific traits of these animals.

1. **Energetic**, but **reticent** creatures which do not cluster for mating.
2. Heavily dictated by **weather conditions**.

Surveys should involve a combination of artificial refugia and visual searching as the former alone are not ideal for all species.

ii. Measurable Characteristics

Evaluation of these indicators enables species assessment on a specific site.

1. **Population Size:** The time period for this activity is April-October using 'mark-recapture' as any other method will be less precise.
2. **Breeding Success:** This is determined by counting the juveniles joining the breeding group annually.
3. **Survival and Mortality:** Can only consistently be measured by mark-recapture techniques and undertaken by the appraisal of the survival of uniquely marked animals between occurrences of trapping. To be certain that a population has been affected by death or emigration dead animals must be found. Containment is vital as birth and immigration is often confused.

iii. Types of Methodology

There are four basic types of survey used for reptiles.

1. Artificial Refugia
2. Standard Walked Transects or Visual Searching
3. Trapping
4. Mark-Recapture

1. Artificial Refugia

Sheets of metal or roofing felt are used as artificial shelters which attract reptiles to them as which warm up naturally in the sun. This is especially so for slow-worms which are often found under naturally occurring refuges such as logs but other species of lizard and snake will also utilise such shelters as basking sites, in particular, sand and common lizards.

These are checked in early morning or evening by turning the refugia and identifying any individuals resting beneath. Refugia laid out in a grid format can be used to estimate the density or a population in addition to presence which can be helpful in those areas where searching for naturally occurring shelters is difficult and time consuming. Distances between refuges can be identified as transects for logging purposes (see later for Standard Walked Transects.) Such artificial shelters are carefully hidden to prevent disturbance or collection by unauthorised persons. Reptile surveys are highly weather dependant and should only be undertaken in optimal weather conditions to avoid an inaccurate representation of the population.

Standard Survey Requirements

As a principle, there should 5-10 refuges per hectare, placed as close as possible, to randomly selected pieces of ground with suitable vegetation *(Froglife 1999)*. Land with inappropriate vegetation should be avoided. The numbered and labelled sheets should be camouflaged but exposed to the sun. Ideally they should be removed at the end of the survey and should not remain in place for more than 3 seasons. If unauthorised tampering is suspected they should be removed or relocated *(Griffiths & Inns, 1998).*

Monitoring

Refuges are best set-up during winter prior to the reptiles emerging from hibernation in the spring. Later set-up can return errors in a survey due to the possibility that some refugia will remain undiscovered.

The site should be monitored between April and October, (the optimal months being April, May and September). The best months should be the focus of attention *(Gibson & Gibson, 1998*). A minimum of 7 visits is recommended, in appropriate weather conditions i.e. warm and sunny but not hot with little rain and wind, as well as the time of year to determine presence/absence. (Froglife, 1999) Optimum weather conditions for observations vary with species. The ideal conditions for most species are 11-19 ^{o}C, with periods of sunshine and cool nights with minimum precipitation and between the hours of 6-8 am and 6-8pm.

Data Analysis and Interpretation

Abundance and density is calculated from surveys taken from refugia and must be standardised to enable comparison between areas and visits. Weather is critical and therefore, variations such as temperature, and wind speed should be recorded to ensure comparisons between surveys completed during similar conditions are made. Reptile numbers can be inflated by the use of refugia as they can attract animals external to the survey area and care must be taken when making conclusions over larger tracts of land.

Standard Walk Transects

A transect is a path along which is recorded occurrences of flora or fauna. The observer moves along a specified path, counting the occurrences of reptiles and, noting the distance of an animal from the path. To enable density calculation of a species in a given area. They can be more intensively searched by studying cover within a specified distance of the transect line which will increase observation number. This technique is used for all reptiles, (except slow worms) which commonly bask during sunny periods. This method can be combined with the use of other techniques but particularly with **Artificial Refugia**. This method is the best option for surveying species that are less likely to be found under refugia e.g. grass snake, common lizard and sand lizard.

Field Methods

Reptiles are not easy to spot. The observer moves slowly, back to the sun, focussing on basking spots, out of shadow and as far into the distance as possible. They are extremely shy and will disperse if disturbed but often soon return to their chosen spot if the observer retreats and remains still. Log piles, stumps, the bottom of dry stone walls, and patches of open ground among heather should be carefully studied. Snakes, in particular, are frequently found on the periphery of a habitat or away from direct sun under bushes and shrubs.

