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REPTILE REPORT
Hillingdon Gardens

October 2019

BMD.19.020.RPE/P2.804-Reptile

DOCUMENT HISTORY

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-	Planning	MH	HSM	JP	11/11/2019

Declaration of compliance with professional code of ethics or conduct
The information which we have prepared and provided is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bonafide opinions.

Every reasonable attempt has been made to comply with the relevant best practice guidelines and BS42020:2013 (Biodiversity: Code of practice for planning and development).

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EXECUTIVE SUMMARY

CLIENT	Inland Homes
CONSULTANT	Bradley Murphy Design Ltd.

SITE

Location	Hillingdon Gateway, Freezeland Way, Uxbridge, Hillingdon, London. UB10 9QE
National Grid Reference	Approx. centre TQ 077 849.
Over-view	The Site comprises hardstanding, broadleaved plantation woodland, scattered trees, tree lines, scattered scrub, tall ruderals and poor semi-improved grassland.
Landscape context	The Site was located within an urban landscape north of Hillingdon.

DEVELOPMENT & PLANNING BACKGROUND

Proposed works	Proposals entail vegetation clearance, access creation, building of a residential-led development with associated hard landscaping for parking in addition to communal gardens and a green space.
Planning stage	Detailed planning application

ECOLOGICAL BACKGROUND

General	The Ecological Assessment and Preliminary Bat Assessment (BMD.14.052.RPE/RP.801 EcoAss&Bat) undertaken by Bradley Murphy Design 2018 identified habitat with potential to support reptiles within the Site and a presence/absence survey was recommended. This was reviewed and updated in Ecological assessment undertaken in July 2019.
Reptile	No previous surveys for reptiles are known to have been completed on Site. The Ecological Assessments (2018 & 2019) confirmed potential habitat for reptiles within the Site. Slow worm and grass snake have been recorded within 1 km of the Site; the most recent records are from 2012. Common lizard has been recorded within 1.5 km of the Site; the most recent record was from 2006.

SURVEY

Objectives	To provide baseline data on status of reptile on Site. To inform the detailed planning applications and level of mitigation required to ensure favourable conservation status of reptiles at the site as a result of the proposed development.
Approach	Desk based assessment Habitat assessment Presence/likely absence surveys using artificial refugia
Date	April – September 2019.
Results	A low population of slow worm were confirmed present on Site.
Conclusions	Slow worm are confirmed to be present on Site and appropriate mitigation will be necessary.

RECOMMENDATIONS

A mitigation strategy will need to be developed prior to any works, including vegetation clearance, on Site.
Any proposed landscaping to include habitat suitable for reptiles.
Appropriate habitat connectivity to retained with adjacent habitats.

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1. INTRODUCTION

1.1 Background Information

1.1.1 Bradley Murphy Design (BMD) was commissioned by Inland Homes in June 2019 to undertake a reptile survey of a Site at Uxbridge, Hillingdon, London, UB10 9QE. The Site, hereafter referred to as 'the Site', is approximately centred on national grid reference: TQ 0788 8486 and covers approximately 8.7 ha; the application (proposed development) area is approximately 2.5 ha within this.

1.1.2 The following reptile assessments were completed between April 2019 – September 2019:

- Habitat assessment
- Presence/likely absence surveys.

1.1.3 This report presents the approach, results and evaluation of the reptile surveys undertaken at the Site in order to determine the value and use of the Site by reptiles. The data will further inform the detailed planning applications and level of mitigation required to ensure favourable conservation status of reptiles at the Site as a result of the proposed development.

1.2 Proposed Development

1.2.1 Construction of a residential-led, mixed-use development comprising buildings of between 2 and 11 storeys containing 513 units (Use Class C3); flexible commercial units (Use Class B1/A1/A3/D1); associated car (164 spaces) and cycle parking spaces; refuse and bicycle stores; hard and soft landscaping including a new central space, greenspaces, new pedestrian links; biodiversity enhancement; associated highways infrastructure; plant; and other associated ancillary development.

1.3 Client Commitment to The Conservation of Reptile Status

1.3.1 Inland Homes are committed to maintaining and enhancing the conservation status of the reptile populations on the Site. Where possible suitable habitat supporting the species have been retained within the master plan and connective corridors retained and enhanced as part of the site wide green infrastructure.

1.4 Site Context

Historic Context

In the late 19th century the area was a rural landscape of fields, small woodlands and scattered buildings. By the 1930's, Hillingdon had been established and the area was dominated by urbanisation to the south, south-west and north-west of the Site. By the 1960's a public house had been built on the Site. The Site was developed further by the late 1980's and the A40 motorway was present directly north of the Site, forming an at least semi-permeable wildlife barrier. By around 2010 the buildings had been destroyed and the Site began to become derelict.

Present Context

1.4.1 Arterial roads are present to the immediate north, south and west whilst the horse grazed parcel continues to the east. Residential development dominated land use to the north and south, agricultural field parcels dominate to the east and west with RAF Northolt beyond to the east and further residential developments to the west.

1.4.2 A single pond was located at the eastern end of Ickenham Marsh, Austin's Pasture and Freezeland Covert Site of Nature Conservation Interest (SINC), approximately 260 m east to the site boundary.

1.5 Ecological Context

General

1.5.1 An Ecological Assessment and Initial Bat Assessment was conducted by Bradley Murphy Design in 2018. At the time the Site comprised hardstanding areas with extensive colonising vegetation, unmanaged former amenity areas and scattered trees. Habitats present included; amenity grassland, poor semi-improved grassland, broadleaved plantation woodland, dense scrub, introduced shrubs, tall ruderal, spoil piles, bare ground and hardstanding.

1.5.2 Habitat with potential to support bats (roosting/foraging/commuting), nesting birds, badger (foraging/commuting), great crested newt (limited terrestrial opportunities only), reptiles and stag beetle were identified. A number of invasive species were also identified including species on the London Invasive Species Inventory (LISI) and Schedule 9 of Wildlife Countryside Act 1981 (as amended).

1.5.3 The report recommended a reptile survey to determine the status of the species group on Site and a fixed vantage point survey of a tree assessed as having 'Moderate' bat roosting potential.

1.5.4 As a result of Site clearance and boundary changes an up updated Ecological Assessment was undertaken in July 2019 (BMD.19.020.RPE/P1.801-Ecology). This assessment included a bat assessment of the Site.

