

Global Centre of Rail Excellence Complementary Earthworks Scheme

Reptile Species Report and Trapping and
Relocation Method Statement

GCRE Ltd

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Summary

Report purpose	The aim of this report is to present findings of reptile surveys carried out by Atkins during September 2022 and to provide a Trapping and Relocation Method Statement for the Scheme, for inclusion in the Ecological Protection Plan (EPP) for the project.
The Nant Helen Scheme	The Welsh Government (WG) has formed a consortium (GCRE Ltd) to develop a rail testing and storage facility, known as The Global Centre of Rail Excellence (GCRE), in partnership with the local authorities of Powys County Council (PCC) and Neath Port Talbot County Borough Council (NPTCBC). GCRE is a development planned to encompass two test tracks of loop configuration: an electrified high speed rolling stock test track of 6.9 km in length and an electrified low speed infrastructure test track of approximately 4.5 km, with overhead line equipment (OLE). GCRE is understood to be delivered across two adjacent sites: the Nant Helen site, near Onllwyn, and the Onllwyn Coal Washery site. Atkins have been commissioned to deliver ecological services for the Nant Helen site only. Any activities related to delivery of the GCRE Complementary Earthworks Scheme within the Nant Helen site ('the Nant Helen Site') are hereafter referred to as 'the Nant Helen Scheme'. The Nant Helen Scheme will be delivered in phases, comprising large-scale earthworks including earth movement and land reclamation, leaving a suitably engineered and landscaped landform to receive the test-track and associated infrastructure developed for GCRE.
Desk studies and field surveys	Field surveys have been carried out to record suitable reptile habitats and to record reptiles at the site. These were: • Reptile surveys, completed by Arup, conducted during September 2019. • A Preliminary Ecological Appraisal (PEA) survey, conducted by Atkins, comprising a walkover survey over five days between 09/06/2022 and 16/06/2022. An ecological desk study and data search was undertaken on 30/06/2022 to support the PEA. • Reptile surveys, undertaken by Atkins, conducted between 01/09/2022 and 26/09/2022. • Walkovers to further assess reptile habitat suitability 23/02/2023
Ecological features	Reptile surveys completed by Arup in 2019 and Atkins in 2023 recorded an 'Exceptional' population¹ of common lizard occurring across the Reptile Survey Area as a whole, and areas of negligible, poor, moderate and good quality reptile habitat at locations across the site. No other reptile species were recorded with the Scheme redline boundary; however, slow worm were recorded by Arup approximately 800m west of the Scheme boundary.
Recommendations	A common lizard trapping and relocation programme is proposed prior to commencement of Scheme earthworks in areas suitable for common species of reptile, and will continue as necessary, in-line with programme phasing. This would comprise trapping in targeted areas, completed between March and October, aided by semi-permanent reptile fencing, temporary drift fencing, habitat manipulation, and destructive search. The ultimate duration of trapping effort at each phase will be determined by the rate at which reptiles are recorded throughout the mitigation exercise, but this would include a minimum of 30 days' trapping in each trapping compartment, and will continue until there are 5 days with no reptile captures or observations, under suitable conditions.

¹ Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10.

Areas of habitat with low suitability for reptiles, where trapping is not considered necessary, would be subject to habitat manipulation and hand search.
Three reptile receptor sites have been agreed with GCRE.

1.1. Report Validity

In the event of scope or programme changes, or if works do not commence within 12 months of the date of this report, then updates to the surveys may be required to ensure the validity of the data, as per Chartered Institute of Ecology and Environmental Management (CIEEM) guidance².

² CIEEM (2019) Advice Note on the Lifespan of Ecological Reports and Surveys

2. Introduction

2.1. Terms of Reference

Atkins Limited (Atkins), part of the SNC-Lavalin Group, has been commissioned by GCRE Ltd to undertake the detailed design of proposed earthworks for the redevelopment of the Nant Helen site, near Onllwyn (hereafter referred to as the Nant Helen Site), as the Global Centre of Rail Excellence, which will be a rolling stock and rail infrastructure testing facility (hereafter referred to as the Scheme).

As part of this commission, Atkins have reviewed existing information and undertaken a reptile presence/ likely absence survey, to assess the species of reptile likely to be present at the Site, and to inform the authorship of a reptile trapping and relocation method statement, required to complete the Scheme's Ecological Protection Plan (EPP) and discharge relevant Scheme planning conditions.

This report has been completed with reference to current good practice ^{3, 4}.

