A12 Chelmsford to A120 widening scheme TR010060

6.3 ENVIRONMENTAL STATEMENT APPENDIX 9.9 REPTILE SURVEY REPORT

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

August 2022

Infrastructure Planning

Planning Act 2008

A12 Chelmsford to A120 widening scheme
Development Consent Order 202[ ]

ENVIRONMENTAL STATEMENT
APPENDIX 9.9 REPTILE SURVEY REPORT

Regulation Reference	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010060
Application Document Reference	TR010060/APP/6.3
Author	A12 Project Team & National Highways

Version	Date	Status of Version
Rev 1	August 2022	DCO Application

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1 Executive Summary

1.1.1 This report is an appendix of the A12 Chelmsford to A120 widening scheme Environmental Statement (ES) (hereon referred to as the 'proposed scheme').

1.1.2 The report presents an evaluation of the presence/likely absence of reptiles based on field surveys undertaken in 2017 and incidental reptile sightings in 2020. It presents the policy and legislative context within which the Environmental Impact Assessment (EIA) process is being carried out. The likely significant effects of the proposed scheme on the local reptile population and appropriate mitigation strategies for reptiles are considered in Chapter 9 of the ES.

1.1.3 Reptiles were surveyed following best practice guidance from Froglife in Advice Sheet 10, Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation (Froglife, 1999).

1.1.4 Reptile species recorded within the study area from desktop records in 2020 and field surveys undertaken in 2017 include common lizard *Zootoca vivipara*, slow worm *Anguis fragilis* and grass snake *Natrix helvetica*.

1.1.5 As agreed with consultees, an update to the field surveys was not required in 2020 as the habitats on site had not significantly changed between the two years. Furthermore, scheme-wide preconstruction surveys are planned to update baseline data. In addition, a precautionary approach to mitigation will be provided along the length of the proposed scheme.

1.1.6 Reptile surveys were conducted for 28 sites located within the footprint of the proposed scheme and adjacent to the proposed borrow pits. Common lizards were recorded at 15 sites, slow worms were recorded at eight sites and grass snakes were recorded at three sites. Reptiles were not detected at ten of the surveyed sites. The survey results indicate that the size of the reptile population varies over the site, with 'low' numbers in some areas and 'good' numbers in other areas (Froglife, 1999).

1.1.7 The desktop study and incidental field records support the 2017 field survey findings of common lizard, slow worm and grass snake being present within and directly adjacent to the proposed scheme and borrow pits.

1.1.8 Although adder *Vipera berus* records are present within 2km of the proposed scheme they are assumed to be absent from the Provisional Order Limits (POL) due to the distance of the records (more than 1km from the site) and the lack of suitable habitat available.

2 Introduction

2.1 Background

2.1.1 The A12 Chelmsford to A120 widening scheme comprises improvements to the A12 between junction 19 (Boreham) at TL741094, and junction 25 (Marks Tey) at TL917238, approximately 24km, or 15 miles. The proposed scheme involves widening the A12 to three lanes throughout. It includes safety improvements, including closing of existing at grade accesses, and reducing access to cyclists along the dual carriageway by providing an alternative route for walkers, cyclists, and horse riders.

2.1.2 The proposed scheme would require new crossings of watercourses and potential improvements to existing culvert and bridge crossings. There are eight crossings of main rivers, six of which comprise existing crossings and two of which comprise new crossings on proposed offline sections of road. Three of the crossings would require minor realignments at the crossing points.

2.1.3 Land would be required both temporarily and permanently to construct, operate and maintain the proposed scheme. Permanent land-take requirements include the footprint of all the proposed highway infrastructure and associated earthworks, drainage works and access roads, together with environmental mitigation areas such as landscape planting and biodiversity habitat creation.

2.1.4 The proposed scheme is classed as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act (2008), triggering the need to apply for a Development Consent Order (DCO).

2.1.5 The selection criteria in the Infrastructure Planning Environmental Impact Assessment Regulations 2017 have been used to screen the proposed scheme and identified the potential for significant effects. The proposed scheme is therefore required to be accompanied by an Environmental Statement to provide information on likely significant effects.

2.1.6 The Scoping Report (National Highways, 2020a) (informed by an Extended Phase 1 Habitat Survey (National Highways, 2020b) identified several ecological receptors which have the potential to be impacted by construction or operation of the proposed scheme.

2.1.7 Surveys are required to establish an accurate baseline against which the impacts of the proposed scheme could be assessed in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance for Ecological Impact Assessment (CIEEM, 2018) and DMRB LA 108 – Biodiversity (National Highways, 2020).

2.1.8 Scoping opinions received from statutory and non-statutory consultees during this process were also taken into consideration (refer to Chapter 9 of the ES).

2.1.9 The Extended Phase 1 Habitat Survey confirmed the requirement to undertake the following suite of ecological surveys for the proposed scheme:

a. Botanical surveys of potential UK Biodiversity Action Plan (BAP) priority habitats

b. Hedgerow

c. Freshwater macro-invertebrates

d. Freshwater fish

e. Freshwater macrophytes

f. White-clawed crayfish

g. River habitat survey

h. Pond habitat survey

i. Terrestrial invertebrates

j. Birds (breeding and wintering)

k. Barn owls

l. Bats (bat activity, bat roost potential, and roost characterisation surveys)

m. Dormice

n. Water vole

o. Otter

p. Badger

2.1.10 Presence/likely absence reptile surveys were undertaken between August and October 2017 by suitably qualified and experienced ecologists. Optimal habitats within the footprint of the proposed scheme were surveyed for reptiles, in what is hereafter referred to as 'the study area' (Figure 1).

2.1.11 An update to the field survey was not undertaken in 2020 as agreed with stakeholders because habitats throughout the proposed scheme footprint remain largely the same as in 2017. Results of the 2017 surveys are applicable to the entire proposed scheme due to the similarity and continuity of habitats.

2.1.12 It is proposed preconstruction surveys will be undertaken before the commencement of works to confirm populations sizes, and for the purposes of the impact assessment mitigation will be designed on a precautionary basis.

2.2 Purpose of the report

2.2.1 This report is an appendix of the A12 Chelmsford to A120 widening scheme ES. It presents an evaluation of the status of reptiles associated with the proposed scheme, based on a desk-based review of records and field surveys.

2.2.2 The report presents the policy and legislative context within which the EIA is carried out. Likely significant effects on, and mitigation for reptiles, are considered in Chapter 9 of the ES.

2.2.3 This report presents the results of a desktop study in 2020 and reptile presence/likely absence surveys undertaken between August and October 2017 for the proposed scheme.

2.3 Survey objectives

2.3.1 The key objectives of the reptile survey were to:

a. determine the presence or likely absence of reptiles within the study area

b. identify reptile distribution in the study area

c. provide a preliminary evaluation for the reptile population size in the study area

d. inform the assessment of potential impacts on reptile associated with the proposed scheme (as detailed within the ES)

e. provide sufficient field data for the development of appropriate mitigation where necessary (as detailed in the ES)

3 Reptile ecology

3.1.1 There are six species of reptile native to the United Kingdom. This includes three species of lizard: common lizard, slow worm, and sand lizard *Lacerta agilis*; and three species of snake: grass snake, adder, and smooth snake *Coronella austriaca* (Froglife, 1999).

3.1.2 Reptiles tend to favour habitats that are open, sunny and with south-facing margins or slopes, with lots of edge habitat and a heterogeneous vegetation structure. Typical reptile habitats include heathlands, woodlands of varying structure, chalk downland and sand dunes as well as numerous man-made habitats such as disused allotments, suburban wasteland, and road/railway embankments (Froglife,1999). Reptiles hibernate in winter when food is scarce.

3.1.3 Common lizard, slow worm, grass snake and adder have a wide distribution and occur in a variety of habitats. The two rarest species, sand lizard and smooth snake, have a restricted distribution with naturally occurring populations found in the heathlands of Dorset, Hampshire, and Surrey. Sand lizards inhabit the Merseyside dunes systems. Reintroductions have extended the ranges of both species, but neither is known to occur in Essex.

Common lizard

3.1.4 The common lizard grows up to 15cm long and is usually a shade of brown with spots or stripes, although they can vary in colour. They prefer open, sunny glades and are usually found in dry, exposed areas close to dense cover which they retreat to if disturbed. They predominately feed on spiders and insects (ARC Trust, 2017).

Slow worm

3.1.5 Slow worms can reach lengths up to 40cm. They have a shiny appearance where males are grey/brown in colouration and females are brown with dark dorsal sides. Slow worms rarely bask in the open and instead are usually found under cover such as logs or in compost heaps. Slow worms predominately feed on slow moving prey such as slugs (ARC Trust, 2017).

Grass snake

3.1.6 The grass snake is the longest British reptile, capable of reaching over 1m in length. They are grey/green in colour with a distinctive yellow and black collar around the neck and black bars down the side of the body. Grass snakes favour habitats near water as they primarily feed on fish and amphibians (ARC Trust, 2017).

Adder

3.1.7 Adders are the only native venomous snake in the United Kingdom and can reach lengths of up to 60cm long. Adder colouration can be variable amongst individuals and populations, with shades of green, grey, brown, red, and melanism. The most identifiable features of an adder are a red eye with a vertical slit and a distinctive, continuous dark ‘zig-zag’ stripe along the back, which is most frequently black in males and brown in females. Adders generally

prefer open habitats such as heathland, moorland, commons, sea cliffs, and woodland rides (ARC Trust, 2017).

4 Legislation and policy

4.1 Legislation

4.1.1 The four widely distributed species of native reptile (common lizard, slow worm, grass snake and adder) are protected under the Wildlife and Countryside Act (1981) (as amended) under part of Section 9(1) and all of Section 9(5). They are protected against intentional killing, injury, and trade.

4.1.2 Sand lizard and smooth snake are protected under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017.

4.1.3 It is an offence to intentionally kill, injure or capture a European Protected Species (EPS) of reptile, to possess a reptile or any part of a reptile, or sell or offer for sale without a licence. It is an offence to intentionally or recklessly disturb or destroy any place used by reptiles for shelter. The distribution of these species is highly localised and the habitats where they are found do not occur within the boundaries of the proposed scheme (Essex Biodiversity Partnership, 2011).

4.1.4 Licences can be granted by Natural England, the licensing authority in England, to allow activities that would otherwise be illegal, (in relation to sand lizard and smooth snake) to take place. The activities must be carried out in accordance with the provisions of the licence whereby the favourable conservation status of the species is maintained.

4.1.5 Section 40 of the Natural Environment and Rural Communities Act 2006 (NERC) places a duty on all public bodies to have regard to the conservation of biodiversity in England, when carrying out their normal functions (the biodiversity duty).

4.2 National Networks National Policy Statement

4.2.1 The National Networks National Policy Statement (NNNPS) sets out the Government's policies to deliver the development of NSIP on the national road and rail networks in England. The Secretary of State uses the NNNPS as the primary basis for making decisions on DCO applications.

4.2.2 Paragraph 5.22 of the NNNPS states that the applicant's assessment should describe any likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance; protected species; habitats (including irreplaceable habitats such as ancient woodland and veteran trees); and other species identified as being of principal importance for the conservation of biodiversity. The surveys described in this report will inform the assessment of significant effects within the ES.

4.2.3 In addition to the national policy set out in the NNNPS, the proposed scheme has also had regard to relevant legislation and local plans and policy.

4.3 Priority species

4.3.1 The NERC places a responsibility on local authorities and government departments to consider the purposes of conserving biodiversity in a manner consistent with their normal duties, such as policy and decision-making. This Act ties together wildlife legislation and planning policies.

4.3.2 The UK BAP was the UK's response to the Global Convention on Biological Diversity (CBD) in 1992. It lists priority species and habitats that are identified as being the most threatened and require conservation action (JNCC, 2012. In 2012, the UK Post-2010 Biodiversity Framework (2012) succeeded the UK BAP and is the UK Government's response to a new strategic plan of the CBD which was published in 2010.