Weather and Time of Year

Common lizards will be observed at the beginning of March when temperatures are between 9-18^{o}C when the sun is out. Pregnant females will also bask in June and July and so August and September are the optimum months to observe hatchlings. Slow-worms are rarely seen in the open but have basking characteristics similar to the common lizard. Sand lizards are very elusive and should be studied between April and September when hatchlings can be seen. Adders will emerge relatively early from hibernation and frequently bask together in temperatures between 8 - 16^{o}C near their place of hibernation. Surveying can start in March as adders are less tolerant of high temperatures than other reptiles.

Data Analysis and Interpretation

Sightings per hour can be used to measure abundance and therefore site comparisons and between years if standardisation and sampling is used. Typically, in optimum ideal conditions only one fifth to one third of the total population is observable on a transect *(Gent, 1994*) .This method is useful for obtaining adult and juvenile populations and can indicate breeding success between years.

Trapping

This is undertaken using a combination of pitfall traps and drift fencing to enhance effectiveness. The former are holes in the ground into which an animal falls and cannot escape. These consist of either glass, plastic or metal container, sunk into the soil so that the mouth is level with the soil

surface. They should be placed along areas, where they are most likely to be encountered by the animals to be trapped.

Drift fencing is a long continuous barrier so when the animals come upon the fence they move along it looking for an opening. It allows them to be more easily captured when many small species are most active and hard to observe. This method can be used to determine presence. Fences are useful for excluding species from an area but not particularly useful for population surveys. Traps are less suitable than refugia or transects as the animals are left vulnerable to predation and extremes of heat.

Field Methods

Traps are placed in warm and open areas but covered with a raised lid to shade and reduce anxiety to the animal. They must be checked repeatedly during the day. To prevent predation or exposure, cover needs to also be provided and captives should not be left in traps overnight and the lid fitted when not in use. The traps are set-up in a grid formation as per refugia or placed along the edges of the habitat.

Data Analysis and Interpretation

Trapping data is best used with a mark-recapture study allowing a more accurate calculation of abundance plus other population considerations. Additionally, direct comparisons can be made between data obtained between different occasions. This is an important factor as reptile densities are often low, the intrinsic fluctuation in data can make prediction of trends inaccurate and so results need standardising for comparative purposes and traps should be positioned in representative habitat.

Mark-recapture

This is the only technique that allows for production of sufficient data for accurate population size to be assessed. Animals are trapped using one of the techniques listed, marked to enable future identification and then released. Subsequent trapping will reveal the ratio of new captures to recaptures and is used to estimate the total population size. This technique can provide other population characteristics such as births, deaths, immigration and emigration. The mark chosen depends on whether individual recognition is required or only batch marking.

Field Methods

Capture

Reptiles can be caught with traps or by hand during the checking of refugia (tinning) or transect surveys. Catching by hand is difficult and should only be undertaken if absolutely necessary. Handling of reptiles, especially Adders, must be undertaken by trained individual as it is critical to avoid damage to the animal. Slow-worms are held firmly but not tightly between the head and body. Common Lizards should be caught by holding the whole of the head and body supporting it with the hand. All lizards will drop their tails if mishandled and should never be caught in this way, especially in warm weather, which can be damaging. Slow-worms in particular, are not able to fully regrow their tails if this occurs. On capture reptiles will writhe about and slow-worms and grass snakes may defaecate. With lizards, the handler must be calm by supporting the animal in the hand. Where adders are involved, surveyors must work in pairs in case of adder bites which can be serious but rarely fatal.

Marking

A PIT (Passive Integrated Responder) tag can be used which is a radio frequency device, with no internal battery, that transmits a unique individual code to a reader. The reader powers the PIT via radio frequency induction and receives the code back from the tag. Advantages are this form of identification does not require line of sight, and tags are readable as long as they are within range. Reptiles can be marked with paint such as nail varnish which is temporary and does not hurt the animal but could make it easier to spot by prey. The actual markings can be used avoiding the need for artificial marking such as chin spots for slow-worms and head markings for all snake species and is the preferred method. The markings are drawn onto prepared blank sketches or photographs of the individual taken whilst in a transparent container.