2.2. The Site

The site is located between the villages of Onllwyn, Abercraf and Ystragynlais, within the Dulais Valley located within Powys and Neath Port Talbot, approximately 20 km northeast of the city of Swansea.

The Site, as it is understood, is shown on Figure A-1 – Site Location Plan. The Site's central Ordnance Survey national grid reference is SN 82620 11296.

The Site measures approximately 416 hectares and comprises the former Nant Helen open cast mine, which ceased operation in June 2022. The developable area is estimated to cover approximately 109ha of potentially suitable reptile habitat.

2.3. Structure of the Report

This document presents the findings of a reptile presence/ likely absence survey undertaken by Atkins within the Nant Helen Site, between 01/09/2022 and 28/09/2022. The results of this survey and interpretation of the survey results are included as the following sections in this document; Section 3: Methods, Section 4 Limitations, Section 5: Results, Section 6: Discussion and Recommendations.

Section 7: Reptile Trapping and Relocation Method Statement is based on the interpretation of survey results in this document, and aims to discharge relevant planning conditions for the Scheme.

³ Herpetofauna Groups of Britain and Ireland (1998), Evaluating Local Mitigation/ Translocation Programmes: Maintaining Best Practice and Lawful Standards. HGBI Advisory Notes for Amphibian and Reptile Groups (ARGs).

⁴ Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10.

3. Methods

3.1. Desk Study

The geographical area for obtaining ecological data through desk studies has been determined using best practice guidance⁵ and professional judgement. The Biodiversity Information Service for Powys and Brecon Beacons National Park⁶ (BIS) were contacted to request records of protected and priority species and habitats and details of non-statutory designated sites. No reptile records older than 10 years have been considered for this assessment.

3.2. Gap Analysis

A summary gap analysis was completed as part of the PEA report for the site, to review baseline data gathered to inform the Ecological Impact Assessment (EclA) included with the Ove Arup & Partners Ltd (Arup) 2020 Environmental Statement, Chapter 7. The findings presented in *Arup (2020) Global Centre for Rail Excellence (GCRE) Reptile Survey Report* are discussed in this document.

3.3. Presence/ Likely Absence Reptile Surveys

Presence/likely absence surveys for widespread species of reptile⁷ were carried out in September 2022 in accordance with standard survey guidance^{3, 4} and CIEEM competencies for undertaking reptile surveys⁸.

The extent of the Reptile Survey Area was based on the zone of influence for this species group. Potentially suitable reptile habitat within the Nant Helen Site was recorded during the Preliminary Ecological Appraisal survey⁹ for the Scheme; these habitats were sampled for this reptile survey, where access allowed (see Figure A-3 – Reptile refugia locations and results).

The objective of this reptile survey was to:

- Assess the species composition of reptiles within the Reptile Survey Area.
- Record the relative abundance of reptiles within the Reptile Survey Area, and;
- Inform the methods of reptile trapping and relocation to be completed at the site, to be detailed as part of the Ecological Protection Plan for the Scheme.

A total of 445 artificial reptile refuges were deployed within the Reptile Survey Area, covering a targeted study area of approximately 67 hectares, at a density of 6.65 refuges per hectare. Refuges were placed in habitats assessed to be likely to be utilised by reptiles, and which were to be impacted by proposals. The material used for the artificial refuges comprised roofing felt measuring approximately 0.5 m². Deployment of artificial refuges was completed between 15th and 17th August 2022, to allow sufficient bedding-in time before the commencement of surveys.

Seven checks of the artificial refuges were undertaken between 1st September 2022 and 26th September 2022. Due to the large size of the Reptile Survey Area, each check was carried out over two days, where each refugia was checked once over a two-day period. The total number of reptiles observed over a two-day period have been combined and are considered as being the total from a single check.

Other suitable refuges already present on the site that could be used by reptiles (e.g. litter and logs) were also checked where present.

All checks of refuges were completed in suitable weather conditions (taken to be daytime air temperatures between 9°C and 18°C with little or no wind or precipitation); the weather conditions during each check are summarised in Appendix C.1.

Surveyors initially checked the upper surface of reptile refuges to identify any reptiles basking. The refuges were then lifted to identify any reptiles present underneath. Characteristics of any reptiles identified were recorded, including numbers and species, and where possible, sex, age, and notable identification features.

⁵ CIEEM (2017) Guidelines for preliminary ecological appraisal. 2nd Edition.

⁶ <https://www.bis.org.uk/>

⁷ Due to the restricted geographic ranges of smooth snake and sand lizard, these species are not considered within this report.