4.3.3 Much of the work previously carried out under the UK BAP is now focussed at a county level. The UK BAP list of priority species and habitats remains important and has been used to draw up the Section 41 statutory list (see section 4.3.5).

4.3.4 Local BAPs (LBAPs) integrate the conservation measures provided in the UK BAP to enhance biodiversity at the local and regional level.

4.3.5 Section 41 of the NERC and the UK BAP include all six species of reptile native to the UK. Only the widespread species of reptile occur in Essex and are not listed on the Essex LBAP.

5 Methodology

5.1 Desk study

5.1.1 A desk study was undertaken to obtain information pertaining to reptiles in the study area and surrounding landscape.

5.1.2 The extent of the data search included the length of the proposed scheme and an additional 2km buffer. This search area also included potential borrow pits.

5.1.3 The following organisations were contacted to provide desk study records:

a. Essex Wildlife Trust Record Centre (EWTRC) (2020)

b. Essex Field Club (EFC) (2020)

Limitations

5.1.4 Although the data provided by the consultees is the most complete set of species data available, the absence of records should not be taken as an indication of absence of a species.

5.2 Field study

5.2.1 Reptile surveys were conducted between August and October 2017. Surveys were carried out in accordance with current best practice guidance (Froglife, 1999).

5.2.2 As agreed with consultees, updated field surveys were not required in 2020 as the habitats on site have not significantly changed between the two years. There are plans to undertake scheme wide preconstruction surveys to update baseline data prior to construction. In addition, a precautionary approach to mitigation will be provided along the length of the proposed scheme.

5.2.3 Areas of optimal reptile habitat were identified from the results of the Extended Phase 1 Habitat Survey undertaken in 2017 (reported in Jacobs (2016)) and interpretation of aerial photographs. Optimal habitats within the footprint of the proposed scheme were surveyed for reptiles (see Figure 1).

5.2.4 The optimum period for surveying reptiles is during the months of April, May, and September when the weather is warm and dry with little to no wind or rain. Optimal temperature ranges are generally considered to be between 9°C and 18°C, but this varies depending on the weather. Temperatures at the higher end of the range may be more favourable on cloudy days, temperatures at the lower end of the range will be more favourable on bright sunny days (Froglife, 1999).

5.2.5 Artificial Refugia (AR) made from pre-cut roofing felt (0.5m x 0.5m) were placed in areas of habitat suitable for reptiles, approximately 10m apart. Artificial Refugia provide shelter and basking opportunities for reptiles, as they heat up more quickly than the surrounding habitat, and reptiles can use them to help regulate their body temperature.

5.2.6 A total of 784 ARs were placed across 28 survey sites during August and September 2017. A map showing the locations of ARs around the site is provided in Figure 1.

5.2.7 Artificial Refugia were left to 'bed-in' for a minimum of one week prior to commencing the surveys. After the initial 'bed-in' period, ARs were checked seven times in September, but not on consecutive days. Surveys undertaken at survey Sites 7, 8, 17, 18, 21, 23, 24 and 28 were carried out in October.

5.2.8 Natural basking spots and refugia (eg. log piles, drain covers and discarded car tyres) identified within the survey area were checked for reptile presence or signs of recent activity such as sloughs (shed reptile skin). Any reptiles seen on or under ARs were recorded (species, sex, age class or sloughed skins), along with any reptiles or other notable species observed in the surrounding habitat.

5.2.9 The approximate area of each survey site has been calculated using aerial photographs overlaid with a shape file of the refugia locations. A GIS tool was used to map the area of suitable habitat within which each group of refugia was situated, in order to demonstrate refugia had been placed at the minimum density required for evaluation of the data (10 per hectare).

5.2.10 Peak counts of adults for each species of reptile were calculated for each survey site. This data was compared to values in Froglife (1999) to determine if populations are 'low', 'good' or 'exceptional'.

Limitations

5.2.11 Land access was not permitted to all areas of interest for reptiles within the boundaries of the proposed scheme. The habitats in these areas were similar to those surveyed elsewhere within the site and will likely support similar assemblages and numbers of reptiles to those recorded.

5.2.12 Due to the commencement of surveys late in the season, ARs were only left to bed in for one week (as opposed to two recommended in best practice guidance). As reptiles were encountered during the first checks in many parts of the site this is not considered a significant constraint to the quality of survey data obtained.

5.2.13 Surveys at Sites 7, 8, 17, 18, 21, 23, 24 and 28 continued into October in order to achieve the minimum required number of survey visits. The weather conditions were suitable for reptiles at the time of the surveys and therefore this does not represent a significant constraint to the data collected.

5.2.14 Limitations during the field surveys included surveying during sub-optimal weather conditions for reptiles for a small proportion of the surveys (Annex C). This is not considered a significant constraint as most surveys were undertaken during optimal conditions, and therefore the population sizes recorded across the duration of the surveys are considered to be accurate.

5.2.15 The findings of this report represent the professional opinion of qualified ecologists and do not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this document.

5.2.16 The survey data reflects the site at the time of survey. Species can move in and out of an area following a survey, and habitats are subject to change.

5.2.17 This report should be read in full and excerpts may not be representative of the findings.

5.2.18 This report has been prepared exclusively for Jacobs' client and no liability is accepted for any use or reliance on the report by third parties

6 Results

6.1 Desk study

6.1.1 Data from EWTRC and EFC returned 115 records of adder, 217 records of common lizard, 91 records of slow worm and 108 records of grass snake within 2km of the proposed scheme (Annex A). None of the adder records are located within the boundary of the proposed scheme.

6.2 Field study

6.2.1 The Extended Phase 1 Habitat survey (National Highways, 2020b) recorded a range of habitats potentially suitable for three of the four common species of reptile. A description of each survey site is provided in Annex E.

6.2.2 The habitats identified as having potential to support reptile populations included rough grassland and areas with interfaces of tall and short vegetation, such as dense scrub or tall ruderal vegetation around field margins. Multiple ponds and wet ditches throughout the survey area provide suitable foraging habitat for grass snakes.

6.2.3 Three species of reptile were recorded across the survey area by Jacobs' ecologists during field surveys. These were common lizard, slow worm, and grass snake.

6.2.4 A peak count of thirteen adult common lizards were recorded at survey Site 7. Eight adult slow worms were recorded at survey Site 12 and one adult grass snake was recorded at survey Sites 9 and 18. A summary of the survey results are provided in Table 6.1, with full results provided in Annex D.

6.2.5 All three species of reptile were recorded at survey Site 18, located near Boreham. Two species of reptile were recorded at survey Sites 7 (Feering), 8 (Marks Tey), 11 (Rivenhall End), 13 (Whetmead Local Nature Reserve), 17 (Hatfield Peverel), and 19 (Witham). A single species of reptile was recorded at Sites 5 (Kelvedon), 6 (Easthorpe Green), 9 (Kelvedon), 12 (Witham), 14 (Junction 21), 15 (Witham), 16 (Junction 21), 20 (Kelvedon), 21 (Feering) and 22 (Hatfield Peverel) and 25 (Kelvedon).

Table 6.1 Field survey results

Survey Site no.	Area (ha)	Count of refugia	Reptile species	Adult count (max. count on any one visit)	Juvenile count (max. count on any one visit)	Population size
1	0.72	40	None	0	0	-
2	0.7	20	None	0	0	-
3	Combined with site 27 due to continuity of habitats.		None	0	0	-

Survey Site no.	Area (ha)	Count of refugia	Reptile species	Adult count (max. count on any one visit)	Juvenile count (max. count on any one visit)	Population size
4	2.56	64	None	0	0	-
5	0.4	28	Common lizard	9	7	Good
6	1.72	20	Common lizard	1	5	Low
7	0.46	19	Common lizard	13	55	Good
			Slow worm	1	3	Low
8	0.22	20	Common lizard	9	8	Good
			Slow worm	3	1	Low
9	1.21	63	Grass snake	1	0	Low
10	0.15	15	None	0	0	-
11	0.22	20	Common lizard	4	8	Low
			Slow worm	2	2	Low
12	0.05	10	Slow worm	8	6	Good
13	0.21	30	Common lizard	9	11	Good
			Slow worm	6	3	Good
14	0.45	20	Common lizard	8	36	Good
15	2.4	54	Common lizard	2	1	Low
16	0.44	25	Common lizard	6	12	Good
17	0.14	21	Common lizard	3	2	Low
			Slow worm	2	0	Low
18	0.14	15	Common lizard	6	1	Good
			Slow worm	2	0	Low
			Grass snake	1	0	Low
19	0.75	40	Common lizard	7	6	Good
			Slow worm	6	9	Good

Survey Site no.	Area (ha)	Count of refugia	Reptile species	Adult count (max. count on any one visit)	Juvenile count (max. count on any one visit)	Population size
20	0.04	10	Common lizard	1	3	Low
21	0.15	19	Common lizard	4	5	Low
22	0.94	40	Grass snake	0	1	Low
23	0.16	27	None	0	0	-
24	2.13	64	None	0	0	-
25	0.28	20	Common lizard	3	5	Low
26	0.1	10	None	0	0	-
27	0.42	36	None	0	0	-
28	1.65	34	None	0	0	-

6.2.6 A database of incidental records of reptiles has been maintained throughout the duration of field surveys. Eight records of common lizard, one record of slow worm, one record of grass snake and two anecdotal (and unconfirmed) records of adder reported by members of the public were recorded between July 2016 to October 2017.

6.2.7 In 2020 five records of common lizard, one record of slow worm and four records of grass snake were recorded by ecological surveyors. One record of grass snake was returned from a landowner (Annex B).

7 Discussion

7.1 Summary

7.1.1 Habitats with the potential to support populations of common species of reptile (excluding adders) were recorded within the study area. Habitats included rough grassland and areas with interfaces of tall and short vegetation such as dense scrub or tall ruderal vegetation around field margins. Waterbodies within the site boundary are suitable foraging habitat for grass snake.

7.1.2 Three species of common reptile have been recorded in low to good numbers across the proposed scheme. A peak count of 13 common lizard, eight slow worm and one grass snake were recorded at any one survey site.

7.1.3 Three species of reptile were recorded at Site 18 and therefore would therefore constitute a 'key reptile site' in accordance with Froglife (1999).

7.1.4 Of the 28 sites surveyed, common lizard was recorded at 15 sites (5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25), slow worm at 8 sites (7, 8, 11, 12, 13, 17, 18, 19) and grass snake at three sites (9, 18, 22). Reptiles were not detected during any of the survey visits at 10 of the sites (Survey Sites 1, 2, 3, 4, 10, 23, 24, 26, 27 and 28).

7.1.5 Although there are adder records within 2km of the proposed scheme, and there are two anecdotal records from the public, no adders were recorded during field surveys.

7.1.6 Woodland habitat often supports adders and is present within the site boundary; however, the blocks are small and relatively isolated. Other habitats such as heathland and moorland are absent from the proposed scheme, which often support adder. It is therefore assumed that adders are absent from the footprint of the proposed scheme.

7.1.7 In accordance with current best practice guidance, the survey results indicate that 'low' to 'good' populations of common lizard and slow worm, and 'low' populations of grass snake are present within the study area boundary (Froglife, 1999).

7.2 Evaluation

7.2.1 The common lizard is the most widespread reptile species in the UK. Common lizard populations, alongside grass snake, slow worm, and adder populations, are in decline (BTO, 2018) due to the destruction and fragmentation of their habitats (London, Essex and Hertfordshire Amphibian and Reptile Trust, 2020 and Baker *et al.,* 2004).