Reptile

1.5.5 Following the 2018 recommendations a reptile survey was commenced on Site in April 2019. This survey was interrupted by site clearance works (removal of vegetation and spoil piles from the central portion of the Site) in late April/May which resulted in the loss of some potentially suitable reptile habitat. As a result, the artificial refugia were re positioned to cover the remaining suitable habitat on Site.

1.5.6 The Site boundary was also realigned in June 2019 and with slow worm already confirmed present within the Site the reptile survey area was extended to incorporate the additional land.

1.6 Compliance with National Policy and Legislation

1.6.1 A summary of national planning policy and wildlife legislation relating to development projects and reptiles in England is provided in Appendix A. The protocols, evaluations and recommendations contained within this report were made in accordance with these policies and legislation.

2. APPROACH

2.1 Introduction

2.1.1 This report has been produced with reference to current guidelines for reptile surveys (Gent & Gibson, 2003; Froglife, 1999). Reference was also made to BS42020:2013: Biodiversity – Code of Practice for Planning and Development. The assessment comprised a presence/likely absence survey using artificial refugia.

2.1.2 Full survey methodologies are provided in Appendix B and summarised below. Details of dates, surveyors, weather conditions and a review of survey limitations are provided in Appendix C. Definitions of technical terms used in this report are provided in the Glossary in Section 7. Common names of species are used throughout the report with scientific names provided in Section 7.2.

2.2 Presence/likely absence surveys

2.2.1 Surveys were conducted in line with current best practice and professional judgement, in this case between seven and 14 surveys between April and September. Except where weather conditions were deemed suitable surveys in July and August were avoided. Artificial refugia comprising roofing felt (approx. 0.5 x 0.5 m in size) were laid out approximately two weeks prior to the first survey. These were positioned in suitable habitat at an average density of approximately 24 ha^{-2}. Surveys were completed no less than 5-7 days apart.

2.2.2 Surveys for the original Site boundary commenced in April 2019 but due to Site clearance (see limitations) were re-stated in May 2019. The Survey area was extended in early July to cover land to the south and east with surveys being conducted until late September. For consistency the original survey area was also surveyed during this period, resulting in 14 checks for the original area and seven for the extended area.

2.3 Limitations

2.3.1 A summary of all limitations considered is provided in Appendix C.

2.3.2 A maximum of five surveys were conducted July - August which is considered sub-optimal for reptile detection due to higher temperatures and less need to bask. However, the conditions at the time of the surveys were within the parameters recommended by best practise guidelines and therefore results are considered valid.

2.3.3 The initial presence/absence survey commenced in April 2019 but was interrupted by Site clearance works between setting out the artificial refugia and the first survey in early May. Therefore, the artificial refugia were re-arranged within the remaining suitable habitat and the survey re-started.

2.3.4 The Site was subject to temporary disturbance by a group of travellers who occupied the Site for several days in August. It was apparent that fly tipping and burning of refuse had occurred during the occupation. It is not considered that this would have affected the outcome of this assessment.

2.3.5 Land within the adjacent Ickenham Marsh, Austin's Pasture and Freezeland Covert Site (SINC) was subject to rotational grazing by five to ten horses across the survey period. This reduced the suitability of the habitat present by producing a uniform short sward in grazed areas and likely disturbance to any reptile present.

2.4 Evaluation and review

2.4.1 Following the desk study (completed during the Ecological Assessment of the Site) and field surveys:

- The value of the Site was assessed in terms of supporting reptiles.
- The use of the Site by reptiles.
- Where present the estimated possible meta-populations within the site.
- A review of likely impacts resulting from the proposed development on individual and populations of reptile.

3. RESULTS

3.1 Habitat Assessment

3.1.1 Table 3.1 provides a summary of the Site in relation to key reptile habitats and features.

Table 3.1 Summary of Site in relation to key reptile habitats and features

Key Reptile Requirements	Notes
Cover	
Active season	Tall grasses, scrub, shrubs and hedgerows provide potential resting, basking, foraging and refugia for reptiles.
Hibernation season	Hedgerows, broken ground and scrub provide hibernacula for reptiles.
Disturbance	The main body of Site is secure, fenced off with no public access therefore there is little disturbance from people and dogs. The survey area outside the current Site boundary, i.e the eastern field parcel, is within the broader SINC site and open to the public however it does not appear to be used extensively and disturbance by people and dogs is limited. However, this area was rotationally grazed by horses throughout the survey period so does experience disturbance.
Basking opportunity	
Aspect	The Site is predominately flat with no east or south facing basking spots. However, the open marginal/transitional habitat between grassland and scrub/shrubs within the poor semi improved grassland provided suitable basking opportunities.
Topography	Predominantly flat with a landscaped western bank supporting shrubs and bund.
Foraging opportunity	
Vegetation structure	Rough grassland and scattered scrub.
Prey potential	The habitat has potential to provide prey, e.g. small mammals and invertebrates for a number of reptile species.
Connectivity to habitat features	
To habitat features	Connects to hedgerows and pasture/rough grassland to the east which provides suitable foraging and dispersal habitat for a number of reptile species.
To nearest known reptile record	Slow worm recorded approximately 700 m north east of the Site, associated with the adjacent SINC site.
Breeding	
Egg-laying site potential (grass snake only)	No obvious grass/vegetation piles or arisings identified that could be utilised by grass snakes for egg laying.

3.1.2 Table 3.2 provides a summary of the habitats of each transect and an indication of survey effort in terms of density of reptile refugia tiles set out. Indicative photographs of habitats within each transect are provided in the Appendix.

Table 3.2 Summary of 2019 reptile transects

Transect ref.	Location within Site and key habitats	$N^{0.}$ Tiles and Approx. tile density (ha^{-1})[1]
A	Raised spoil pile with dense cover of butterfly bush in south west corner of Site with variable topography provides potential basking opportunities and overnight refugia.	5 83
B	Scrub, tall ruderal and species poor semi improved grassland mosaic south of the Site with a diverse sward provides potential basking, foraging and resting places for reptiles.	20 34

Transect ref.	Location within Site and key habitats	N⁰. Tiles and Approx. tile density (ha^{-1})[1]
C	Species poor semi-improved grassland, scrub and bare ground in the east of the Site This combination of habitats in close association provides suitable foraging, basking, resting and overnight refugia for reptiles.	21 84
D	Species poor semi-improved grassland and bare ground adjacent to plantation woodland along northern boundary. South facing this habitat provides good basking opportunities.	11 33
E	Mosaic of rank poor semi-improved grassland interspersed with tall ruderals, scrub, shrubs and trees (0ff Site) offering foraging, basking and refuge opportunity.	35 42
F	Mosaic of rank semi-improved grassland with regular scrub, tall ruderals, shrubs and trees (off Site) offering foraging, basking and refuge opportunity.	26 9
G	Mosaic of rank semi-improved grassland with regular scrub, tall ruderals, shrubs and trees (off Site) offering foraging, basking and refuge opportunity.	10 18
Notes 1. Habitats covered by Transects F and G were continuous. Both areas experienced rotationally grazing by horses during the survey season which reduced the sward to a short and uniform habitat lowering the suitability for reptiles. Combined and assuming the whole area remained suitable for reptiles, these areas had a tile density of 11 tiles per hectare.		