Mitigation

Where the effect of development cannot be avoided then mitigation will be required and is directly dependent on the form and size of the impact. Each case must be assessed on its merits and therefore the mitigation must be appropriate to the impact caused in conjunction with a consultant. Such plans must be agreed with the relevant SNCO and may include the purchase or allocation of land, creation of habitat, capture, exclusion and translocation of reptiles as necessary plus post development monitoring and habitat management. A development licence must be obtained if required. Additionally, the timing of mitigation must take into consideration any other protected species.

Translocation

A last resort this is only considered if the loss of habitat is completely unavoidable due to the time and investment involved and is not always particularly successful. Therefore the granting of a development licence where translocation of sand lizards or smooth snakes are involved are highly unlikely in England and Wales. Bearing in mind the legislation, the minimum requirement in a situation where habitat loss is completely unavoidable, is that any reptile on the development site must be excluded, by the use of trapping and fencing in the optimum time of the year, and moved to an alternative site before ground clearance can begin. The minimum time that must be allowed to catch all reptiles is from 60 suitable* days upward depending on population number. However, where the animal number is of real significance then this period may extend to 2 years plus. If scrub management is undertaken early in the year to prevent birds nesting then efforts must be made to avoid affecting hibernating reptiles.

*Suitable refers to weather conditions which allow the animals to be caught by hand or using artificial refugia.

After Development Commences

If animals are found on the site after work has begun then all works must stop immediately since, with reference to the legislation, killing or injuring any species of British reptile is against the law.

Penalties

Companies and/or individuals may be held liable and offences are punishable by up to £5000.00 maximum for each offence committed. Furthermore, prison sentences of up to 6 months are possible and all vehicles involved in the offences may be required to be surrendered. The level of punishment is dictated by the specific law broken. Penalties can higher if dealt with by a Crown Court.

Appendix 5- Positive Impacts

vi. Positive Outcomes Post Development

As a result of development and with small additions, reptile habitats can be improved as part of the landscaping works:

1. South facing banks for basking can be created from excavated rock or soil,
2. Sheltering spots can be fashioned from clearance debris such as rock and log piles,
3. Scrub and grassland can be formed by planting.

Appendix 6- South Yorkshire Badger Group

Badger Sett Record Search by South Yorkshire Badger group

Date. 4/7/2014

Requested by

Kirsty rogers,
Enzygo Ltd, Singleton Court Business Park Monmouth.

Ref CRM.066.001.

Report for area around Houghton Main Colliery, grid ref SE 41693/06440

Our records show no badger setts within a 2Km radius of the location.

Graham Shepherd

SOUTH YORKSHIRE BADGER GROUP

Sett Records – Explanatory Notes

1. All Badger Group sett records are collected and recorded by enthusiastic amateurs for our own purposes only. Absence of a record does not guarantee absence of a sett.

2. The data given should be used only in conjunction with a full professional survey.

3. The sett names are arbitrarily chosen by the person reporting the sett and may not conform to names given on the map of the area. The grid reference is a better means of identification.

4. Where two map references are very similar these may represent two areas of the same sett.

5. The information provided must be treated with discretion and should never become available to the general public. It is customary to make all references in reports etc. in general terms unless accurate location of setts is part of the essential objective of the report.

6. South Yorkshire Badger Group cannot be held responsible for the accuracy or completeness of the data we share with others and will not accept legal liability arising from work done, advice given or sett records supplied to other organisations or individuals.

Appendix 7- Bat Conservation Trust Data Results

Bat Conservation Trust
Partner Group

Kirsty Rogers
Consultant Ecologist
Enzygo Ltd, Office 24,
Singleton Court Business Park,
Wonastow Road Industrial Estate,
Monmouth, NP25 5JA

29th June 2014

Project: 2km search of SE 41693 06440

Dear Kirsty,

Further to your request, all grid squares around 2km search of SE 41693 06440 were searched in the South Yorkshire Bat Group Database. The records found from the search are in the attached spreadsheet.

Our charge for performing this data search is £30.00 and an invoice is attached.

To ensure that our database is as comprehensive as possible and therefore of greatest benefit to users in the future, we would appreciate a copy of any bat records made during your project.

Please note the South Yorkshire Bat Group data-set contains information gathered as part of the National Bat Monitoring Programme via the Bat Conservation Trust. Please see the enclosed notes on interpreting the metadata from NBMP surveys.

Please do not hesitate to contact us if you require any further information.