⁸ CIEEM (2014) Competencies for Species Survey: Reptiles. The Chartered Institute of Ecology and Environmental Management.

⁹ Atkins (2022), GCRE Preliminary Ecological Appraisal Report.

3.4. Population Size Class Assessment

The results of the reptile survey have been interpreted against Froglife Advice Sheet 10¹⁰ (see Table), to determine the population size class of reptile present at the Site as a whole.

Table 3-1* - Classification of the relative size of reptile populations¹⁰

Species	Low population	Good population	Exceptional population
Common lizard	<5	5-10	>20

*Numbers in Table 3-1 refer to maximum number of adult reptiles seen by observation and/or under refugia, by one person during a single check (in this case, combining the total number of observations made over a two-day-period).

(Notes:

- This assessment is also consistent with Natural England's Technical Information Note TIN102¹¹ which was adopted as guidance in previous phases of GCRE.
- Clustering of common lizard records in areas of high suitability and the possible presence of distinct metapopulations, together with a precautionary approach to these aspects is discussed further in Section 6.1).

¹⁰ Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10.

¹¹ Natural England (2011) Technical Information Note TIN102, Reptile mitigation guidelines (**withdrawn**)

4. Limitations

The density of reptile refuges used for this study was approximately 6.65 refuges per hectare of suitable reptile habitat. This density is below that recommended in good practice guidance¹², of 10 refuges per hectare, and so it is assumed that the numbers of common lizard at the Site (the only species recorded during these surveys), may be higher than recorded in this study. Under-recording of common lizard is however not considered to be a significant limitation to the conclusions of this document, since this species has been calculated to have an 'Exceptional¹²' reptile population estimate, which is the highest population class recognised by this guidance.

It has been assessed that reptile population density is likely to vary across the site depending on habitat suitability. Since the survey methodology required the clustering of artificial refuges in the most suitable reptile habitats, it is likely that lower population densities will be present in less suitable habitats, although this was not recorded and must be assumed. This is not considered to be a significant limitation to the survey results, since mitigation measures will take account of habitat suitability, and therefore the varying population density across the site.

Good practice survey guidance¹² recommends that after the completion of seven presence/ likely absence survey visits, a further 13 survey visits should be undertaken to obtain an accurate estimate of the reptile population sizes within the Reptile Survey Area. This was not undertaken due to limitations of the Scheme programme, so actual reptile population numbers may be higher or lower than presented in this document. However, as explained above, given the Exceptional population of common lizard found, the data is considered sufficient to indicate population class.

Weather conditions during reptile surveys were variable, with one survey having to be cancelled due to the poor conditions. Surveyors paused or postponed surveys during the periods of most unsuitable weather, continuing during periods of weather suitable for reptile survey, so this is not considered to be a significant limitation to the surveys.

The Reptile Survey Area was based on the redline boundary of the Scheme, and our understanding of the Scheme design at the time that surveys were planned. If the design or timing of the Scheme should change, the extent of the Reptile Survey Area should be reviewed and additional reptile presence/ likely absence surveys may be required to establish the baseline reptile populations in areas that had not been surveyed.

¹² Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10.

5. Results

5.1. Desk Study

BIS provided no records of widespread species of reptiles within 1 km of the Site; however, did return records of common lizard, slow-worm, and grass snake, at distances ranging between 1.5km and 3.4km outside of the Site boundary; no abundance information was provided with these desk study results.

5.2. Gap Analysis

Arup completed a reptile presence and likely absence survey at the Site between 6th June 2019 and 3rd October 2019, comprising a total of seven visits, with each visit completed over a period of two days (comparable to the methods followed by Atkins in 2022). The survey completed by Arup included land outside of the Scheme redline boundary, and within the Washery boundary, neither of which are considered here. Within the Nant Helen redline boundary, the Arup survey utilised approximately 106 artificial reptile refugia.

During these surveys, a peak daily observation of 20 common lizard was recorded within the Scheme's redline boundary, on Survey 4a/4b, which is considered to indicate an Exceptional population¹³ (the Arup report interpreted this total as a 'good' population; however, this did not consider the combined number of individual reptiles observed for both visit 4a and 4b).

A total of two slow worm was were also recorded during these surveys, approximately 802m west of the Site boundary, outside of any area predicted to be at risk of direct or indirect impact due to the proposals.

5.3. 2022 Reptile Presence and Likely Absence Survey

The results of the reptile survey completed by Atkins in 2022 are summarised in Table 5-1 below. Full survey results are presented in Table 7-3 in Appendix B.