3.2 Presence/Likely absence surveys

3.2.1 No reptiles were recorded when the reptile refugia tiles were set out in April 2019. Table 3.3 details the results of the reptile surveys; a plan depicting these data is provided in the Appendix.

Table 3.3 Reptiles recorded during survey

Transect	Location within Site and approx. area of suitable reptile habitat	Reptiles recorded Slow worm
Survey 1: 22/04/2019	Setting out refugia	-
Survey 2: 03/05/2019	Site cleared. Refugia re-set.	-
Survey 3: 05/06/2019 – Survey re-started		
Transect B	Land adjacent to site, south east corner (off Site).	1 adult ♀
Survey 4: 11/06/2019		
Transect B	Land adjacent to site, south east corner (off Site).	1 adult ♀
Transect D	Edge of plantation woodland along northern boundary.	1 adult ♀
Survey 5: 17/06/2019		
Transect B	Land adjacent to site, south east corner (off Site).	1 adult ♀
Transect D	Edge of plantation woodland along northern boundary.	1 adult ♀
Survey 6: 21/06/2019		-
Survey 7: 27/06/2019		-
Survey 8: 01/07/2019		-
Survey 9: 05/07/2019	Setting out refugia in adjacent land	-
Survey 10: 19/07/2019		-
Survey 11: 08/08/2019		-
Survey 12: 21/08/2019		-

Transect	Location within Site and approx. area of suitable reptile habitat	Reptiles recorded Slow worm
Survey 13: 02/09/2019		-
Survey 14: 12/09/2019		
Transect B	Land adjacent to Site, south east corner (off Site)	1 adult ♀
Survey 15: 17/09/2019		-
Survey 16: 23/09/2019		-
Notes ♀: Female		

3.3 Summary of reptile presence

3.3.1 Based on the current surveys, Table 3.4 provides the population estimates of reptiles for the area of reptile habitat covered by each Transect.

Table 3.4 Summary of reptiles recorded during survey

Transect ref.	Location within Site	Peak count (adults only in a single survey) and Population estimate (based on estimated reptiles per ha) Slow worm
A	Raised bank/spoil pile in south west corner of Site with introduced shrubs.	-
B	Adjacent (off Site to south) mosaic of species poor semi-improved grassland with tall ruderals, scrub, trees and shrubs.	1: low
C	Grassland, scrub and trees along eastern Site boundary.	-
D	Grassland and scrub along edge of northern plantation woodland.	1: low
E	Adjacent (off Site to east) mosaic of species poor semi-improved grassland with tall ruderals, scrub, trees and shrubs.	-
F	Adjacent (off Site to east) mosaic of species poor semi-improved grassland, scrub, trees and shrubs.	-
G	Adjacent (off Site to east) mosaic of species poor semi-improved grassland, scrub, trees and shrubs.	-

3.3.2 Despite suitable habitat being present and connectivity to areas where reptiles were confirmed (Transect B and D), no reptiles were found during the survey period in the following locations:

- Transect A: vegetated spoil bank in the south east of the Site.
- Transect C: grass scrub mosaic in the east of the Site.
- Transect E: mosaic of grassland, tall ruderal and scrub off Site to the east.

No reptiles were found at Transects F and G (off Site to the east). These areas were subject to rotational horse grazing during the survey period which subsequently degraded the value for habitat suitability for reptiles.

4. EVALUATION

4.1 Introduction

4.1.1 This Section reviews the results in relation to the proposed development proposals; it:

- Identifies likely metapopulations;
- Assesses implications of reptiles to the proposed development at the Site.

4.2 Habitat Assessment

4.2.1 The Phase 1 Habitat Surveys (2018 and 2019) identified suitable habitat for reptiles within and adjacent to the current proposed development area of the Site. Further, more specific habitat assessment identified a range of habitats with the diversity of structure to support populations of reptiles. A mosaic of shrubs, trees, scrub and grassland were present in close association providing basking, resting, foraging and hibernating opportunities for the species group across their life cycle.

4.2.2 A number of boundary features including broadleaved plantations and tree lines were present in close association with scrub and grassland across the Site, providing commuting opportunities and access to suitable habitat within the Site and the broader landscape to the east. The adjacent Ickenham Marsh, Austin's Pasture and Freezeland Covert Site (SINC) supported a mosaic of shrubs, woodland, scrub, grassland and ponds, considered suitable and valuable habitat for the species group.

4.2.3 The subsequent reptile survey confirmed slow worms utilising the habitat within and adjacent to the current proposed development area of the Site:

- Within development area along the northern boundary
- Adjacent to the south of the development area.

4.2.4 As such maintaining habitat connectivity within the Site and into the wider landscape is necessary to ensure the Site continues to support a viable reptile population.

4.3 Presence of reptiles

4.3.1 Slow worms were recorded on four occasions across the survey period within two of the seven transects. No other reptile species were encountered during the survey period.

4.3.2 Reptiles were shown to be using the following areas and habitats within the Site:

- Transect B: Mosaic of scrub, tall ruderal, shrubs, trees and poor semi-improved grassland in adjacent land to the south of the development area.
- Transect D: Poor semi-improved grassland and scrub adjacent to northern boundary woodlands within the development area.

4.3.3 Only adult females were recorded across the survey period with a peak count of two (across all transects on a single site survey visit; a maximum of one was found at individual transects on a single survey visit) indicating the presence of a low population of slow worm on Site. A female slow worm was recorded

during three consecutive surveys (5th, 11th and 17th June) along Transect 'B' under the same tile. It is considered that the same individual was likely habitually utilising the tile. Similarly, a female slow worm was found on two consecutive surveys (11th and 17th June) under the same tile in Transect D; it is considered likely that this was the same individual.