South Yorkshire Bat Group

Email: sybatgroup@googlemail.com

Records terms and conditions

Through the request of information from the South Yorkshire Bat Group (SYBG) data-set (and additional data-sets including National Bat Monitoring Programme and Natural England roost visits), you and your organisation agree to the following conditions:

1) Any use of such records and the source must be acknowledged in any report or documentation you produce;
2) Some information provided has been supplied from the general public and other third parties. We therefore do not provide any guarantee as to how accurate this data is and it should not be fully relied upon in making any determination on bat use of a site;
3) The Data is provided at a limited resolution in agreement with other record sharing organisations. Additional more detailed record specific information may be available and can possibly be obtained via the bat group;
4) This data is provided for one use only in accordance with the requirement as outlined when you made the request. It must not be used for any other purpose, survey or report without agreement from SYBG;
5) The records provided must not be passed onto any other individual or organisation other than the purpose as identified in item 1.

Bat Conservation Trust

National Bat Monitoring Programme

Conserving bats with sound science

Metadata

Notes on interpreting data from NBMP surveys

General note: NBMP data are collected for the purposes of UK surveillance of bats according to a stratified random or other sampling design. The results do not, therefore, necessarily reflect the true distribution of the species in 1km squares, nor are they a complete record of species occurrence in each area, and properly designed surveys to assess species presence should still be carried out. However, they do contribute additional information to the recording effort for each region.

NB If planning to visit any Colony Count or Hibernation Survey sites listed in the dataset, it is very important to liaise with the named recorder (contact the NBMP team at nbmp@bats.org.uk if help is needed with contacting the recorder). This is to reduce disturbance at the site and check for landowner permissions and health and safety issues.

Survey methodologies

Colony Counts: Subject species are **common pipistrelle**, **soprano pipistrelle**, **pipistrelle sp** (i.e. not identified to species level), **serotine**, **Natterer's bat** and **lesser horseshoe**. A few incidental records of other species are also included. Volunteers carry out counts of bats emerging at dusk from known bat roosts, normally on two evenings in June, although some counts carried out in other months are also included. Counts commence at sunset or shortly before (depending on the species being counted); reasons for stopping the count are given in the dataset.

Field Survey: Subject species are **common pipistrelle, soprano pipistrelle, noctule** and **serotine**. Any other species encountered are not recorded. Volunteers are asked to carry out two surveys in July. The survey begins 20 minutes after sunset. Volunteers walk a roughly triangular transect within a 1km square normally selected from a list of randomly generated 1km grid refs. In each survey square the same route is followed each year (with slight variations if parts of the route become dangerous or inaccessible). Twelve spots, approximately evenly spaced, are marked out along the survey route. At each spot the bat detector is tuned around 50 kHz and common and soprano pipistrelle passes are counted for two minutes. While walking between each spot the bat detector is tuned around 25 kHz and noctule and serotine passes are recorded. NB the number of passes indicates levels of bat activity and not numbers of individual bats.

Waterway Survey: Subject species is **Daubenton's bat**, but a few incidental records of other species are also included. Volunteers are asked to carry out two surveys in August. The survey begins 40 minutes after sunset. Volunteers walk along a stretch of waterway of roughly 1km in length. Sites are normally selected from a list of waterways previously surveyed as part of the Environment Agency's River Habitats Survey. At each survey site the same route is followed each year (with slight variations if parts of the route become dangerous or inaccessible). Ten spots, approximately evenly spaced, are marked out along the survey route. At each spot Daubenton's bat passes are counted for four minutes with the bat detector tuned to 35 kHz. NB the number of passes indicates the levels of bat activity and not numbers of individual bats.

Hibernation Survey: Licensed volunteers visit known or potential bat hibernation sites, preferably once in January and once in February, although some counts from other months are also included. All bats seen are identified where possible and numbers are counted. The survey is biased towards hibernation sites which are accessible to humans, such as caves, mines and tunnels, so bat species which tend not to use such sites are under-recorded. The results are

also biased in favour of bats that hang in full view and against those that tend to conceal themselves in nooks and crannies. The ratio of bats seen to bats not seen is unknown. If no bats are recorded at a site it should not be assumed that bats are not present.