Table 5-1 - Summary of 2022 Reptile Presence and Likely Absence Survey

Survey Visit	Dates	Species observed	Numbers observed
1	1st-2nd September	Common lizard	42
2	5th-6th September	Common lizard	41
3	12th-13th September	Common lizard	17
4	15th-16th September	Common lizard	26
5	19th-20th September	Common lizard	5
6	22nd-23rd September	Common lizard	24
7	27th-28th September	Common lizard	5
			160

During Survey Visit 1, 42 common lizard were recorded over a two-day period, which was the peak daily count recorded across the seven survey visits. Following good practice guidance¹³, this is considered an Exceptional population¹³ of common lizard.

Common lizard was recorded within all Phases of the Scheme that were sampled as part of this survey, with 23% of the 443 artificial refugia recorded as in-use by common lizard; Figure A-3 illustrates how these positive confirmations are distributed throughout the Site.

No other reptile species were recorded during the surveys.

¹³ Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10.

6. Discussion and Recommendations

The results of this 2022 survey indicate that the reptile population in the Reptile Survey Area is comparable to that recorded during surveys completed by Arup in 2019.

A peak daily observation of 20 common lizard was recorded over Survey 4a and 4b by Arup in 2019, which is considered an Exceptional population¹³, the same population size class recorded by Atkins in 2022. Although the peak count of 42 common lizard recorded by Atkins is 2.1 times greater than the 20 recorded by Arup, the Atkins survey also utilised a higher density of artificial refugia, a total of 442 compared to a total of 106 deployed by Arup, therefore the increase in individual reptiles observed is considered to be proportionate to the increase in survey effort.

The results of this 2022 survey show that common lizard have a widespread distribution across the Site, as illustrated by Figure A-3 – Reptile refugia locations and results, which shows the locations of common lizard observations and evidence. As shown on this plan, common lizard were confirmed in all Phases of the Scheme, and geographically distributed through a high proportion of the areas subject to this sampling survey. These refugia were clustered in areas of the most suitable habitats (see 6.1 Reptile Habitats, below).

Common lizard were the only reptile species recorded within the Scheme redline boundary, in 2019 and 2022. Slow worm had been recorded outside of the redline boundary during surveys completed by Arup in 2019, but the closest record was located approximately 802m west of the Site boundary, and outside of the impact of proposals. As this species was not recorded during surveys completed in 2022, it is considered that slow worm are unlikely to occur within the Scheme's redline boundary, with the results of these surveys consistent with those completed in 2019; however, the impact assessment for the Scheme will follow a precautionary approach, and this species will be considered to be potentially present within the impact of the Scheme.

6.1. Reptile Habitats

Due to the widespread geographic distribution of common lizard across the Site, it has been assumed that this species is likely to occur in varying density within all potentially suitable semi-natural habitats at the Site that are to be impacted by proposals.

Common lizard were associated with seven Phase 1 habitats¹⁴ recorded at the Site, with the highest occurrences across all seven survey visits occurring in semi-improved acid grassland, marshy grassland, and acid dry dwarf shrub heath; see Table 6-1.

Table 6-1 - Phase 1 habitat types and proportion of common lizard recorded

JNCC Habitat Type	A1.1.1 - Broadleaved woodland - semi-natural	A1.3.2 – Mixed woodland - plantation	B1.2 - Acid grassland - semi-improved	B5 - Marsh/ marshy grassland	D1.1 - Dry dwarf shrub heath - acid	J1.2 - Amenity grassland	J5 - Other habitat	Total %
Reptiles recorded	8	3	64	45	37	1	2	160
Percentage of total	5.00%	1.88%	40.00%	28.13%	23.13%	0.63%	1.25%	100

Based on occurrences of common lizard at the Site in these habitat types, and based on review of habitat connectivity across the Site, professional experience in working with this species group and informed by good practice guidance, areas of the Site have been classified in relation to their relative suitability for use as reptile habitat, as shown in Table 6-2, and presented in Figure A-3. The Site comprises a mixture of high, moderate, low and negligible suitability habitat for common lizard. This assessment of habitat suitability, together with survey findings, has informed the development of the reptile mitigation strategy for this site, as detailed in Section 7.

¹⁴ Atkins (2022), GCRE Preliminary Ecological Appraisal Report.