4.3.4 Transects were confined to suitable habitat along the boundaries of the proposed development area of the Site and all transects were linked via suitable commuting habitat. Although the transects supporting reptiles were at opposite ends of the proposed development area of the Site, south east and north west corners, given the relatively small size of the Site and presence of connective habitat it is considered there is only one population of slow worm.

5. CONCLUSIONS

5.1.1 The survey work undertaken at the Site in relation to reptiles is considered valid and to have followed best practise guidelines and professional judgement.

5.1.2 Slow worms were confirmed present on Site, both within the proposed development area and adjacent to it, with individuals recorded within two of the seven transects.

5.1.3 A maximum count of two adult slow worms, taking in the whole survey area on a single survey visit, were recorded across the survey period which constitutes a low population. It is considered the Site supports a single population of slow worms with movement possible between the various suitable habitats on Site within and adjacent to the proposed development area.

5.1.4 To ensure compliance with the Wildlife and Countryside Act 1981 (As Amended), a reptile mitigation strategy will be required and implemented prior to development works commencing at the Site. In line with English Nature (2004) guidance and current best practise (Natural England, 2015), the aims of the mitigation strategy must be to:

- Protect reptiles from any harm that might arise during the development work;
- Ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the existing reptile population;
- Ensure no net loss of local reptile conservation status.

5.1.5 Preference will be for reptiles to be accommodated within the Site, however, off-site alternatives may be considered in certain circumstances.

5.1.6 Based on the current results it is considered that the reptiles within the proposed development area of the Site can be translocated through appropriate methods (e.g. habitat reduction and translocation and appropriate times of year) to the adjacent land within the client's landownership; area of Transect B and E. These areas should be enhanced to optimise them for the species and increase the carrying capacity to support net gain aspirations of development.

5.1.7 Habitat within the development area should also be designed to be suitable for reptiles and maintain connectivity to the wider landscape.

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7. GLOSSARY

7.1 Scientific Terms and Acronyms

CIEEM Chartered Institute of Ecology and Environmental Management, the professional organisation and provider of professional codes of conduct for ecological consultancy.

GIGL Green Space Information for Greater London

LBAP Local Biodiversity Action Plan.

Notable species A species which is listed as a UK Priority Species, carries an unfavourable conservation status (e.g. scarce, rare, threatened, Red-listed), is invasive or is otherwise worthy of note from an ecological perspective.

Protected species A species protected under specific UK or European legislation, including Habitats Directive, Wildlife and Countryside Act.

UK Priority Habitat / species A habitat or species identified as a priority for conservation in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006). Section 40 of the Act places a duty on public authorities to have regard for the conservation objectives of these habitats / species. (Also known as Section 41 (S41) habitats/species).

7.2 Scientific Names

7.2.1 Scientific names of species mentioned in this report are outlined in Table 7.1.

Table 7.1 Scientific names of species mentioned within this report

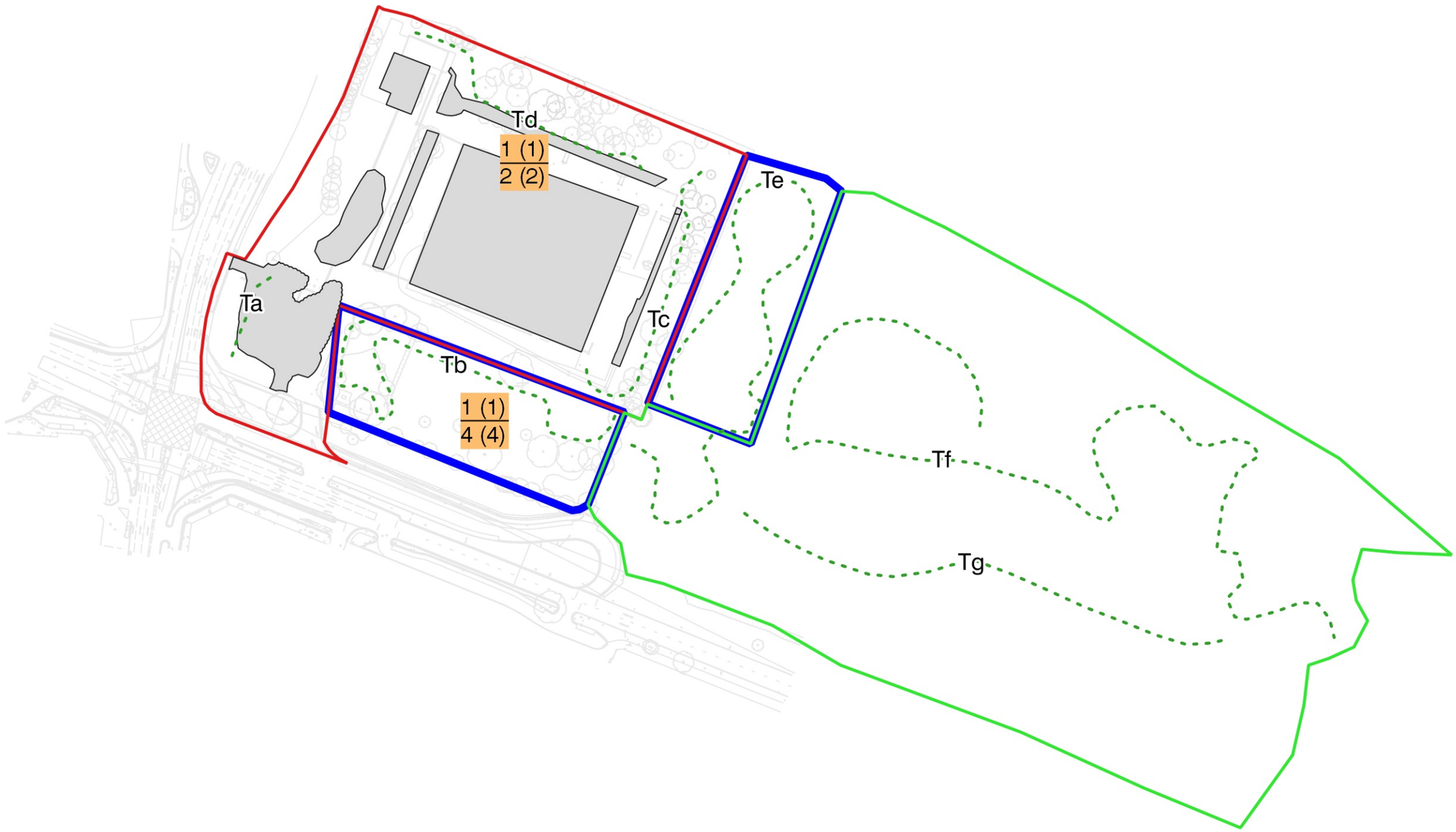
English Name	Scientific Name
Reptiles	
Grass snake	*Natrix helvetica*
Slow worm	*Anguis fragilis*
Common lizard	*Zootoca vivipara*