7.2.2 The reptile population in the study area is considered to be of Local Importance for Biodiversity.

Abbreviations

Abbreviation	Term
AR	Artificial Refugia
CBD	Convention on Biological Diversity
CIEEM	Chartered Institute of Ecology and Environmental Management
DCO	Development Consent Order
EFC	Essex Field Club
EIA	Environmental Impact Assessment
EWTRC	Essex Wildlife Trust Records Centre
LBAPs	Local Biodiversity Action Plans
NERC	Natural Environment and Rural Communities
NNNPS	National Networks National Policy Statement
NSIP	Nationally Significant Infrastructure Project
UK BAP	UK Biodiversity Action Plan

Glossary

Glossary	Definition
Artificial Refugia	Sheets of material such as roofing felt or corrugated tin; reptiles are attracted to these materials as they are generally warmer than the surrounding environment. Standard sizes are 1m x 0.5m or 1m x 1m.

References

a. Amphibian and Reptile Conservation Trust (ARC Trust) (2017). *Species Information: Common Lizard, Slow Worm and Grass Snake.* Available online: [redacted] [Accessed September 2017].

b. Baker, J.R., Suckling, J. & Carey, R. (2004). *Status of the adder Vipera berus and slow-worm Anguis fragilis in England*. English Nature Research Report 546, English Nature, Peterborough, UK.

c. British Trust for Ornithology (BTO) (2018). [redacted] [Accessed December 2020].

d. CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Version 1.1 Chartered Institute of Ecology and Environmental Management, Winchester.

e. Convention on Biological Diversity (CBD) (1992). Available online: [redacted] [Accessed September 2017].

f. Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations (2019). HMSO, London.

g. Essex Biodiversity Partnership (2011). *Essex Biodiversity Action Plan 2010 – 2020*. Available online: [redacted] [Accessed September 2017].

h. Froglife (1999). *Reptile Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation.* Froglife Advice Sheet 10. Froglife, Halesworth.

i. National Highways (2020a). A12 Chelmsford to A120 Widening Scheme Environmental Scoping Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010060/TR010060-000006-A12%20-%20Environmental%20Scoping%20Report.pdf.[Accessed January 2021].

j. National Highways (2020b). A12 Chelmsford to A120 Widening Scheme Extended Phase 1 Habitat Survey Report.

k. Jacobs (2016). *A12 Chelmsford to A120 (Junction 19-25) Extended Phase 1 Habitat Survey Report*.

l. Joint Nature Conservation Committee and Defra (on behalf of the Four Countries' Biodiversity Group). (2012). *UK Post-2010 Biodiversity Framework*. Available online: http://jncc.defra.gov.uk/page-6189. [Accessed September 2017].

m. Joint Nature Conservation Committee (JNCC) (2017). *The UK Biodiversity Action Plan (UK BAP)*. Available online: http://jncc.defra.gov.uk/ukbap. [Accessed September 2017].

n. London Essex and Hertfordshire Amphibian and Reptile Trust. [redacted] [Accessed December 2020].

o. Natural Environment and Rural Communities (NERC) Act 2006. Available online: http://www.legislation.gov.uk/ukpga/2006/16/contents. [Accessed September 2017].

p. Wildlife and Countryside Act (1981) (as amended). HMSO, London.

Annex A. Essex Wildlife Trust and Essex Field Club reptile records

Table A.1 Records of adder within 2km of the proposed scheme

Data source	Date	Grid Reference	Location	No. of records
EFC	2012	TL93780586	Maldon	1
EFC	2016	TL9185004249	Maldon	1
EFC	2011	TL8543812106	Great Totham	1
EFC	2012	TL778044	Danbury	1
EFC	2015	TL784047	Danbury Common: Woodland	1
EFC	2020	TL78290426	Danbury Common	3
EFC	2018	TL7822404304	Danbury Common	1
EFC	2019	TL7817304387	Danbury Common	2
EFC	2014	TL8031014625	Mersea Island	1
EFC	2014	TL93700580	Ramsey Marsh	2
EFC	2015	TL9305405479	Steeple Creek	2
EFC	2017	TL9450006100	St Lawrence	1
EFC	2017	TL9430006000	St Lawrence	1
EFC	2012	TL9311105792	Southminster	1
EFC	2016	TL9436006030	Ramsey Marsh Essex	2
EFC	2012	TL93780586	Ramsey Marsh	1
EFC	2014	TL937058	Ramsey Marsh	2
EFC	2019	TL7818304296	Danbury	1
EFC	2013	TL7817604511	Danbury	2
EFC	2013	TL7809803964	Danbury	2
EFC	2015	TL7800003900	Danbury	2
EFC	2019	TL7839104496	Chelmsford	1
EFC	2012	TL7121606612	Chelmsford	2
EFC	2018	TL7672823775	Braintree	1
EFC	2018	TL7662423702	Braintree	1
EFC	2012	TL7647424326	Braintree	1
EFC	2012	TL7815004150	Backwarden	1
EFC	2019	TL7822604548	Danbury	2
EFC	2020	TL78250441	Danbury	1

Data source	Date	Grid Reference	Location	No. of records
EFC	2013	TL7868804813	Danbury	1
EFC	2013	TL7817604511	Danbury	1
EFC	2013	TL7809803964	Danbury	2
EFC	2012	TL8031014625	Danbury	1
EFC	2013	TL7868804813	Danbury	6
EFC	2019	TL7838504081	Danbury	1
EFC	2019	TL7828704264	Danbury	1
EFC	2020	TL78280442	Danbury	1
EFC	2019	TL7826704391	Danbury	2
EFC	2012	TL93780586	Maldon	1
EFC	2016	TL9185004249	Maldon	1
EFC	2011	TL8543812106	Great Totham	1
EFC	2012	TL778044	Danbury	1
EFC	2015	TL784047	Danbury Common: Woodland	1
EFC	2020	TL78290426	Danbury Common	3
EFC	2018	TL7822404304	Danbury Common	1
EFC	2019	TL7817304387	Danbury Common	2
EFC	2014	TL8031014625	Mersea Island	1
EFC	2014	TL93700580	Ramsey Marsh	2
EFC	2015	TL9305405479	Steeple Creek (grassland)	2
EFC	2017	TL9450006100	St Lawrence	1
EFC	2017	TL9430006000	St Lawrence	1
EFC	2012	TL9311105792	Southminster	1
EFC	2016	TL9436006030	Ramsey Marsh Essex	2
EFC	2012	TL93780586	Ramsey Marsh	1
EFC	2014	TL937058	Ramsey Marsh	2
EFC	2019	TL7818304296	Danbury	1
EFC	2013	TL7817604511	Danbury	2
EFC	2013	TL7809803964	Danbury	2
EFC	2015	TL7800003900	Danbury	2
EFC	2019	TL7839104496	Chelmsford	1
EFC	2012	TL7121606612	Chelmsford	2

Data source	Date	Grid Reference	Location	No. of records
EFC	2018	TL7672823775	Braintree	1
EFC	2018	TL7662423702	Braintree	1
EFC	2012	TL7647424326	Braintree	1
EFC	2012	TL7815004150	Backwarden	1
EFC	2019	TL7822604548	Danbury	2
EFC	2020	TL78250441	Danbury	1
EFC	2013	TL7868804813	Danbury	1
EFC	2013	TL7817604511	Danbury	1
EFC	2013	TL7809803964	Danbury	2
EFC	2012	TL8031014625	Danbury	1
EFC	2013	TL7868804813	Danbury	6
EFC	2019	TL7838504081	Danbury	1
EFC	2019	TL7828704264	Danbury	1
EFC	2020	TL78280442	Danbury	1
EFC	2019	TL7826704391	Danbury	2
EWTRC	2011	TL83731205	Wickham Bishops, St Barts churchyard	1

Table A.2 Records of common lizard within 2km of the proposed scheme

Data source	Date	Grid reference	Location	Number of records
EFC	2016	TL841059	Maldon	1
EFC	2012	TL8416406145	Maldon	1
EFC	2012	TL8485307024	Maldon	1
EFC	2018	TL8522104631	Maldon	1
EFC	2017	TL93770583	Maldon	1
EFC	2012	TL8485307024	Maldon	1
EFC	2014	TL8386207029	Maldon Beeleigh	1
EFC	2018	TL7417	Mann Wood, Great Leighs	1
EFC	2020	TL70070637	Marconi Ponds Nature Reserve	1
EFC	2020	TL84031710	Rivenhall	1
EFC	2012	TL7937311908	Hatfield Peverel	1

Data source	Date	Grid reference	Location	Number of records
EFC	2019	TL8776508642	Heybridge Basin	1
EFC	2018	TL8604807491	Heybridge	1
EFC	2018	TL871070	Heybridge Timberyard	1
EFC	2017	TL8623719586	Kelvedon	16
EFC	2015	TL77992040	Land East of Mill Lane, Cressing	7
EFC	2012	TL7937311908	Hatfield Peverel	1
EFC	2020	TL84301734	Rivenhall	1
EFC	2012	TL82391705	Rivenhall, car park south of Tarecroft Wood	7
EFC	2017	TL862195	Watering Farm	21
EFC	2018	TL9673427802	West Bergholt Site A, Colchester	1
EFC	2018	TL9694227631	West Bergholt Site B, Colchester	1
EFC	2019	TL7178415965	Wilderness Foundation UK	1
EFC	2018	TL8306116224	Witham	1
EFC	2012	TL8763708569	Witham	1
EFC	2012	TL8763708569	Witham	1
EFC	2018	TL927081	Rolls Farm	1
EFC	2014	TL949061	St Lawrence: sea wall	1
EFC	2012	TL94800620	St. Lawrence	1
EFC	2014	TL94920619	St. Lawrence	1
EFC	2013	TL94960619	St. Lawrence	2
EFC	2012	TL95000610	St. Lawrence	1
EFC	2012	TL95100610	St. Lawrence	2
EFC	2013	TL94960619	Stone Sailing Club	1
EFC	2012	TL950061	Stone Sailing Club, St Lawrence Bay	1
EFC	2012	TL948062	The Stone, St Lawrence Bay	1
EFC	2012	TL951061	The Stone, St Lawrence Bay	1
EFC	2020	TL83841689	Braintree	1
EFC	2020	TL83851691	Braintree	2

Data source	Date	Grid reference	Location	Number of records
EFC	2020	TL83861694	Braintree	1
EFC	2020	TL83861700	Braintree	3
EFC	2020	TL83891701	Braintree	7
EFC	2020	TL839169	Braintree	4
EFC	2020	TL839170	Braintree	3
EFC	2020	TL840170	Braintree	3
EFC	2020	TL840171	Braintree	8
EFC	2020	TL841171	Braintree	1
EFC	2020	TL84161716	Braintree	1
EFC	2020	TL84211723	Braintree	1
EFC	2020	TL83831688	Braintree	5
EFC	2020	TL838169	Braintree	3
EFC	2014	TL756114	Boreham Pits: meadow	1
EFC	2012	TL7647424326	Braintree	1
EFC	2020	TL83701675	Braintree	2
EFC	2020	TL837168	Braintree	9
EFC	2020	TL83791684	Braintree	3
EFC	2020	TL838168	Braintree	3
EFC	2020	TL84211725	Braintree	1
EFC	2020	TL842172	Braintree	6
EFC	2018	TL9468224960	Colchester Zoo, Stanway	1
EFC	2018	TL7791103686	Danbury	1
EFC	2020	TL78250441	Danbury	1
EFC	2020	TL78290426	Danbury Common	1
EFC	2019	TL8727019641	Feering	1
EFC	2014	TL91821507	Former Park Lane Kennel, Tolleshunt Knights	1
EFC	2020	TL842173	Braintree	7
EFC	2020	TL84241729	Braintree	5
EFC	2020	TL843173	Braintree	6
EFC	2020	TL843174	Braintree	5
EFC	2020	TL844174	Braintree	3
EFC	2020	TL84531763	Braintree	1