Table 6-2 - Common Lizard habitat suitability

Classification	Description
High	• Mosaic of habitats, including scrub, heath, tussocky grassland, open areas for basking, and areas of marsh. • Large areas of semi-natural habitat. • Good connectivity for reptile dispersal, connected semi-natural habitats. • Low levels of disturbance.
Moderate	• Habitat types are suitable for reptiles, but without forming complex mosaics. • Compartments of semi-natural habitat. • Provides some connectivity to suitable reptile habitats. • Area subject to some disturbance.
Low	• Monoculture habitats, suitable for use by reptiles. • Semi-natural habitats present in low abundance. • Poor connective routes for reptile dispersal.
Negligible	• Exposed and disturbed locations. • Absence of semi-natural habitats. • Poor connectivity to potentially suitable habitats. • Highly disturbed.

Since this survey targeted the most likely suitable habitats for common lizard at the site, there is also the potential for low population levels to be present in sub-optimal habitats, not recorded here. It is also noted that since individual reptiles were not marked between survey visits, the same individuals could potentially have been recorded over multiple survey visits.

As common lizard appeared to be present at higher densities in the more suitable habitat, it is considered that these concentrations may form a number of metapopulations (see Table 6-3). For the purposes of the method statement a precautionary approach will be taken and these clusters will be treated as metapopulations for the purposes of planning and executing the mitigation strategy.

Table 6-3 - Common Lizard clustering and associated capture rates.

Metapopulation id	Location & Habitat	Number of reptiles recorded	Number of artificial refugia	Approximate Capture rate (reptile records/artificial refugia)
MP1	Northwest, pastures to the east of plantation woodland	35	166	1:5
MP2	Central – Heathland and purple moor dominated grassland	22	57	1:3
MP3	Central East – restored grassland	3	16	1:5
MP4	Central South – Peat Bog	24	193	1:8

Metapopulation id	Location & Habitat	Number of reptiles recorded	Number of artificial refugia	Approximate Capture rate (reptile records/artificial refugia)
MP5	Southwest – land below overburden mound	17	55	1:3
MP6	Southeast – Onllwyn access road	4	20	1:5

M2 and M5 have the highest common lizard population densities and may require the longest duration of trapping effort. M1 has a lower population density and M3 M4 and M6 have lowest densities and may require the shortest duration of mitigation effort.

7. Reptile Trapping and Relocation Method Statement

The Scheme's planning conditions include a requirement for an Ecological Protection Plan (EPP) to be authored and submitted to Powys County Council (PCC) and Neath Port Talbot Borough Council (NPTBC) to discharge the following planning conditions:

- PCC – 20/0738/FUL Condition 11, and;
- NPTCBC – P2020/0362 Condition 9.

The EPP is to include a reptile trapping and relocation method statement, which is included here.

This reptile method statement has been produced to form part of the EPP and assist with the discharge of these conditions. However, this is a live document which will be updated as and when required, should proposals change, to accommodate changes to the works footprint, further input from the Contractor, timings of work resulting from programme changes, phasing of work and/or additional mitigation for reptiles deemed necessary by the Project Ecologist and/ or Ecological Clerk of Works (ECOW).

Common species of reptile (adder, grass snake, common lizard and slow worm) are protected against intentional killing and injury under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). There is no requirement for a licence where development works affect common species of reptiles; however, where reptiles are present, they must be protected from any harm that might arise during development works through appropriate mitigation. On the basis of specialist knowledge and experience working with common species of reptiles, and on the assumption that this Method Statement is adhered to, it is reasonably unlikely that the proposed works will result in an offence under the Wildlife and Countryside Act 1981 (as amended).

Three different approaches will be employed to protect reptiles at the Site and will be applied as appropriate to the habitat type, topography, ground conditions and habitat suitability for reptiles. These approaches are: capture and translocation of reptiles from the works footprint area (referred to as **trapping and relocation**), displacement of reptiles from the working area (referred to as **habitat manipulation**), and upon completion of those approaches, (or where these methods are not feasible), dismantling structures and habitats used by reptiles by hand and machinery (referred to as **hand search** and **destructive search**). All approaches are to be conducted under the watching brief of the ECOW.

Contractor Specifications will be written to provide detailed guidance on delivery of this Method Statement on site. These will be written in collaboration between the Project Ecologist, ECOW, and the contractor to be delivering the works. These specifications will include details of:

- Exact layout of mitigation compartments (based on habitats present, works phasing, and mitigation types to be employed); indicative layout of mitigation compartments and expected mitigation types are included in this document.
- Timings of works.
- Methods of Habitat Manipulation (if required).
- Fencing layouts and installation methods (if required).
- Artificial refugia numbers and placement (if required), and;
- Bespoke mitigation required in each compartment (i.e. additional internal 'drift fencing', access points for vehicles, habitat manipulation required).