APPENDICES

PLANS AND SITE PHOTOGRAPHS

Drawing BMD.19.020.DRE.902: Survey Results

Drawing BMD.19.020.DRE.904: Survey extents- Reptile



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NOTES
1. THIS DRAWING IS BASED ON LASER SURVEYS 8063 AND PHASE 1 HABITAT DRAWING: BMD.19.020.DRE.901
2. DO NOT SCALE FROM THIS DRAWING
3. ANY DISCREPANCIES WITHIN THIS DRAWING OR BETWEEN THIS DRAWING AND ANY OTHER INFORMATION IS TO BE REPORTED TO BMD FOR CLARIFICATION

LEGEND

- Application boundary (as per Collado Collins Drawings)
- Ownership boundary (as per Collado Collins Drawings)
- Reptile extended survey area
- Clearance between 2018 and 2019 ecological surveys
- Reptile transect
- # (#) / # (#) — Single survey: Max No. adults (Max No. all ages) / Across all surveys: Total No. adults (Total No. all ages)
- Tx — Transect reference
- Slow worm recorded

Survey result notes.

Transect B: Three of the four reptile sightings were noted under the same tile (at the eastern end of the Transect) on each of the three occasions during the survey period. It is considered likely to have been the same individual. The fouth sighting was at the western end of the Transect.

Transect D: Both reptile sightings were noted under the same tile (at the western end of the Transect) on each of the two occasions during the survey period. It is considered likely to have been the same individual.

Rev	Description	Date

Purpose of Issue
PLANNING

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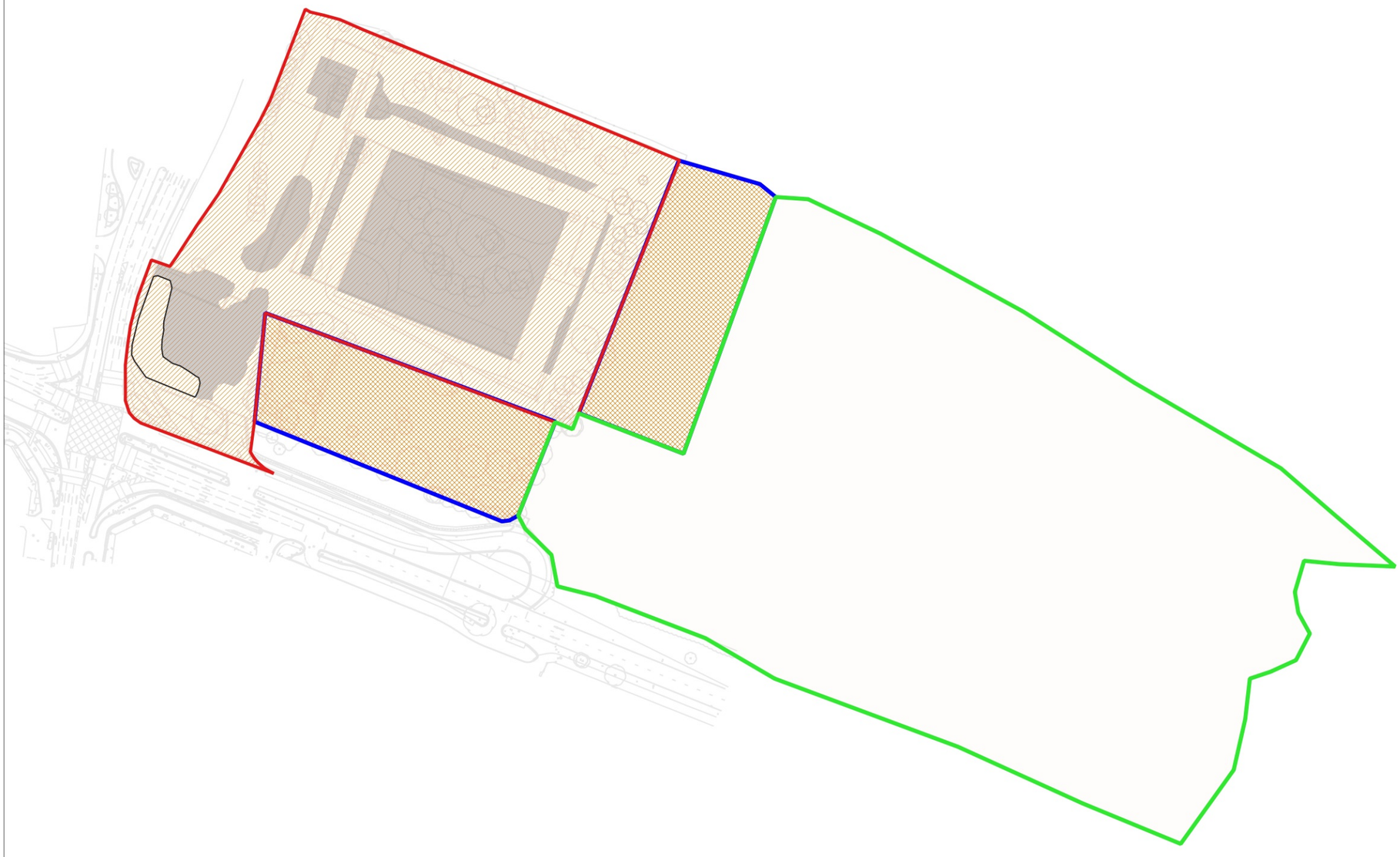
Client
INLAND HOMES

Project
HILLINGDON GARDENS

Drawing Title
REPTILE SURVEY RESULTS 2019

Drawn	Checked	Approved	Date: Survey
HSM	MH	JP	May-Sept 2019
Job No.	**Scale**	**Sheet Size**	**Revision**
19.020	1:2000	A3	A
Drawing Number		**Date: Drawing**	
BMD.19.020.DRE.902		23/10/2019	