Data source	Date	Grid reference	Location	Number of records
EFC	2020	TL84541767	Braintree	1
EFC	2014	TL7313421727	Braintree, Great Notley Country Park	2
EFC	2014	TL75601140	Chelmsford	1
EFC	2012	TL7118607288	Chelmsford	1
EFC	2016	TL841059	Maldon	1
EFC	2012	TL8416406145	Maldon	1
EFC	2012	TL8485307024	Maldon	1
EFC	2018	TL8522104631	Maldon	1
EFC	2017	TL93770583	Maldon	1
EFC	2012	TL8485307024	Maldon (pinpoint)	1
EFC	2014	TL8386207029	Maldon Beeleigh	1
EFC	2018	TL7417	Mann Wood, Great Leighs	1
EFC	2020	TL70070637	Marconi Ponds Nature Reserve	1
EFC	2020	TL84031710	Rivenhall	1
EFC	2012	TL7937311908	Hatfield Pevril	1
EFC	2019	TL8776508642	Heybridge Basin	1
EFC	2018	TL8604807491	Heybridge Cm9 4uj	1
EFC	2018	TL871070	Heybridge Timberyard	1
EFC	2017	TL8623719586	Kelvedon	16
EFC	2015	TL77992040	Land East of Mill Lane, Cressing	7
EFC	2012	TL7937311908	Hatfield Peverel	1
EFC	2020	TL84301734	Rivenhall	1
EFC	2012	TL82391705	Rivenhall, car park south of Tarecroft Wood	7
EFC	2017	TL862195	Watering Farm	21
EFC	2018	TL9673427802	West Bergholt Site A, Colchester	1
EFC	2018	TL9694227631	West Bergholt Site B, Colchester	1
EFC	2019	TL7178415965	Wilderness Foundation UK	1
EFC	2018	TL8306116224	Witham	1

Data source	Date	Grid reference	Location	Number of records
EFC	2012	TL8763708569	Witham	1
EFC	2012	TL8763708569	Witham (pinpoint)	1
EFC	2018	TL927081	Rolls Farm	1
EFC	2014	TL949061	St Lawrence: sea wall	1
EFC	2012	TL94800620	St. Lawrence	1
EFC	2014	TL94920619	St. Lawrence	1
EFC	2013	TL94960619	St. Lawrence	2
EFC	2012	TL95000610	St. Lawrence	1
EFC	2012	TL95100610	St. Lawrence	2
EFC	2013	TL94960619	Stone Sailing Club	1
EFC	2012	TL950061	Stone Sailing Club, St Lawrence Bay	1
EFC	2012	TL948062	The Stone, St Lawrence Bay	1
EFC	2012	TL951061	The Stone, St Lawrence Bay	1
EFC	2020	TL83841689	Braintree	1
EFC	2020	TL83851691	Braintree	2
EFC	2020	TL83861694	Braintree	1
EFC	2020	TL83861700	Braintree	3
EFC	2020	TL83891701	Braintree	7
EFC	2020	TL839169	Braintree	4
EFC	2020	TL839170	Braintree	3
EFC	2020	TL840170	Braintree	3
EFC	2020	TL840171	Braintree	8
EFC	2020	TL841171	Braintree	1
EFC	2020	TL84161716	Braintree	1
EFC	2020	TL84211723	Braintree	1
EFC	2020	TL83831688	Braintree	5
EFC	2020	TL838169	Braintree	3
EFC	2014	TL756114	Boreham Pits: meadow	1
EFC	2012	TL7647424326	Braintree	1
EFC	2020	TL83701675	Braintree	2
EFC	2020	TL837168	Braintree	9
EFC	2020	TL83791684	Braintree	3

Data source	Date	Grid reference	Location	Number of records
EFC	2020	TL838168	Braintree	3
EFC	2020	TL84211725	Braintree	1
EFC	2020	TL842172	Braintree	6
EFC	2018	TL9468224960	Colchester Zoo, Stanway	1
EFC	2018	TL7791103686	Danbury	1
EFC	2020	TL78250441	Danbury	1
EFC	2020	TL78290426	Danbury Common	1
EFC	2019	TL8727019641	Feering	1
EFC	2014	TL91821507	Former Park Lane Kennel, Tolleshunt Knights	1
EFC	2020	TL842173	Braintree	7
EFC	2020	TL84241729	Braintree	5
EFC	2020	TL843173	Braintree	6
EFC	2020	TL843174	Braintree	5
EFC	2020	TL844174	Braintree	3
EFC	2020	TL84531763	Braintree	1
EFC	2020	TL84541767	Braintree	1
EFC	2014	TL7313421727	Braintree, Great Notley Country Park	2
EFC	2014	TL75601140	Chelmsford	1
EFC	2012	TL7118607288	Chelmsford	1
EWTRC	2011	TL821141	Witham, Kings Chase	1
EWTRC	2011	TL821141	Witham, Kings Chase	1
EWTRC	2014	TL756114	Boreham Road Gravel Pits	2
EWTRC	2017	TL916240	Marks Tey station	15
EWTRC	2017	TL945248	Stane Park	3
EWTRC	2018	TL7875811835	Hatfield Peverel	2

Table A.3 Records of grass snake within 2km of the proposed scheme

Data source	Date	Grid reference	Location	Number of records
EFC	2014	TL897190	Messing CO5 9TU (garden)	1
EFC	2018	TL8176225700	Nuntys Lane, Pattiswick	1
EFC	2017	TL7375425137	Panfield	1
EFC	2012	TL827243	Pattiswick	1
EFC	2016	TL95402154	Ram Plantation, Colchester	7
EFC	2016	TL9529121677	Ram Plantation, Colchester Zoo	7
EFC	2016	TL9540321544	Ram Plantation, Colchester Zoo	7
EFC	2014	TL94200590	Ramsey Marsh	1
EFC	2017	TL9158015100	Maldon CM9 8HA	1
EFC	2014	TL8574907910	Maldon	1
EFC	2015	TL8496008215	Maldon	1
EFC	2018	TL871070	Heybridge Timberyard	1
EFC	2017	TL8466508421	Heybridge	1
EFC	2017	TL8623719586	Kelvedon	5
EFC	2014	TL942059	Ramsey Marsh	1
EFC	2020	TL82811782	Rivenhall	1
EFC	2012	TL9552110446	Tollesbury	2
EFC	2017	TL862195	Watering Farm	6
EFC	2012	TL946279	West Bergholt: Hillhouse Wood WT	1
EFC	2012	TL8763708569	Witham	1
EFC	2015	TL7639803797	Sandon	1
EFC	2020	TL82821782	Rivenhall	4
EFC	2019	TL82831780	Rivenhall	3
EFC	2020	TL82831783	Rivenhall	1
EFC	2019	TL82821779	Rivenhall Churchyard	5
EFC	2012	TL82391705	Rivenhall, car park south of Tarecroft Wood	5
EFC	2012	TL8763708569	Witham	1
EFC	2012	TL7118607288	Chelmsford	1
EFC	2019	TL7178615973	Chelmsford	1

Data source	Date	Grid reference	Location	Number of records
EFC	2011	TL7394308129	Chelmsford	1
EFC	2011	TL7401807903	Chelmsford	1
EFC	2018	TL7767209051	Chelmsford	1
EFC	2020	TL96152205	Colchester	1
EFC	2012	TL7090307876	Chelmsford	1
EFC	2018	TL8240626423	Burtons Green	1
EFC	2012	TL7815004150	Backwarden	1
EFC	2012	TL7073511930	Blasford Hill	1
EFC	2020	TL76092416	Braintree	1
EFC	2019	TL7702224179	Braintree	1
EFC	2019	TL7770627319	Braintree	1
EFC	2019	TL7771427328	Braintree	1
EFC	2015	TL95402154	Colchester woodland area	1
EFC	2012	TL7796805454	Danbury	1
EFC	2012	TL7773405895	Dansbury Common	1
EFC	2012	TL839252	Earls Colne, adjacent to pond	1
EFC	2012	TL951254	Eight Ash Green (garden)	1
EFC	2012	TL7937311908	Hatfield Peverel	1
EFC	2012	TL7937311908	Hatfield Peverel	1
EFC	2012	TL778045	Danbury	1
EFC	2019	TL7827204185	Danbury Common	1
EFC	2013	TL7809803964	Danbury	1
EFC	2019	TL7828704264	Danbury	1
EFC	2013	TL7840104623	Danbury	2
EFC	2014	TL7851805184	Danbury	2
EFC	2012	TL8031014625	Danbury	1
EFC	2013	TL7809803964	Danbury	1
EFC	2013	TL7840104623	Danbury	2
EFC	2012	TL7773405895	Danbury common	1
EFC	2019	TL7817304387	Danbury Common	1
EWTRC	2011	TL821141	Witham, Kings Chase	1
EWTRC	2011	TL821141	Witham, Kings Chase	2

Data source	Date	Grid reference	Location	Number of records
EWTRC	2014	TL92862378	Copford	1
EWTRC	2017	TL93462619	Eight Ash Green	1
EWTRC	2018	TL914233	Mark's Tey	1

Table A.4 Records of slow worm within 2km of the proposed scheme

Data source	Date	Grid reference	Location	Number of records
EFC	2016	TL841059	Maldon	1
EFC	2012	TL8416406145	Maldon	1
EFC	2016	TL8479306770	Maldon	1
EFC	2012	TL8485307024	Maldon	1
EFC	2012	TL8500906119	Maldon	1
EFC	2015	TL8524706395	Maldon	2
EFC	2015	TL77992040	Land East of Mill Lane, Cressing	1
EFC	2012	TL7937311908	Hatfield Peverel	1
EFC	2012	TL7937311908	Hatfield Pevril	1
EFC	2020	TL84810810	Heybridge	1
EFC	2018	TL871070	Heybridge Timberyard	1
EFC	2020	TL85770615	Maldon	1
EFC	2012	TL8485307024	Maldon (pinpoint)	1
EFC	2020	TL89931626	Tiptree	1
EFC	2012	TL9552110446	Tollesbury	2
EFC	2012	TL8210214667	Witham	1
EFC	2018	TL8305116224	Witham	3
EFC	2017	TL824131	Witham, Blackwater Rail Trail	1
EFC	2012	TL8210214667	Witham CM8 1XZ	1
EFC	2019	TL7739315381	Terling	1
EFC	2012	TL8500906119	Maldon, CM9 6BH	1
EFC	2020	TL70070637	Marconi Ponds Nature Reserve	1
EFC	2020	TL82731724	Rivenhall	1
EFC	2020	TL82741726	Rivenhall	1
EFC	2018	TL8301716169	Rivenhall	2

Data source	Date	Grid reference	Location	Number of records
EFC	2019	TL7369808829	Springfield	1
EFC	2012	TL951254	Eight Ash Green (garden)	1
EFC	2020	TL838168	Braintree	2
EFC	2020	TL838169	Braintree	2
EFC	2020	TL840170	Braintree	1
EFC	2012	TL7607122047	Braintree, CM7 1DZ	1
EFC	2020	TL72330674	Chelmer Village	1
EFC	2020	TL83811686	Braintree	1
EFC	2020	TL837168	Braintree	1
EFC	2012	TL7607122047	Braintree	1
EFC	2015	TL7609522404	Braintree	1
EFC	2017	TL7611122390	Braintree	10
EFC	2019	TL7616022039	Braintree	1
EFC	2019	TL70280824	Chelmsford	1
EFC	2019	TL70310821	Chelmsford	1
EFC	2012	TL7118607288	Chelmsford	1
EFC	2012	TL7773405895	Danbury common	1
EFC	2019	TL7817304387	Danbury Common	2
EFC	2019	TL7827204185	Danbury Common	1
EFC	2020	TL78290426	Danbury Common	1
EFC	2015	TL779046	Danbury Common: The Armoury Barn	2
EFC	2012	TL778046	Danbury, cm3 4jn	1
EFC	2012	TL7773405895	Dansbury Common	1
EFC	2012	TL7837705113	Danbury (pinpoint)	1
EFC	2012	TL8031014625	Danbury	1
EFC	2012	TL7837705113	Danbury	1
EFC	2012	TL7153506496	Chelmsford	2
EFC	2012	TL7221408273	Chelmsford	1
EFC	2012	TL7221408273	Chelmsford, CM1 6JJ	1
EFC	2020	TL96162205	Colchester	1
EFC	2019	TL7784904651	Danbury	2
EFC	2012	TL7796805454	Danbury	1
EFC	2019	TL7828704288	Danbury	1