The Contractor Specifications will follow the mitigation principles as outlined in Section 7.4 Habitat Manipulation Method and Section 7.5 Trapping and Relocation Method. Any deviations from these principles will be agreed with the project ecologist and the ECOW prior to the Contractor Specifications being approved and works starting, and updates to this document will be made if required.

The project ecologist will keep records of capture rates of common species of reptiles, and all other decisions that are made regarding reptile mitigation on Site, to provide an audit trail for decision making purposes.

7.1. Reptile Mitigation Principles

7.1.1. General

The following mitigation principles will be implemented during works:

- 1) Contractor Specifications will be produced for each reptile mitigation compartment to provide details of specific mitigation measures and receptor site enhancements that will be completed, in accordance with the habitats present, the constraints present, and the nature and phasing of the works.
- 2) No trapping and relocation and/or habitat manipulation will commence until a receptor site is prepared and ready to receive reptiles. Further information on the requirements of the receptor site for the Scheme are detailed in Appendix A Figure A-5 – Reptile Mitigation plan.
- 3) Benchmarks for total reptile releases into each receptor sites will be stated in the Contractor Specifications.
- 4) Habitat connectivity will be maintained between receptor sites and other suitable reptile habitats outside of the construction footprint, through maintaining existing habitat linkages or creation of new ones, such as provision of animal passages, as detailed in the Scheme Environmental Statement.
- 5) The first stage of reptile mitigation will be habitat manipulation, which is the phased strimming (or mowing using suitable equipment where deemed appropriate) of vegetation to encourage the movement of reptiles from an area. This will be used as a method of reptile mitigation where:
 - Habitats share connectively to a receptor site.
 - Where the habitats are of poorer suitability for reptiles.
 - Where there are lower density reptile populations, and;
 - Where there are no areas of marshy grassland, due to incompatibility of method.
- 6) Where very large areas require habitat manipulation (and it is deemed unfeasible to use strimming by hand due to the extent of the area), then mowing using suitable equipment may be employed. If mowing is considered necessary, then the following precautions will be taken:
 - Weather conditions must be suitable for reptile activity; so not cold or wet (as ground conditions are likely to be too soft). Reptiles need to be active enough to escape as mowing equipment approaches.
 - Mowing will only be employed where there is high confidence that no snake species or slow worm are present. Common lizard are able to escape from mowing equipment, slow worm, grass snake and especially adder are less able to escape and the risk of harm is higher.
 - If a tractor drawn mower is used, then it will be a type that does not flatten the vegetation – there must be no roller. It must be a mounted flail or cutter with adjustable height, and ideally it will cut horizontally rather than vertically.
 - A 'boxer' machine that has low ground pressure will be employed, as required.
 - ECoW will walk at a safe distance ahead of the mowing equipment looking out for reptiles and move any reptiles to safety.
 - ECoW will check cut material and move any reptiles to safety
 - Artificial reptile refugia mats will be placed at the edge of mown areas at the end of the day to provide shelter for any displaced reptiles. These will be checked, and reptiles moved before further mowing is undertaken.
 - Undulating ground where there is a risk of the mower blades hitting higher ground or areas with anthills, where reptiles might be present, will not be mown and will be left for hand strimming.
- 7) Habitat manipulation whether by hand strimming or mechanical mowing will only be used during the active season for reptiles and in suitable weather conditions under the guidance of an ECoW undertaking a watching brief.
- 8) The second stage of reptile mitigation will be trapping and translocation, to be used in areas of marshy grassland, fen, swamp and wooded habitats and other areas deemed unsuitable for habitat manipulation. Semi-permanent reptile fencing will be installed on the perimeter of translocation sites, with artificial refugia placed on the inside perimeter of the fencing and around areas of potentially suitable habit, to allow capture of reptiles and movement to receptor sites. Drift fencing will be used to create separate areas within the compartments as required. Trapping and relocation of reptiles will only

occur during the active season for reptiles when suitable weather conditions are prevalent (see Section 7.5.3 for further details on requirements for this method).