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NOTES
1. THIS DRAWING IS BASED ON LASER SURVEYS 8063 AND PHASE 1 HABITAT DRAWINGS: BMD.18.052.DRE.901 AND BMD.19.020.DRE.901
2. DO NOT SCALE FROM THIS DRAWING
3. ANY DISCREPANCIES WITHIN THIS DRAWING OR BETWEEN THIS DRAWING AND ANY OTHER INFORMATION IS TO BE REPORTED TO BMD FOR CLARIFICATION

LEGEND

- APPLICATION BOUNDARY (AS PER COLLADO COLLINS DRAWINGS)
- OWNERSHIP BOUNDARY (AS PER COLLADO COLLINS DRAWINGS)
- REPTILE EXTENDED SURVEY AREA
- 2018 ECOLOGICAL SURVEY AREA
- 2019 EXTENDED ECOLOGICAL SURVEY AREA
- SITE CLEARANCE BETWEEN 2018 & 2019 ECOLOGICAL SURVEYS

N

0 250 500 1000
METERS

Rev	Description	Date

Purpose of Issue
PLANNING

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BMD

Client
INLAND HOMES

Project
HILLINGDON GARDENS

Drawing Title
SURVEY EXTENTS - REPTILE

Drawn	Checked	Approved	Date: Survey
HSM	MH	JP	2019
Job No.	**Scale**	**Sheet Size**	**Revision**
19.020	1:2000	A3	-
Drawing Number		**Date: Drawing**	
BMD.19.020.DRE.904		23/10/2019	

PHOTO SHEETS

Photograph 1: Tiles along Transect A on spoil piles in south west corner of Site.

Photograph 2: Tiles along Transect B (off site) within scrub, tall ruderal and species poor semi-improved grassland mosaic south of development area of the Site.

Photograph 3: Tiles along Transect C within grassland and scrub adjacent to tree line along eastern Site boundary.

Photograph 4: Tile along Transect D within species poor semi-improved grassland and bare ground adjacent to plantation woodland along northern boundary.

Photograph 5: Tile along Transect E (off site) within mosaic of rank poor semi-improved grassland interspersed with tall ruderals, scrub, shrubs and trees.

Photograph 6: Tiles along Transect F (off site) within mosaic of rank poor semi-improved grassland interspersed with tall ruderals, scrub, shrubs and trees.

Photograph 7: Tiles along Transect G (off site) within mosaic of rank poor semi-improved grassland interspersed with tall ruderals, scrub, shrubs and trees.

Photograph 8: Adult slow worm recorded on Site.

Photograph 9: Toad found under tile along Transect C.

A. NATIONAL POLICY AND LEGISLATION

A.1.1 The common and widespread species of reptile (adder, grass snake, common lizard and slow worm) are protected under the Wildlife and Countryside Act 1981 (as amended) (Section 9 (1)) against intentional killing and injury. Where it is predictable that reptiles could be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.

A.1.2 The common and widespread reptile species are also Priority Species (Natural England and Rural Communities Act (2006) – Section 40, listed in accordance with Section 41).

A.1.3 The two rarer reptile species, sand lizard and smooth snake, benefit from greater protection, including from European legislation. Both species have a restricted geographical distribution and very specific habitat requirements and as such considered to be absent from the current study area.

A.1.4 Key planning policies / documents are:

- The National Planning Policy Framework (2019); and
- The Natural Environment and Rural Communities (NERC) Act (2006).

B. ASSESSMENT METHODOLOGIES

B.1 Presence/Likely Absence Survey

B.1.1 During the first site visit, habitats and features of value to reptiles were identified. Important reptile features, include vegetation piles, sunny aspects, log piles etc, were also identified and searched. Artificial refugia comprising roofing felt approx. 0.5 x 0.5 m in size were positioned in transects within suitable habitats and conditions. Suitable conditions typically include areas which provide reptiles with cover as well as basking locations. Refugia densities varied based on habitats but were calculated to give an overall density of between five and ten refugia per hectare, as is current best practice.

B.1.2 The refugia were left to 'bed in' for approximately two weeks prior to presence/likely absence surveys commencing. Following this period, seven survey visits were made during suitable weather conditions within the accepted survey period (April to September inclusive) and with no less than five days between each survey. July and August can be considered to be sub-optimal for surveying for reptiles, however, surveys can still be undertaken if conditions are suitable; this may mean surveys are conducted earlier or later in the day. Suitable weather conditions are considered to be low wind, at least spells of sunlight, minimal/no rain and an air temperature of 9-18°C. Showers interspersed with sunny spells can, however, be effective survey conditions if refugia are checked immediately after the showers as reptiles tend to emerge and bask to warm up again. Warm, sunny days following a period of wet weather can also be productive for reptile surveys.

B.1.3 During each survey, refugia were located and approached at a sedate pace and lifted. All reptiles recorded on or beneath refugia were mapped and recorded and, where possible, the age class and sex also noted. Existing refugia, where present, and suitable reptile habitat or basking 'hot spots' were also checked for reptiles during the course of surveys.

B.1.4 An indication of population size can be estimated using guidance developed for conservation site by Frogfile (Froglife, 1999). It is noted that detailed population sizes would require numerous site visits over an entire season, therefore the values given in Table B2.1 are to be used only as a guide.

Table B2.1 Population size estimates

Reptile	Population (max. nº. adults recorded by one person on one day with refugia at a density of 10/ha)		
	Low	Good	Exceptional
Adder	<5 individuals/ha	5-10 individuals/ha	>10 individuals/ha
Grass snake	<5 individuals/ha	5-10 individuals/ha	>10 individuals/ha
Common lizard	<5 individuals/ha	5-20 individuals/ha	>20 individuals/ha
Slow-worm	<5 individuals/ha	5-20 individuals/ha	>20 individuals/ha

B.1.5 All equipment used during reptile surveys was subject to bio-control measures which ensured equipment was cleaned and disinfected between sites to reduce the potential for the spread of diseases and invasive plants.