Data source	Date	Grid reference	Location	Number of records
EFC	2014	TL717092	Springfield	1
EFC	2012	TL8115	Elm Hall Cottages	1
EWTRC	2017	TL824131	Blackwater Rail Trail Ma25	1
EWTRC	2017	TL825136	Blackwater Rail Trail Ma25	1
EWTRC	2017	TL916240	Marks Tey station	5
EWTRC	2017	TL945248	Stane Park	1
EWTRC	2017	TL945248	Stane Park	2
EWTRC	2018	TL7875811835	Hatfield Peverel	1

Annex B. Incidental reptile records

Table B.1 Records of common lizard from July 2016 – October 2017 and May 2020 – October 2020

Record no.	Date	Location	Grid reference	Comment	Total
1	13/07/2017	Adjacent to Site 28	TL 81563 12453		1 X A
2	22/08/2017	Howbridge Hall Road	TL 81696 12953		1
3	23/08/2017	Site 18 Paynes lane	TL 74665 09903	Road margin. Basking on tyre.	1 X J
4	08/08/2017	East of Paynes Lane	TL 74947 09994		1 X A
5	15/08/2017	West of Bury Lane	TL 78349 11695	Field margin. Moving through grass.	1 X A
6	15/08/2017	West of Bury Lane	TL 78390 11640	Arable field. Basking on bare ground.	1 X A
7	03/10/2017	North of Latney's	TL 80663 12706	Found after survey when collecting felts.	1 X F
8	25/07/2017	Off Henry Dixon Road	TL 83809 16873	On wooden post besides railway line.	1
9	13/08/2020	Prested Hall	TL 8815 1957		1
10	16/07/2020	West of Hatfield Peverel	TL 7820 1154		Multiple
11	11/08/2020	West of Hatfield Peverel	TL 7820 1154		Multiple
12	02/09/2020	North of Hatfield Peverel	TL 78816 12214	Common lizard basking on telegraph pole	1
13	08/09/2020	West of Hatfield Peverel	TL 7820 1154		Multiple
14	09/09/2020	Between Feering and Marks Tey	TL 89633 21997	Juvenile common lizard	1

Table B.2 Records of slow worm from July 2016 - October 2017 and May 2020 – October 2020

Record no.	Date	Location	Grid reference	Comment	Total
1	08/08/2017	East of Paynes Lane	TL 74947 09994	N/A	1 X A
2	04/06/2021	East of Junction 19	TL 92228 23945	Slow worms in compost bin	

Table B.3 Records of grass snake from July 2016 - October 2017 and May 2020 – October 2020

Record no.	Date	Location	Grid reference	Comment	Total
1	w/c 04/09/2017	Latney's kennel	TL 80732 12630	Employee from Latney's dog kennel saw a juvenile grass snake in a drain around the kennel site.	1 X J
2	2020	North of Little Braxted	TL 83464 15365	Grass snakes seen along ditch	2
3	27/05/20	Between Rivenhall End and Kelvedon	TL 84844 17234	Anecdotal evidence provided by landowner	1
4	29/05/2020	Along River Blackwater	TL 85557 17587	Dead grass snake	1
5	02/06/2020	East of Kelvedon	TL 86788 18774	Grass snake	1
6	18/08/2020	South west of Hatfield Peverel	TL 78455 10972	Grass snake	1

Annex C. Reptile field survey metadata

Table C.1 Metadata for all reptile surveys conducted in 2017

Date	Time	Survey Site no.	Temperature °C	Beaufort scale	Cloud cover %	Rain
05/09/2017	09:17 – 09:45	16	20.5	3 - 4	90	None
06/09/2017	08:50 – 09:20	22	17.1	2	90	None
	09:10 – 09:30	21	17.5	3	90	None
	09:58 – 10:11	14	17.1	2	40	None
	10:15 – 11:30	15	17.8	1	60	None
	11:55 – 12.10	10	18.5	1	60	None
	12:30 – 13:10	18	20.0	3	95	None
	13:46 – 14:15	19	16.8	1	100	None
07/09/2017	08:15 – 08:30	17	14.9	2	5	None
	11:08 – 11:45	11	18.5	2	90	None
	16:11 – 16:31	16	21.1	1	80	None
08/09/2017	07:50 – 08:15	18	16.1	3	100	Light
	08:10 – 08:30	19	15.5	5	100	None
	08:49 – 08:55	10	15.7	3	100	Light
	09:10 – 09:18	14	16.3	2	100	None – light
	09:20 – 09:40	15	16.3	1	100	None – light
	10:20 – 10:40	22	17.1	1	100	None – light
11/09/2017	17:05 – 17:35	21	16.2	3	30	None
	17:51 – 18:15	25	16.5	3	60	None
	18:25 – 18:39	17	17.3	3	70	None
	18:50 – 19:10	8	15.3	3	70	None
	18:10 – 18:24	11	16.3	2 – 3	95	None
12/09/2017	08:39 – 08:55	19	11.6	2-3	10	None
	08:40 – 09:10	18	12.4	3	5	None
	09:10 – 09:19	10	14.9	2 – 3	15	None
	09:30 – 09:40	16	15.5	2 – 3	10	None
	09:35 – 09:55	12	15.7	3	10	None
	09:55 – 10:50	13	15.7	3	50	None
	09:42 – 09:50	14	15.5	2	20	None

Date	Time	Survey Site no.	Temperature °C	Beaufort scale	Cloud cover %	Rain
	09:55 – 10:20	15	15.5	2	30	None
	11:20 – 11:55	22	15.0	2	20	None
	11:25 – 11:50	5	16.3	3	50	None
	11:52 – 12:05	20	18.3	3	50	None
	13:45 – 14:00	6	18.1	3	60	None
	14:10 – 14:35	7	18.6	3	90	None
	14:55 – 15:55	9	17.3	3	90	None
	13:30 – 13:40	3	18.2	1	80	None
	13:54 – 14:00	1	18.2	1	90	None
13/09/2017	10:00 – 10:04	2	15.4	6	5	None
	10:06 – 10:13	26	15.4	6	5	None
	10:27 – 10:49	4	19.3	6	10	None
	10:58 – 11.18	11	19.3	6	30	None
	10:30 – 11:00	21	15.3	5	30	None
	11:08 – 11:32	25	16.9	5	80	None
	11:46 – 12.05	23	16.3	5	70	None
	11:59 – 13:10	24	18.3	6	80	None
	12:25 – 12:55	8	18	5	80	None
	13:05 – 13:25	17	18.1	5	90	None
14/09/2017	07:50 – 08:04	1	11.2	1	95	None
	07:45 – 08:20	6	12	2	90	None
	08:34 – 08:55	18	11.8	2	90	None
	09:10 – 09:20	12	12.8	2	100	Light
	08:59 – 09:20	19	11.9	1	100	None
	09:45 – 09:56	10	11.9	1 – 2	100	None
	10:06 – 10:20	16	13.3	1	100	None
	10:25 – 10:44	14	13.3	1 – 2	100	None
	10:45 – 11:10	15	13.3	1 – 2	100	None
	11:40 – 12:00	22	15.3	1	90	None
15/09/2017	07:55 – 08:15	23	10.3	2	5	None
	08:25 – 08:35	17	10.8	2	5	None
	08:40 – 08:50	11	12.9	1	0	None
	09:05 – 09:30	21	11.3	2	5	None
	09:12 – 09:53	24	12.4	1	20	None

Date	Time	Survey Site no.	Temperature °C	Beaufort scale	Cloud cover %	Rain
18/09/2017	16:25 – 16:45	23	16.5	1	100	Light
	16:30 – 17:15	24	13.7	1	100	Light
	17:30 – 17:35	10	13.7	1	100	Light
19/09/2017	07:40 – 07:55	1	11.9	1	100	None
	08:06 – 08:10	2	10.8	1	100	None
	08:11 – 08:19	26	10.8	1	100	None
	08:20 – 08:40	18	13.1	1	95	None
	08:33 – 08:40	3	12.9	1	100	None
	08:58 – 09:25	4	15.5	1	95	None
	09:40 – 09:55	11	14.9	1	95	None
	10:30 – 10:55	19	12.9	1	100	None
	11:30 – 11:37	16	13.9	1	100	None
	11:40 – 11:49	14	13.9	1	100	None
	11:50 – 12:15	15	13.9	1	100	None
	12:45 – 13:15	22	19.9	1	95	None
20/09/2017	09:05 – 09:35	23	15.8	1	5	None
	09:40 – 10:25	24	18.1	0	50	None
	09:45 – 09:55	17	16.7	2	50	None
	10:37 – 10:50	10	18.5	1	70	None
	13:10 – 13:35	21	19.0	2	100	None
21/09/2017	08:10 – 08:40	18	14.9	2	60	None
	10:05 – 10:22	11	17.9	1 – 2	90	None
	10:45 – 11:10	19	17.6	1 – 2	90	None
	11:39 – 11:57	16	19.1	1 – 2	90	None
	11:59 – 12:15	14	19.1	1 – 2	90	None
	12:16 – 12:39	15	19.1	1 – 2	90	None
	13:02 – 13:20	22	21.5	1	0	None
22/09/2017	08:40 – 09:05	23	14.0	1	0	None
	08:56 – 09:32	24	13.2	1	0	None
	09:10 – 09:20	17	15.0	1	0	None
	09:30 – 09:50	21	14.8	1	50	None
	09:46 – 10.00	10	14.2	1	0	None
26/09/2017	08:15 – 09:08	24	15.0	0	70	None
	09:30 – 10:00	18	16.2	0	100	None

Date	Time	Survey Site no.	Temperature °C	Beaufort scale	Cloud cover %	Rain
	10:15 – 10:35	23	16.4	0	80	None
	10:55 – 11:15	22	18.0	1	80	None
	11:25 – 11:35	17	18.0	1	90	None
	11:45 – 11:55	16	18.3	2	80	None
	12:00 – 12:10	14	18.3	2	80	None
	12:15 – 12:55	15	18.3	2	70	None
27/09/2017	11:00 – 11:45	19	18.4	1	80	None
	12:00 – 12:40	28	18.3	2	70	None
28/09/2017	08:20 – 09:05	24	17.2	3	70	None
	09:20 – 09:45	23	18.2	2	40	None
	10:15 – 10:50	11	19.0	3	100	None
	10:20 – 10:45	28	17.8	2	100	Light
02/10/2017	15:00 – 15:25	28	16.5	3	100	None
05/10/2017	10:20 – 10:45	28	13.0	3	40	None
09/10/2017	16:05 - *	28	16.7	2	100	None
11/10/2017	10:10 – 10:35	28	16.5	2	85	None
13/10/2017	08:52 – 09:15	28	16.2	1	100	None

Annex D. Raw reptile field survey data

Table D.1 Raw data for Site 1

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	0	0
12/09/2017	0	0	0	0	0	0	0	0	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0
27/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.2 Raw data for Site 2

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
07/09/2017	0	0	0	0	0	0	0	0	0
11/09/2017	0	0	0	0	0	0	0	0	0
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0
25/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.3 Raw data for Site 3

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	0	0
12/09/2017	0	0	0	0	0	0	0	0	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
25/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.4 Raw data for Site 4

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
07/09/2017	0	0	0	0	0	0	0	0	0
11/09/2017	0	0	0	0	0	0	0	0	0
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0
25/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.5 Raw data for Site 5

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	0	0
12/09/2017	0	0	0	0	0	0	0	1	1
14/09/2021	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	1	0
21/09/2017	0	0	0	0	0	0	0	9	4
28/09/2017	0	0	0	0	0	0	0	0	7
Peak count of adults and juveniles	0		0	0		0	9		7