Sunset / Sunrise Survey: This survey takes place in July and August and is aimed at er P.T.O. new volunteers and enabling both new and experienced volunteers to locate new roosts in their local area. The survey comprises two parts, either or both of which may be carried out. The Sunset Survey involves going out into a garden or other open space at dusk, looking out for bats flying past and making a note of the general direction from which they appear to be arriving. The Sunrise Survey involves going out one hour before sunset and looking for bats "swarming" as they arrive back at their roosts. Observations made while doing the Sunset Survey on a preceding evening can be used to guide the volunteer in looking for possible roost sites. As many of the participants are beginners, the species identifications are not necessarily accurate. The main value of the data is recording the presence of bats and/or bat roosts in the survey area.

Interpretation of data

Established statistical techniques for interpreting data have been applied when producing national species population trends based on NBMP data. If you wish to refer to the methods used then please see the NBMP Annual Reports at http://www.bats.org.uk/pages/results_and_reports.html or contact us on 0845 1300 228 for a copy of the latest report.

Recorder	Date	GridReference	Address line 1	Address line 2	Address line 3	Type	Notes	Species	Number
Jerry Brown	22/06/1989	SE3406	Regent Street		Barnsley			Unknown	3
English Nature	13/07/2004	SE390081	Sunny Bank Drive	Cudworth	Barnsley	Roost	Several bats on outside wall of house. EB identified roost. 2 storey extension planned. Timing & acces for bats advised.	Unknown	Unknown
English Nature	30/06/2003	SE390081	Sunny Bank Drive	Cudworth	Barnsley		Grounded bat found. Advice given. Bats seen regularly in garden, planning house extension next year. Will ring back if signs of roost. FOB sent.	Unknown	1
Eric Bennett	09/07/2004	SE390081	Sunny Bank Drive	Cudworth	Barnsley	House	Dead babies found grounded.	Pipistrelle sp.	2
Jill Parker	09/07/2004	SE390081	Sunny Bank Drive	Cudworth	Barnsley		Baby found clinging to outside wall. Died.	Pipistrelle sp.	1
Jill Parker	12/07/2004	SE390081	Sunny Bank Drive	Cudworth	Barnsley		Baby found clinging to outside wall. Dead.	Pipistrelle sp.	1
Eric Bennett	08/07/2001	SE3904	Wombwell Lane	Ardsley	Barnsley		Bat found tangled on barbed wire fence	Noctule	1
Eric Bennett	11/11/2004	SE394051		Ardsley	Barnsley		5 P.pip droppings in barn loft.	Common pipistrelle	dr
Eric Bennett	11/11/2004	SE394051		Ardsley	Barnsley	Barn	Several dr.	Pipistrelle sp.	Dr
Jerry Brown	29/05/1989	SE4005	Sorento Way	Darfield	Barnsley			Unknown small Bat	1
Jerry Brown	22/05/1982	SE4006	River Dearne, Storrs Mill Wood					Unknown small Bat	1
Eric Bennett	13/07/1999	SE403050	Genoa Close	Darfield	Barnsley	House		Unknown	63
Householder Unknown	01/07/1999	SE403050	Genoa Close	Darfield	Barnsley			Unknown	63
Eric Bennett	24/06/1999	SE404048	Lugano Grove	Darfield	Barnsley	House		Pipistrelle sp.	+ Dr
P Middleton	08/07/2011	SE404087	Ferry Moor pond			foraging		Common pipistrelle	3
P Middleton	08/07/2011	SE404087	Ferry Moor pond			foraging		Noctule	3
Eric Bennett	08/05/1983	SE4104	Snape Hill Road	Darfield	Barnsley	House		Unknown	1
Eric Bennett	07/09/1993	SE4104	Snape Hill Road	Darfield	Barnsley			Pipistrelle sp.	1
Eric Bennett	07/03/1994	SE4108	Woodland Terrace	Grimethorpe	Barnsley		Grounded bat, broken forearm died later	Pipistrelle sp.	1
Jerry Brown	08/05/1993	SE4104	Snape Hill Road	Darfield	Barnsley			Unknown small Bat	1
English Nature	14/08/2005	SE411047	Ridgeway Avenue	Darfield	Barnsley	Roost	Council house due for re-wiring and other renovations in near future. Bat roost in house? Bats seen coming out at dusk.	Unknown	Unknown
Natural England	24/09/2007	SE414045	Nannymire Road	Darfield	Barnsley		Bat flying inside school hallBat released ok.	Pipistrelle sp.	1
Eric Bennett	01/06/1997	SE418043	School Street	Darfield	Barnsley	House		Unknown	Unknown
Eric Bennett	25/11/2001	SE411058	Edderthorpe Lane	Edderthorpe	Barnsley		Few dr from night hang-up. Barn Owl whitewash only 2 pellets.	Unknown	Unknown
Eric Bennett		SE411058	Edderthorpe Lane	Edderthorpe	Barnsley	Barn		Unknown	Unknown
Eric Bennett	25/11/2001	SE411058	Edderthorpe Lane	Edderthorpe	Barnsley			Unknown	Unknown
English Nature	18/07/2003	SE420040	Middlewood Hall	Darfield	Barnsley		Bat found on garage floor. Advised release at dusk.	Unknown	1
Eric Bennett	29/07/1991	SE420044	Riverside Close	Darfield	Barnsley	House		Pipistrelle sp.	104
Eric Bennett	05/06/1993	SE420044	Riverside Close	Darfield	Barnsley			Unknown	1
Eric Bennett	23/07/1997	SE420049	Middlewood Hall	Darfield	Barnsley	House	prob. Excluded	Pipistrelle sp.	114
Eric Bennett	23/07/1997	SE420049	Middlewood Hall	Darfield	Barnsley			Noctule	1
Jerry Brown	09/05/1982	SE4204	Middlewood Hall	Darfield	Barnsley			Unknown small Bat	2
Eric Bennett	17/10/1992	SE4204	Railway Cutting	Darfield	Barnsley			Pipistrelle sp.	1
Eric Bennett	20/08/1994	SE4208	West Haigh Wood	Brierley	Barnsley			Pipistrelle sp.	2
Eric Bennett	20/08/1994	SE4208	West Haigh Wood	Brierley	Barnsley			Noctule	1
Eric Bennett	30/07/1991	SE421046	River Dearne, A635 bridge	Darfield	Barnsley			Daubenton's bat	6
Eric Bennett	2000	SE422040	Cliff Road	Darfield	Barnsley	House		Unknown	+ Dr
English Nature	28/06/2003	SE422044	Attlee Crescent	Darfield	Barnsley		Roost at house. Some problems with noise. Two grounded bats found. Did not survive.	Unknown	2
Eric Bennett	08/07/2001	SE422044	Attlee Crescent	Darfield	Barnsley	House		Pipistrelle sp.	85
Eric Bennett	06/07/2001	SE422044	Attlee Crescent	Darfield	Barnsley			Pipistrelle sp.	1
Eric Bennett	08/04/2005	SE424044	Doncaster Road	Darfield	Barnsley		Grounded bat.	Soprano pipistrelle	1