C. METADATA, SURVEY CONDITIONS AND LIMITATIONS

C.1 Metadata

Factor	Detail
Data	Reptile habitat suitability, presence/likely absence
Reason for collection	To provide an update to existing baseline data pertaining to reptiles. To inform appropriate mitigation in relation to proposed development.
Location	Hillingdon Gardens, Uxbridge, Hillingdon, London. UB10 9QE, approximate central grid reference: TQ 077 849
Date	Presence/likely absence surveys: 22/04/19 – 23/09/2019
Method of collection	See Appendix B.
Who collected	Matthew Harper BSc (Hons) James Howsam MSc

C.2 Survey Conditions

Date	Start Time	Wind	Cloud (%)	Sun	Temp. (°C)	Precipitation
22/04/2019	13:30 - 15:20	F3	20	Strong sun	20	None
03/05/2019	08:45 – 09:30	F0	100	Overcast before brightening	9	None
05/06/2019	11:00 – 11.40	F1	80	Spells	15	None
11/06/2019	11:00 – 11:30	Still	90	Spells	12	None
17/06/2019	10:20 – 10:55	F2	40	Sunny	17	None
21/06/2019	11:00 – 11:30	F3	50	Strong sun	18	None
27/06/2019	10:20 – 10:50	F3	0	Strong sun	18	None
01/07/2019	10:45 – 11:20	F3	25	Strong	18	None
05/07/2019	08:45 – 09:15	Still	30	Strong	18	None
19/07/2019	08:20 – 09:30	F3	100	Brief spells	16	None
08/08/2019	08:55 – 10:00	Still	90	Brief spells	17	None
21/08/2019	09:00 – 10:00	Still	30	Strong	17	None
02/09/2019	10:45 – 11:45	F3	100	Strong	18	None
12/09/2019	10:30 – 11:30	F3	100	Intermittent	18	None
17/09/2019	13:50 – 14:50	Still	10	Strong	18	None
23/09/2019	09:00 – 09:55	F5	30	Brief spells	15	None

C.3 LIMITATIONS REVIEW

Consideration	Comment
Survey & data	
Personal competence, i.e. qualifications, training, skills, understanding, experience	All survey works were undertaken by or directly supervised by personnel experienced in ecological surveying and licensed to undertake reptile surveys (see meta data; Section B1). Matthew Harper BSc (Hons) has over four years of experience in ecological consultancy with a range of survey skills including reptile survey and mitigation works. James Howsam MSc has about three years of continuous experience in the consultancy sector and extensive experience undertaking ecological fieldwork over five survey seasons. This includes a suitable level of experience with all surveys undertaken at the Site.
Resources (equipment and/or personnel)	Appropriate resources and suitably qualified personnel were used.
Time spent surveying	Sufficient time was spent on site to undertake all surveys. No surveys were 'cut short'.
Data (e.g. arising from incomplete or inappropriate surveys)	The data collected were sufficient for the purpose of the works.
Lack of statistical robustness and higher uncertainties	Statistical analysis of data was not deemed necessary for the purpose of the current works.
Old and out of date data	The survey data in this report remains valid until September 2021.
Timing or seasonal constraints and suboptimal survey periods	The surveys commenced in May 2019 and five (max) surveys were conducted July - August which is considered sub optimal for reptile detection due to higher temperatures and less need to bask. However, the conditions at the time of the surveys were within the parameters recommended by best practice guidelines and results considered valid.
Partial use of and/or departures from good practice guidelines	All surveys accorded with the relevant best practice guidelines.
Site conditions & other factors	
Adverse weather conditions	No significantly adverse weather conditions were encountered during the survey work undertaken at the Site that would be considered to have significantly adversely impacted the reliability and accuracy of data collected.
Restricted access to site or part of site	Access was not restricted.
Unrealistic deadlines	No restrictions on survey data collected or analysed to date are as a result or unrealistic deadlines.
Unproven or untested measures for mitigation and compensation	N/A
Evaluation of conservation value and impacts	The evaluation of the conservation value of habitats and species associated (or potentially associated) with the site and impacts of the development, are based on the current information available.

D. DETAILED SURVEY RESULTS

Transect ref:	TA			No. tiles:	5	Transect length:		25	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
22/04/2019	13:30:00	Preceding days/night	0	Survey 1	Slow worm						0
		Cloud cover	20		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	20		Adder						0
		Wind	3		Notes						
		Precipitation	no								
03/05/2019	08:45:00	Preceding days/night	Rain	Survey 2	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Overcaset before brightening		Grass snake						0
		Temperature	9		Adder						0
		Wind	0		Notes						
		Precipitation	no								
05/06/2019	11:00:00	Preceding days/night	0	Survey 3	Slow worm						0
		Cloud cover	80		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	1		Notes						
		Precipitation	no								
11/06/2019	11:00:00	Preceding days/night	0	Survey 4	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	12		Adder						0
		Wind	0		Notes						
		Precipitation	no								
17/06/2019	10:20:00	Preceding days/night	Heavy rain	Survey 5	Slow worm						0
		Cloud cover	40		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	2		Notes						
		Precipitation	no								
21/06/2019	11:00:00	Preceding days/night	0	Survey 6	Slow worm						0
		Cloud cover	50		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes						
		Precipitation	no								
27/06/2019	10:20:00	Preceding days/night	0	Survey 7	Slow worm						0
		Cloud cover	0		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes						
		Precipitation	no								

Fig D.1 Survey results 2019: Transect A Survey 1-7

Transect ref:	TA			No. tiles:	5	Transect length:		25	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
01/07/2019	10:45:00	Preceding days/night	0	Survey 8	Slow worm						0
		Cloud cover	25		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	2			Notes					
		Precipitation	no								
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.2 Survey results 2019: Transect A Survey 8-16

Transect ref:	TB			No. tiles:	20	Transect length:		200	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
22/04/2019	13:30:00	Preceding days/night	0	Survey 1	Slow worm						0
		Cloud cover	20		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	20		Adder						0
		Wind	3			Notes					
		Precipitation	no								
03/05/2019	08:45:00	Preceding days/night	Rain	Survey 2	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Overcaset before brightening		Grass snake						0
		Temperature	9		Adder						0
		Wind	0			Notes					
		Precipitation	no								
05/06/2019	11:00:00	Preceding days/night	0	Survey 3	Slow worm		1				1
		Cloud cover	80		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	1			Notes					
		Precipitation	no								
11/06/2019	11:00:00	Preceding days/night	0	Survey 4	Slow worm		1				1
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	12		Adder						0
		Wind	0			Notes					
		Precipitation	no								
17/06/2019	10:20:00	Preceding days/night	Heavy rain	Survey 5	Slow worm		1				1
		Cloud cover	40		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	2			Notes					
		Precipitation	no								
21/06/2019	11:00:00	Preceding days/night	0	Survey 6	Slow worm						0
		Cloud cover	50		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
27/06/2019	10:20:00	Preceding days/night	0	Survey 7	Slow worm						0
		Cloud cover	0		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								