Table D.6 Raw data for Site 6

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	0	0

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
12/09/2017	0	0	0	0	0	0	0	0	1
13/09/2021	0	0	0	0	0	0	0	1	2
19/09/2017	0	0	0	0	0	0	0	1	0
20/09/2017	0	0	0	0	0	0	0	1	5
27/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	1		5

Table D.7 Raw data for Site 7

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	1	1	0	4	2
07/09/2017	0	0	0	0	1	0	0	1	9
12/09/2017	0	0	0	0	0	0	0	5	55
14/09/2021	0	0	0	0	0	0	0	3	14
19/09/2017	0	0	0	0	0	0	0	7	13
21/09/2017	0	0	0	0	0	0	1	12	15
26/09/2017	0	0	0	0	0	3	0	5	11
04/10/2017	0	0	0	1	0	0	1	0	2
Peak count of adults and juveniles	0		0	1		3	13		55

Table D.8 Raw data for Site 8

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	0	0	1
08/09/2017	0	0	0	0	0	0	0	1	0
13/09/2017	0	0	0	0	1	1	5	4	8
15/09/2017	0	0	0	0	0	0	0	0	2
20/09/2017	0	0	0	0	3	0	3	6	7
22/09/2017	0	0	0	0	1	0	0	0	0
03/10/2017	0	0	0	0	0	0	0	0	2
05/10/2017	0	0	0	1	0	0	1		1
Peak count of adults and juveniles	0		0	3		1	9		8

Table D.9 Raw data for Site 9

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	1			0	0	0	0	0	0
12/09/2017	0	0	0	0	0	0	0	0	0
14/09/2017	0	1	0	0	0	0	0	0	0
18/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	0	0
27/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	1		0	0		0	0		0

Table D.10 Raw data for Site 10

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	0	0	0
08/09/2017	0	0	0	0	0	0	0	0	0
12/09/2017	0	0	0	0	0	0	0	0	0
14/09/2017	0	0	0	0	0	0	0	0	0
18/09/2021	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	0	0
22/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.11 Raw data for Site 11

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
07/09/2017	0	0	0	0	1	1	0	4	5
11/09/2017	0	0	0	0	0	0	0	1	2
13/09/2017	0	0	0	0	1	0	0	2	0
15/09/2017	0	0	0	0	0	0	0	0	2
19/09/2017	0	0	0	0	2	1	1	0	2
21/09/2017	0	0	0	1	0	2	0	3	8
28/09/2017	0	0	0	2	0	2	0	4	1

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
Peak count of adults and juveniles	0		0	2		2	4		8

Table D.12 Raw data for Site 12

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	1	7	5	0	0	0
07/09/2017	0	0	0	1	3	0	0	0	0
12/09/2017	0	0	0	0	8	0	0	0	0
14/09/2017	0	0	0	0	1	0	0	0	0
19/09/2017	0	0	0	0	1	0	0	0	0
21/09/2017	0	0	0	0	5	0	0	0	0
27/09/2017	0	0	0	0	0	6	0	0	0
Peak count of adults and juveniles	0		0	8		6	0		0

Table D.13 Raw data for Site 13

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	1	5	0	1	1	11
07/09/2017	0	0	0	0	0	0	3		3
12/09/2017	0	0	0	0	4	0	0	4	3
14/09/2017	0	0	0	0	0	0	0	3	0
19/09/2017	0	0	0	0	1	0	0	1	0
21/09/2017	0	0	0	0	0	0	0	0	0
27/09/2017	0	0	0	0	1	3	0	9	9
Peak count of adults and juveniles	0		0	6		3	9		11

Table D.14 Raw data for Site 14

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	0	1	0
08/09/2017	0	0	0	0	0	0	0	0	4

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
12/09/2017	0	0	0	0	0	0	0	5	0
14/09/2017	0	0	0	0	0	0	0	0	2
19/09/2017	0	0	0	0	0	0	0	4	3
21/09/2017	0	0	0	0	0	0	0	3	36
26/09/2017	0	0	0	0	0	0	0	8	8
Peak count of adults and juveniles	0		0	0		0	8		36

Table D.15 Raw data for Site 15

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	0	1	0
08/09/2017	0	0	0	0	0	0	0	1	0
12/09/2017	0	0	0	0	0	0	0	2	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	1
26/09/2017	0	0	0	0	0	0	0	1	1
Peak count of adults and juveniles	0		0	0		0	2		1

Table D.16 Raw data for Site 16

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	1	5	0
07/09/2017	0	0	0	0	0	0	0	1	12
12/09/2017	0	0	0	0	0	0	0	1	2
19/09/2017	0	0	0	0	0	0	0	1	0
21/09/2017	0	0	0	0	0	0	0	3	7
26/09/2017	0	0	0	0	0	0	0	2	2
Peak count of adults and juveniles	0		0	0		0	6		12

Table D.17 Raw data for Site 17

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	0	1
13/09/2017	0	0	0	1	0	0	0	3	1
14/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	1	0	2
26/09/2017	0	0	0	0	2	0	0	0	1
04/10/2017	0	0	0	0	0	0	0	1	0
Peak count of adults and juveniles	0		0	2		0	3		2

Table D.18 Raw data for Site 18

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	1	1	0	0	0	1
08/09/2017	0	0	0	0	1	0	0	0	0
12/09/2017	0	0	0	1	0	0	0	1	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
26/09/2017	0	1	0	0	1	0	0	6	1
03/10/2017	0	0	0	0	0	0	0	1	0
Peak count of adults and juveniles	1		0	2		0	6		1

Table D.19 Raw data for Site 19

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	9	0	7	2
08/09/2017	0	0	0	0	0	3	0	1	6
12/09/2017	0	0	0	0	3	0	0	2	0
14/09/2017	0	0	0	0	1	1	0	1	0
19/09/2017	0	0	0	0	1	2	0	1	3
21/09/2017	0	0	0	0	6	4	0	3	1
27/09/2017	0	0	0	0	3	2	0	0	1

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
Peak count of adults and juveniles	0		0	6		9	7		6

Table D.20 Raw data for Site 20

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
05/09/2017	0	0	0	0	0	0	0	0	0
07/09/2017	0	0	0	0	0	0	0	1	3
12/09/2017	0	0	0	0	0	0	0	1	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	1
27/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	1		3

Table D.21 Raw data for Site 21

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	0	0	0
08/09/2017	0	0	0	0	0	0	0	0	0
11/09/2017	0	0	0	0	0	0	0	4	2
13/09/2017	0	0	0	0	0	0	1	2	5
15/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	3	5
02/10/2017	0	0	0	0	0	0	1	0	0
Peak count of adults and juveniles	0		0	0		0	4		5

Table D.22 Raw data for Site 22

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	1	0	0	0	0	0	0
08/09/2017	0	0	0	0	0	0	0	0	0

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
12/09/2017	0	0	0	0	0	0	0	0	0
14/09/2017	0	0	0	0	0	0	0	0	0
19/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0
26/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		1	0		0	0		0

Table D.23 Raw data for Site 23

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
18/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	0	0
22/09/2017	0	0	0	0	0	0	0	0	0
26/09/2017	0	0	0	0	0	0	0	0	0
28/09/2017	0	0	0	0	0	0	0	0	0
03/10/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.24 Raw data for Site 24

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
18/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	0	0
22/09/2017	0	0	0	0	0	0	0	0	0
26/09/2017	0	0	0	0	0	0	0	0	0
28/09/2017	0	0	0	0	0	0	0	0	0
03/10/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.25 Raw data for Site 25

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
06/09/2017	0	0	0	0	0	0	2	1	1
08/09/2017	0	0	0	0	0	0	0	0	1
11/09/2017	0	0	0	0	0	0	0	0	0
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
20/09/2017	0	0	0	0	0	0	0	0	0
27/09/2017	0	0	0	0	0	0	0	0	5
Peak count of adults and juveniles	0		0	0		0	3		5

Table D.26 Raw data for Site 26

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
07/09/2017	0	0	0	0	0	0	0	0	0
11/09/2017	0	0	0	0	0	0	0	0	0
13/09/2017	0	0	0	0	0	0	0	0	0
15/09/2017	0	0	0	0	0	0	0	0	0
95/09/2017	0	0	0	0	0	0	0	0	0
21/09/2017	0	0	0	0	0	0	0	0	0
25/09/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.27 Raw data for Site 27

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
21/09/2017	0	0	0	0	0	0	0	0	0
25/09/2017	0	0	0	0	0	0	0	0	0
27/09/2017	0	0	0	0	0	0	0	0	0
29/09/2017	0	0	0	0	0	0	0	0	0
02/10/2017	0	0	0	0	0	0	0	0	0
04/10/2017	0	0	0	0	0	0	0	0	0
09/10/2017	0	0	0	0	0	0	0	0	0

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
Peak count of adults and juveniles	0		0	0		0	0		0

Table D.28 Raw data for Site 28

Date	Grass snake			Slow worm			Common lizard		
	Male	Female	Juvenile	Male	Female	Juvenile	Male	Female	Juvenile
27/09/2017	0	0	0	0	0	0	0	0	0
29/09/2017	0	0	0	0	0	0	0	0	0
02/10/2017	0	0	0	0	0	0	0	0	0
05/10/2017	0	0	0	0	0	0	0	0	0
09/10/2017	0	0	0	0	0	0	0	0	0
11/10/2017	0	0	0	0	0	0	0	0	0
13/10/2017	0	0	0	0	0	0	0	0	0
Peak count of adults and juveniles	0		0	0		0	0		0

Annex E. Site descriptions

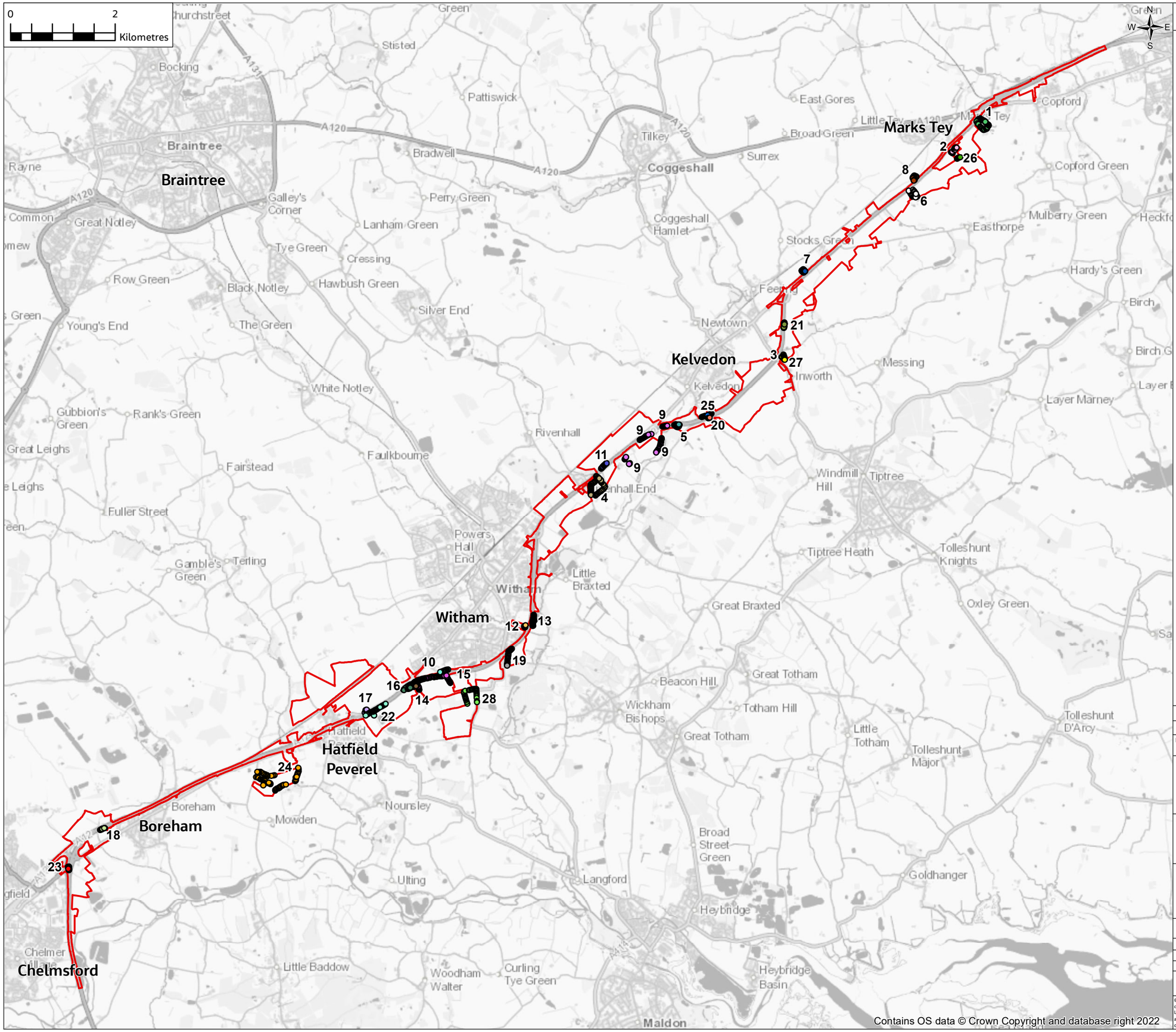
Table E.1 Habitat descriptions for individual sites within the study area