- 9) The final stage of reptile mitigation will be destructive search, to include phased reduction of habitats and a final top-soil strip under the watching brief of an ECoW.
- 10) If any works are programmed during the winter reptile dormancy period (considered to be October through to March, but this can be weather dependent), then reptiles will be removed from these areas during the preceding active season.
- 11) Any works required in areas where reptiles have not been removed will be agreed with the project ecologist/ ECoW, and appropriate controls put in place to prevent impacts on reptiles and ensure legal compliance.

7.2. Reptile mitigation approach

Table 7-1 - Reptile mitigation approach and mitigation compartment details (subject to refinement with Contractor Input)

Reptile mitigation approach	Habitats present	Compartments (To be confirmed with Contractor input) See Figure A-5 for details of the mitigation compartments	Approximate length of reptile fencing required (m) (Note: these are for fencing of mitigation compartments and do not include any additional requirements for perimeter fencing around construction areas.)	Approximate area (ha) (subject to change, with contractor input)
Habitat manipulation	Acid and semi-improved grassland, broad-leaved woodland, and scrub. (see section 7.4 for details)	H1	N/A	0.155
		H2		2.17
		H3		2.57
		H4		6.31
		H5		16.72
		H6		8.65
		H7		1.79
		H8		1.24
		H9		5.04
		H10		14.09
		H11		1.88
		H12		1.62
		H13		1.89
		H14		1.24
Trapping and translocation	Marshy grassland and coniferous plantation. (see	F1	1501	1.56
		F2	510	1.16
		F3	1731	10.33

Reptile mitigation approach	Habitats present	Compartments (To be confirmed with Contractor input) See Figure A-5 for details of the mitigation compartments	Approximate length of reptile fencing required (m) (Note: these are for fencing of mitigation compartments and do not include any additional requirements for perimeter fencing around construction areas.)	Approximate area (ha) (subject to change, with contractor input)
	Section 7.5 for details)	F4	1793	8.65
		F5	1195	1.81
		F6	1293	1.86
		F7	843	1.85
		F8	306	1.56
		F9	1716	1.16
		F10	440	10.33
Destructive Search	Where conditions unsuitable for other methods (See Section 7.6 for details)	D1	N/A	1.75
		D2		5.82
		D3		1.09
		D4		0.74
No mitigation	Quarry, scree, and hardstanding.	N/A		19

7.3. Reptile Receptor Sites

Three reptile receptor areas have been agreed with GCRE, referred to here as Receptor Site 1 (R1), Receptor Site 2 (R2) and Receptor Site 3 (R3); see Figure A-5 – Reptile Mitigation plan **Error! Reference source not found.** R1 and R2 are located within the Scheme redline boundary, outside of the designed work's footprint; R3 is located in common ground, outside of the Scheme redline boundary. The receptor sites' suitability to receive relocated common lizards is based on their size, habitat suitability, and connectivity to other suitable reptile habitats.

7.3.1. Receptor Site 1 (R1)

This is located on the Site's northern embankment and comprises a south-facing slope vegetated with a mix of semi-improved acid grassland and gorse scrub; this has been classified as high suitability reptile habitat. This receptor site is located most closely to potentially suitable reptile habitats due to be impacted within Phase 4 of the Scheme, including the Site's northern embankment, and central area. The northern extent of Phase 2 works is located approximately 320m from this receptor site.

7.3.2. Receptor Site 2 (R2)

This site comprises the Site's heath-bog complex, and surrounding grassland habitat. This receptor site is located adjacent to the southern extent of Phase 2, Phase 3, and the southern extent of Phase 4. This area has been classified as having a mix of high and moderate suitability habitats for reptiles. Some areas have been subject to intense grazing. Grazing levels will be reduced or excluded completely to allow succession of vegetation and the creation of a varied vegetation structure. This is intended to improve the suitability of these areas for reptiles and enhance the carrying capacity of these areas of Receptor site 2 for the translocated population.

7.3.3. Receptor Site 3 (R3)

This receptor is located outside of the Scheme redline boundary, to the south-west, and comprises an area of common ground. This receptor site was identified as a potentially suitable receptor site by the Environmental Statement, supporting a mix of semi-improved acid grassland and marshy grassland habitats, and sharing connectivity to expansive semi-natural habitats outside of the Scheme boundary.