Fig D.3 Survey results 2019: Transect B Survey 1-7

Transect ref:	TB			No. tiles:	20	Transect length:		200	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
01/07/2019	10:45:00	Preceding days/night	0	Survey 8	Slow worm						0
		Cloud cover	25		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	2			Notes					
		Precipitation	no								
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun,	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm		1				1
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.4 Survey results 2019: Transect B Survey 8-16

Transect ref:	TC			No. tiles:	21	Transect length:		130	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
22/04/2019	13:30:00	Preceding days/night	0	Survey 1	Slow worm						0
		Cloud cover	20		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	20		Adder						0
		Wind	3		Notes						
		Precipitation	no								
03/05/2019	08:45:00	Preceding days/night	Rain	Survey 2	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Overcaset before brightening		Grass snake						0
		Temperature	9		Adder						0
		Wind	0		Notes						
		Precipitation	no								
05/06/2019	11:00:00	Preceding days/night	0	Survey 3	Slow worm						0
		Cloud cover	80		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	1		Notes						
		Precipitation	no								
11/06/2019	11:00:00	Preceding days/night	0	Survey 4	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	12		Adder						0
		Wind	0		Notes						
		Precipitation	no								
17/06/2019	10:20:00	Preceding days/night	Heavy rain	Survey 5	Slow worm						0
		Cloud cover	40		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	2		Notes						
		Precipitation	no								
21/06/2019	11:00:00	Preceding days/night	0	Survey 6	Slow worm						0
		Cloud cover	50		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes						
		Precipitation	no								
27/06/2019	10:20:00	Preceding days/night	0	Survey 7	Slow worm						0
		Cloud cover	0		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes						
		Precipitation	no								

Fig D.5 Survey results 2019: Transect C Survey 1-7

Transect ref:	TC			No. tiles:	21	Transect length:		130	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
01/07/2019	10:45:00	Preceding days/night	0	Survey 8	Slow worm						0
		Cloud cover	25		Common lizard						0
		Sun,	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	2			Notes					
		Precipitation	no								
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes	Toad under mat				
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes	Toad under mat				
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.6 Survey results 2019: Transect C Survey 8-16

Transect ref:	TD			No. tiles:	11	Transect length:		125	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
22/04/2019	13:30:00	Preceding days/night	0	Survey 1	Slow worm						0
		Cloud cover	20		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	20		Adder						0
		Wind	3		Notes						
		Precipitation	no								
03/05/2019	08:45:00	Preceding days/night	Rain	Survey 2	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Overcaset before brightening		Grass snake						0
		Temperature	9		Adder						0
		Wind	0		Notes						
		Precipitation	no								
05/06/2019	11:00:00	Preceding days/night	0	Survey 3	Slow worm						0
		Cloud cover	80		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	1		Notes						
		Precipitation	no								
11/06/2019	11:00:00	Preceding days/night	0	Survey 4	Slow worm		1				1
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	12		Adder						0
		Wind	0		Notes						
		Precipitation	no								
17/06/2019	10:20:00	Preceding days/night	Heavy rain	Survey 5	Slow worm		1				1
		Cloud cover	40		Common lizard						0
		Sun, (full/intermittent/hazy)	Spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	2		Notes						
		Precipitation	no								
21/06/2019	11:00:00	Preceding days/night	0	Survey 6	Slow worm						0
		Cloud cover	50		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes	Frog under mat					
		Precipitation	no								
27/06/2019	10:20:00	Preceding days/night	0	Survey 7	Slow worm						0
		Cloud cover	0		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3		Notes						
		Precipitation	no								

Fig D.7 Survey results 2019: Transect D Survey 1-7

Transect ref:	TD			No. tiles:	11	Transect length:		125	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
01/07/2019	10:45:00	Preceding days/night	0	Survey 8	Slow worm						0
		Cloud cover	25		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	2			Notes					
		Precipitation	no								
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.8 Survey results 2019: Transect D Survey 8-16

Transect ref:	TE			No. tiles:	35	Transect length:		350	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.9 Survey results 2019: Transect E Survey 9-16 (surveys in this area commenced at Survey 9)

Transect ref:	TF			No. tiles:	26	Transect length:		550	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.10 Survey results 2019: Transect F Survey 9-16 (surveys in this area commenced at Survey 9)

Transect ref:	TG			No. tiles:	10	Transect length:		220	Survey period:		May - Sept
Date	Time	Weather/conditions		Survey number	Species	Male (adult)	Female (adult)	Unsexed adult	Juvenile	Other	Total adult
05/07/2019	08:45:00	Preceding days/night	0	Survey 9	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
19/07/2019	08:20:00	Preceding days/night	0	Survey 10	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	16		Adder						0
		Wind	3			Notes					
		Precipitation	no								
08/08/2019	08:55:00	Preceding days/night	0	Survey 11	Slow worm						0
		Cloud cover	90		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
21/08/2019	09:00:00	Preceding days/night	0	Survey 12	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	17		Adder						0
		Wind	0			Notes					
		Precipitation	no								
02/09/2019	10:45:00	Preceding days/night	0	Survey 13	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
12/09/2019	10:30:00	Preceding days/night	0	Survey 14	Slow worm						0
		Cloud cover	100		Common lizard						0
		Sun, (full/intermittent/hazy)	intermittent		Grass snake						0
		Temperature	18		Adder						0
		Wind	3			Notes					
		Precipitation	no								
17/09/2019	13:50:00	Preceding days/night	0	Survey 15	Slow worm						0
		Cloud cover	10		Common lizard						0
		Sun, (full/intermittent/hazy)	Strong		Grass snake						0
		Temperature	18		Adder						0
		Wind	0			Notes					
		Precipitation	no								
23/09/2019	09:00:00	Preceding days/night	0	Survey 16	Slow worm						0
		Cloud cover	30		Common lizard						0
		Sun, (full/intermittent/hazy)	Brief spells		Grass snake						0
		Temperature	15		Adder						0
		Wind	5			Notes					
		Precipitation	no								

Fig D.11 Survey results 2019: Transect G Survey 9-16 (surveys in this area commenced at Survey 9)