Site	Description
1	An improved grassland field. Habitats surrounding are primarily amenity grassland. Scrub and waterbodies to the south of the site.
2	Site comprises amenity grassland and hardstanding, with an adjacent area of broadleaved woodland.
3	Comprises a narrow broadleaved woodland and scrub margin.
4	Fields comprising amenity grassland with scrub and a young tree margin along the northernmost field. Areas of amenity grassland surround the site.
5	Site comprises broadleaved woodland and a scrub margin along the A12.
6	Site comprises an improved grassland field, with a section of broadleaved trees to the north of the field. Amenity grassland, broadleaved woodland, and waterbodies to the south of the field.
7	Site comprises an improved grassland field located between an arable field and the A12. Hedgerows line the boundaries.
8	Site comprises tall ruderal vegetation surrounding a grassland field.
9	Site comprises broadleaved woodland and a scrub margin along the A12 to the south, with a large arable field and a river to the east, and amenity grassland and hardstanding to the west.
10	Site comprises a grass margin along a minor road to a new housing estate, with a dense tree line between the grass margin and the A12.
11	Grass margin between an arable field and the A12. Tall sward, tussocky. Frequent ruderals and bramble with occasional gorse *Ulex europaeus*.
12	Site comprises a mosaic of short grassland and short perennial vegetation with planted scrub and broadleaved woodland plantation (goat willow *Salix caprea*, hawthorn *Crataegus monogyna* and horse chestnut *Aesculus hippocastanum*) adjacent to the A12 and the Blackwater River. Dry ditch and planted shrub.
13	Semi-improved neutral grassland and broadleaved woodland margin along the A12, with small, scattered shrub areas. Extensive stand of dense common nettle *Urtica dioica* on the Blackwater riverbank with other ruderal species (hemlock *Conium sp*. and teasel *Dipsacus sp.*).

Site	Description
14	Land adjacent to A12 and arable fields, bordered by hedge and scattered trees. Dense thatch and tall sword with frequent rosebay willowherb *Chamerion angustifolium*.
15	Site comprises a grass strip along arable field margin and line of trees**.**
16	Site comprises an island of land within a slip road to the A12. Rabbit grazed with short sword and large patches of ragwort *Jacobaea vulgaris* and bare earth. Earth bunds to the south and east, not grazed. Narrow tree line to northeast.
17	Rank grassland with large patches of creeping cinquefoil *Potentilla reptans* and tall ruderal. Adjacent to an arable field and rank grassland.
18	Road verge adjacent to A12 and arable field. Rank grassland with patches of hawthorn and dog rose *Rosa canina* scrub, tall ruderals, and occasional field maple *Acer campestre* tree.
19	Grass margin along arable field with a scrub / tree lined margin adjacent to a disused railway to the west.
20	Semi-improved neutral grassland section adjacent to the A12. Between Amenity grassland, scrub, and a broadleaved margin along the A12 to the west.
21	Site comprises a grass margin along the A12, with scattered areas of dense scrub (hawthorn, dog rose and bramble *Rubus fruticosus* agg).
22	Grass margin along length of ditch and along a hedge line bordering the grass verge of A12. Formerly a tall tussocky sward up to 15m wide in places but was cut prior to the undertaking of surveys. Fishing ponds adjacent to grass margin.
23	Island at junction 19 slip road. Adjacent to a flowing ditch. Rank grassland, dense patches of hawthorn and dog rose scrub. Area of hard standing covered in moss.
24	Grass margin along arable field. Occasional bramble and overhanging vegetation from the hedge line.
25	Semi-improved neutral grassland margin along the A12. Extensive stands of common cudweed and a large stand of lesser calamint. Dense scrub to the west.
26	Amenity grassland and hardstanding. Strip of young plantation of broadleaved woodland.
27	Semi-improved grassland small field. Dense scrub and scattered trees between the A12 and the field and to the west, with a large pond. Arable field to the east.
28	Site comprises an arable field with hedge margins and tree lines with gaps, with a narrow grass margin.

Figures

APPENDIX 9.9 - Figure 1

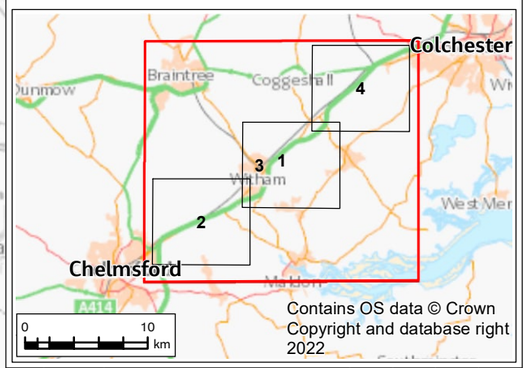


Legend

Provisional Order Limits

Reptile Survey Site (2017)

1	17
2	18
3	19
4	20
5	21
6	22
7	23
8	24
9	25
10	26
11	27
12	28
13	
14	
15	
16	



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P01	31/05/22	For DCO application	ML	LW	NP	SG

Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE SURVEY SITE (2017)
SHEET 1 OF 4

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497	Rev P01

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0713

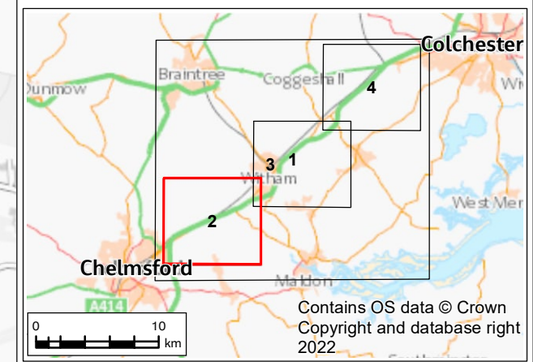
APPENDIX 9.9 - Figure 1

Legend

Provisional Order Limits

Reptile Survey Site (2017)

- 10
- 14
- 15
- 16
- 17
- 18
- 22
- 23
- 24



Rev.	Rev. Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
P01	31/05/22	For DCO application	ML	LW	NP	SG

Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE SURVEY SITE (2017)
SHEET 2 OF 4

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497	Rev P01

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0714

APPENDIX 9.9 - Figure 1

0 2 Kilometres

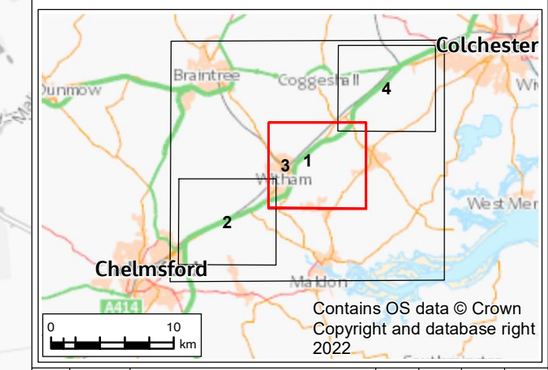
N W E S

Legend

Provisional Order Limits

Reptile Survey Site (2017)

- 3
- 4
- 5
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 19
- 20
- 25
- 27
- 28



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Rev.	Rev. Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE SURVEY SITE (2017)
SHEET 3 OF 4

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497	Rev P01

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0715

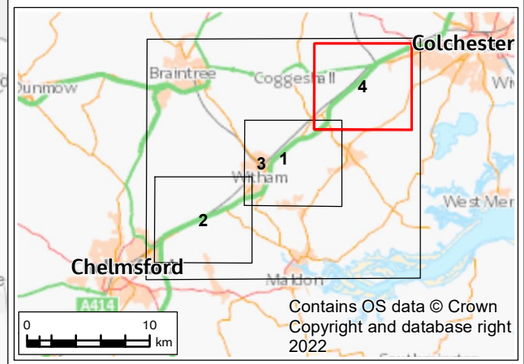
APPENDIX 9.9 - Figure 1

Legend

Provisional Order Limits

Reptile Survey Site (2017)

- 1
- 2
- 3
- 6
- 7
- 8
- 12
- 21
- 26
- 27



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APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE SURVEY SITE (2017)
SHEET 4 OF 4

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497		

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0716

APPENDIX 9.9 - FIGURE 2

0 0.5 Kilometres

N W E S

Legend

Provisional Order Limits

Survey Results

Slow Worm
- Undefined
- Male
- Female
- Juvenile

Common Lizard
- Undefined
- Male
- Female
- Juvenile

Grass Snake
- Undefined
- Male
- Female
- Juvenile

Survey Site 18

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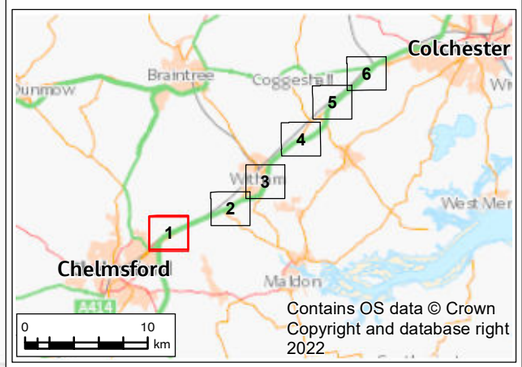

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APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 1 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497	Rev P01