English Nature	26/07/2005	SE426070	Crabtree Drive	Great Houghton, Barnsley		Roost	Concerns about bat droppings. Bat in lounge. EB visit. Roost confirmed at both gable apex.50-100 bats seen. Advised sealing inside loft with ply sheet when bats leave.	Pipistrelle sp.	50
Eric Bennett	28/07/2005	SE426070	Crabtree Drive	Great Houghton	Barnsley	House	Visual id in cavity.	Common pipistrelle	50-100
Eric Bennett	10/06/1998	SE427071	Mileswood Close	Great Houghton	Barnsley			Pipistrelle sp.	1
Eric Bennett	18/03/2000	SE427072	Ashwood Grove	Great Houghton	Barnsley			common pipistrelle	1
Eric Bennett	11/07/1993	SE4306	Pleasant Avenue	Great Houghton	Barnsley			Pipistrelle sp.	1
Eric Bennett	18/09/1989	SE431064	Rotherham Road	Great Houghton	Barnsley			Pipistrelle sp.	1
Eric Bennett	02/06/2004	SE437047	Chapel Lane	Billingley	Barnsley		Single P.pip feeding	Common pipistrelle	1
Eric Bennett	24/04/1990	SE439048	Back Lane	Billingley	Barnsley			Pipistrelle sp.	2

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BRISTOL OFFICE
The Granary
Woodend Lane
Cromhall
Bristol GL12 8AA
Tel: 01454 269237
Fax: 01454 269760

kevin.parr@enzygo.com

SHEFFIELD OFFICE
STEP Business Centre
Wortley Road
Deepcar
Sheffield S36 2UH
Tel: 0114 2903677
Fax: 0114 2903688

matt.travis@enzygo.com

MONMOUTH OFFICE, WALES
Singleton Court Business Park
Wonastow Road
Monmouth
Monmouthshire NP25 5JA
Tel: 01600 714611
Fax: 01600 716744

chris.formaggia@enzygo.com

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