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0717

APPENDIX 9.9 - FIGURE 2

0 0.5 Kilometres

N W E S

Survey Site 17

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Survey Site 15

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Survey Sites 14- 15 - 16

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Legend

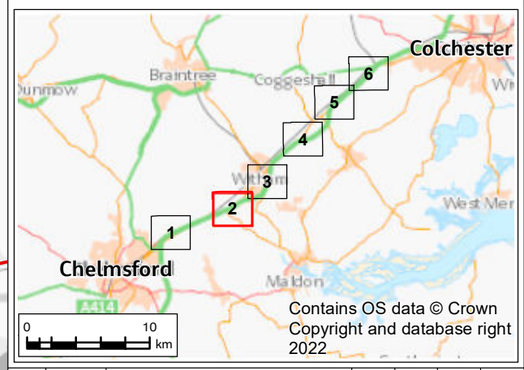
Provisional Order Limits

Survey Results

Slow Worm
- Undefined
- Male
- Female
- Juvenile

Common Lizard
- Undefined
- Male
- Female
- Juvenile

Grass Snake
- Undefined
- Male
- Female
- Juvenile



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APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 2 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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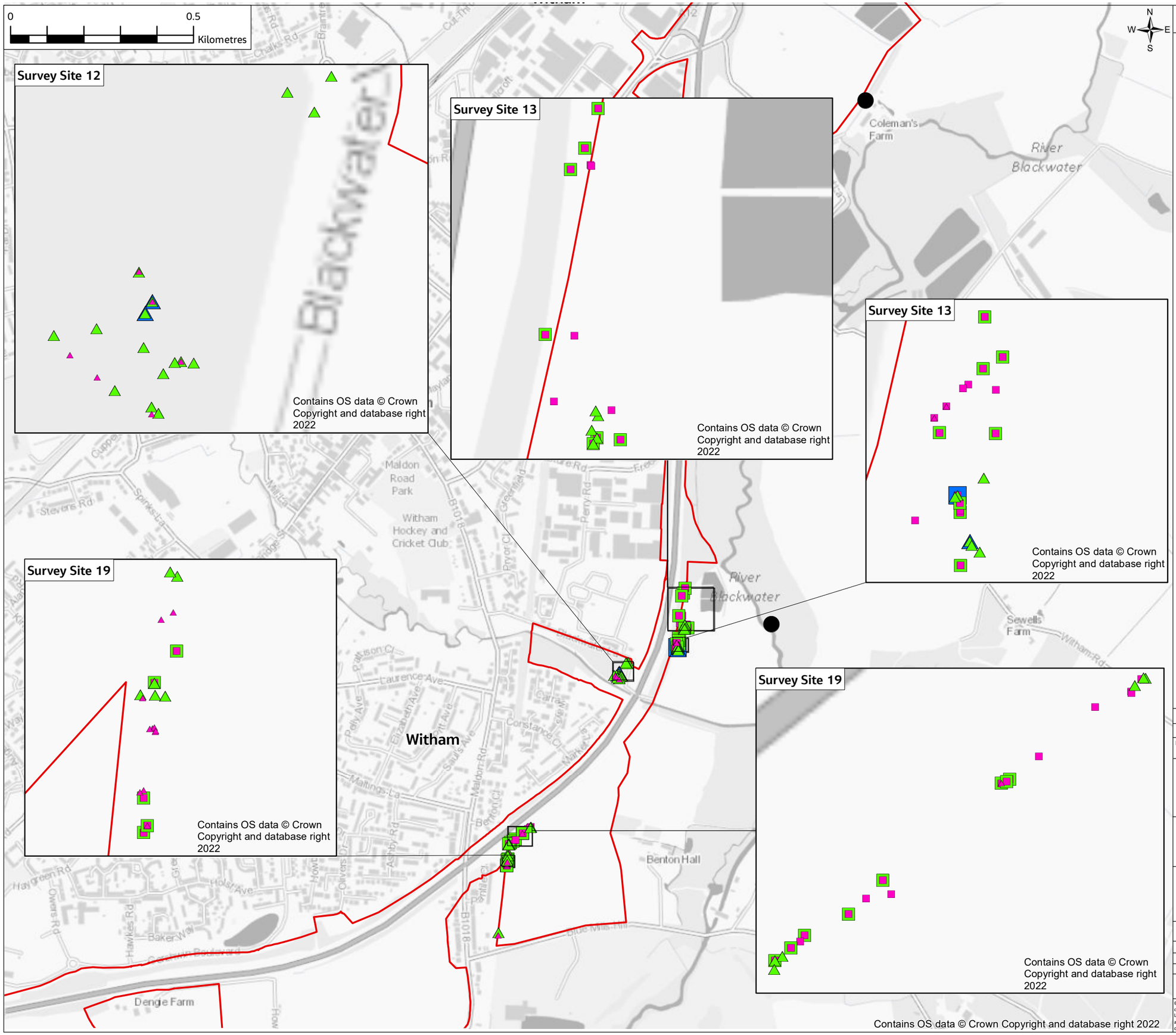
Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0718

APPENDIX 9.9 - FIGURE 2



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Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 3 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497	

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0719

APPENDIX 9.9 - FIGURE 2

0 0.5 Kilometres

N W E S

Kelvedon

Park Farm

Hollow Rd

Survey Site 11

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Survey Site 11

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Survey Site 25

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Glebe Rd

Church St

Brockwell Meadows

River Blackwater

London Rd

B1024

Crabb's Farm

Tintagel House

A12

Ewell Hall

Ewell Hall Chase

Bridgefoot Farm

Maldon Rd

Roobaes Cottages

Survey Site 20

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Survey Site 5

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Hole Farm

Hare Lodge

Ashman's Farm

Old House Farm

Kelvedon Hall Farm

Merlins

Kelvedon Lodge

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Legend

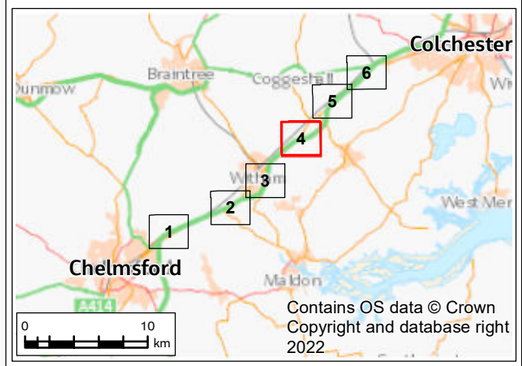
- Provisional Order Limits

Survey Results

Slow Worm
- Undefined
- Male
- Female
- Juvenile

Common Lizard
- Undefined
- Male
- Female
- Juvenile

Grass Snake
- Undefined
- Male
- Female
- Juvenile



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Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 4 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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Client No.	HE551497		

Drawing Number: HE551497-JAC-LDC-SCHW-SK-GI-0720

APPENDIX 9.9 - FIGURE 2

0 0.5 Kilometres

N W E S

Survey Site 7

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Survey Site 21

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Legend

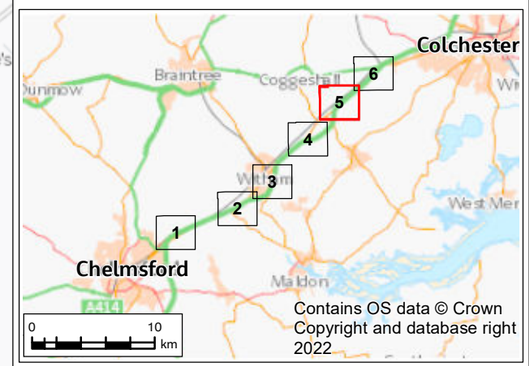
Provisional Order Limits

Survey Results

Slow Worm
- Undefined
- Male
- Female
- Juvenile

Common Lizard
- Undefined
- Male
- Female
- Juvenile

Grass Snake
- Undefined
- Male
- Female
- Juvenile



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Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 5 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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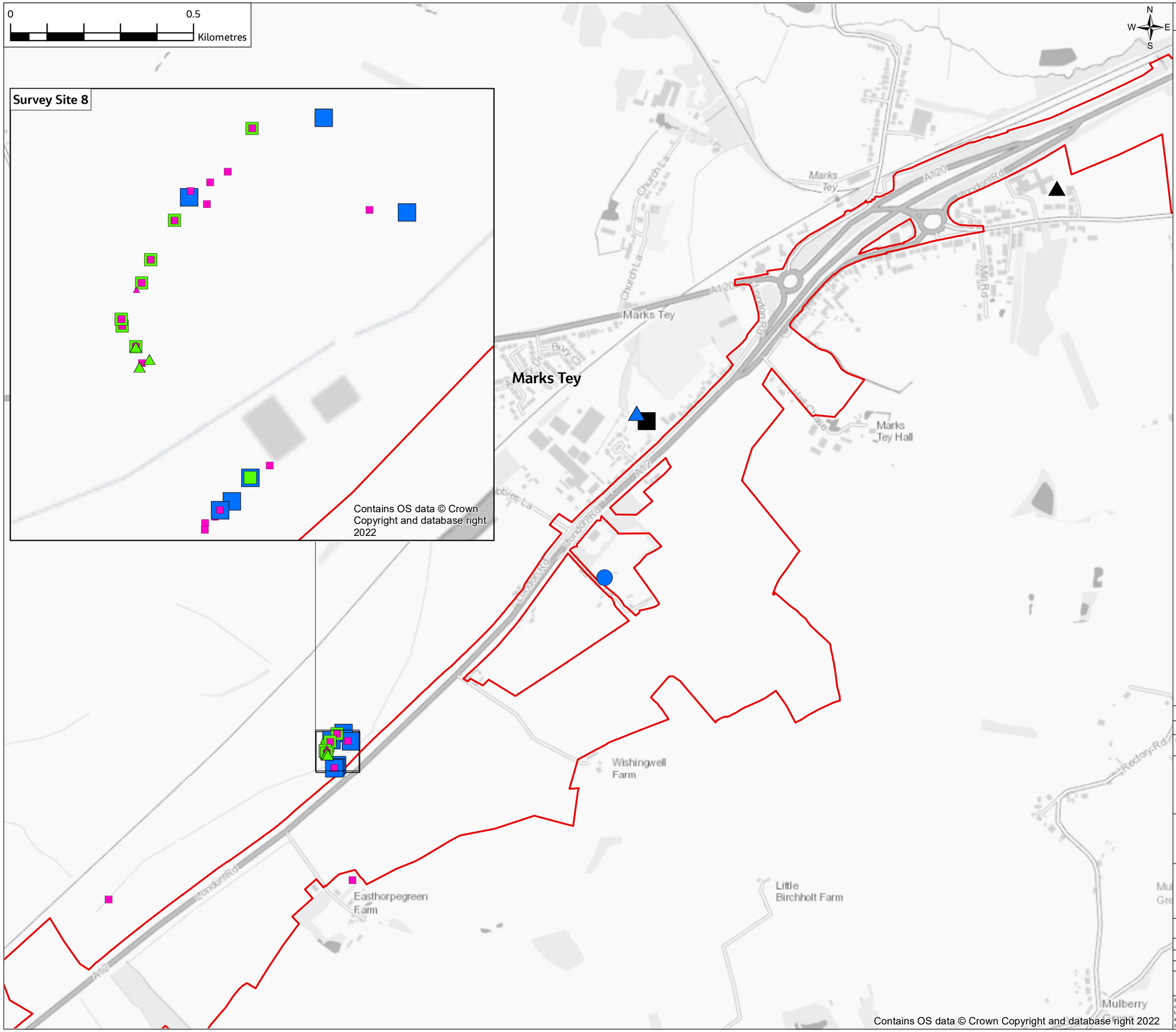
APPENDIX 9.9 - FIGURE 2



Legend

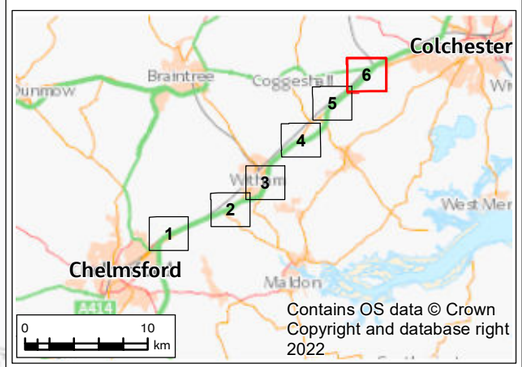
Provisional Order Limits

Survey Results

Slow Worm
- Undefined
- Male
- Female
- Juvenile

Common Lizard
- Undefined
- Male
- Female
- Juvenile

Grass Snake
- Undefined
- Male
- Female
- Juvenile



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Development Consent Order Drawing Number: TR010060/APP/6.3

APFP Regulation: Regulation 5(2)(l)

Client: national highways

Project: REGIONAL DELIVERY PARTNERSHIP
A12 CHELMSFORD TO A120 WIDENING SCHEME

Drawing Title: ENVIRONMENTAL STATEMENT
REPTILE FIELD SURVEY RESULTS (2017)
AND INCIDENTAL RECORDS
SHEET 6 OF 6

Drawing Status: S4 – SUITABLE FOR STAGE APPROVAL

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