Additional mitigation measures will be carried out at R3 (see Figure A-6 for details):

- A barrier of reptile fencing (denoted by a blue line in Figure A-6) will be placed to the northeast of R3 to prevent released reptiles dispersing back into the working areas in the Nant Helen site.
- Artificial refugia will be placed in the area northeast of R3 (denoted by purple shading in Figure A-6) to provide shelter for released reptiles that subsequently disperse from R3

7.3.4. Metapopulations and receptor sites.

As advised by GCRE, a precautionary approach will be taken to the translocation of common lizard into R2, in order to avoid the risk of exceeding the possible carrying capacity of habitats in this area and to mitigate the risk of introducing pathogens with reptiles from other metapopulations:

- Common lizards in compartments H2, H3, H5 and F9 can be considered to be part of metapopulation MP4 (see Section 6.1), and therefore, as a precautionary approach, captured animals are considered suitable to be released into R2, or encouraged into R2 through habitat manipulation.
- Common lizard from compartments not deemed part of the MP4 metapopulation will not be released into R2.
- Common lizard will not be released into the fenced heathland/ peat bog feature at the centre of R2, as a precautionary approach to avoid exceeding the carrying capacity of these habitats.
- Reptile habitat refugia will be provided in the retained grassland of R2 to receive reptiles from compartments H2, H3, H5 & F9.

7.3.5. Receptor Site Habitat Enhancement and Management

As recommended in the Scheme's Environmental Statement (ES), R2 will be subject to short term enhancements, including construction of artificial reptile hibernacula suitable for common lizard, as demonstrated in **Error! Reference source not found.** Figure B-1. The details of these hibernacula will be included in the Contractor Specifications and agreed with the Project Ecologist, ECoW, and contractor. These enhancements will be implemented in advance of the sites receiving translocated reptiles and/or habitat manipulation taking place adjacent to them (i.e., reptiles being displaced into the receptor site). With R1 and R3 to revert to common land, there will be limitations to the extent of habitat management that GCRE can complete there.

Habitat linkages, as shown in the Scheme **Error! Reference source not found.** ES, will provide corridors and crossing points for reptiles and will be in place within a year of the receptor sites receiving reptiles (ideally before key dispersal months for juveniles, between August and October).

The area between R1 and R2 is currently an area of open earthworks as a result of mining activity. In-line with the landscape proposals for the site, this area will be remediated with material stripped from other parts of the site and then sown to create acid grassland. Additionally the reinstatement will result in a smoothing of the Site topography, but with leaving some south-facing slopes and bunds. Future management will aim to allow a mosaic of habitats and varied vegetation structure through succession and sustainable levels of targeted grazing, as set out in the standard guidelines for reptile habitat management¹⁵. The aim will be to create additional habitat and therefore carrying capacity for the reptile populations translocated to the adjacent receptor areas.

The receptor sites will be subject to long-term management and monitoring, for a period of five years, in-line with best practice; see Section 7.7 Long-term Management and Monitoring. These measures will be secured through inclusion in the site's Habitat Management Plan and will aim to increase the carrying capacity of the habitats that are present.

7.4. Habitat Manipulation Method

Habitat manipulation will be carried out to direct the movement of reptiles away from construction activities and create areas of sub-optimal habitat that they are unlikely to inhabit.

The extent of land that will be subject to the habitat manipulation method is indicated in Table 7-1 and will be refined through collaboration between the Project Ecologist, ECoW, and contractor. See Figure A-5 **Error! Reference source not found.** for the current mitigation compartment plan; this is subject to change and the final details will be presented in the Contractor Specification. This approach is expected to be used in compartments H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13 and H14.

The following steps will be taken to displace reptiles from the working areas (during the active season):

1. Displacement of reptiles shall only take place when reptiles are active, typically between March/April and October (but dependent on weather conditions).
2. This method is weather- and temperature-dependent; habitat manipulation can typically start once temperatures are above 9°C for five days or more.
3. An ECoW will be present throughout the vegetation clearance works. Vegetation will be strimmed, cut or mowed using suitable reptile safe equipment and methods by the contractor in two stages; all vegetation will be cut down to a height of no less than 150 mm. The ECoW will walk at a safe distance ahead of the stripping, cutting or mowing operation to look out for reptiles and to increase the chances that reptiles will move out of the way of the cutting. The ECoW will check the cuttings and remove any reptiles to the closest receptor site. Artificial refuges (roofing felt or corrugated roofing sheets) will be placed outside the working area to provide shelter for displaced reptiles and reduce predation by birds. Cuttings will be removed from the working area, once checked by the ECoW, to reduce the habitat suitability for reptiles within the working area.
4. Following the initial cut, any piles of wood, brash and rubble within the working area will be dismantled by hand and immediately removed from the working area. Any reptiles uncovered will be captured by the ECoW and relocated to the closest receptor site.
5. A hand-search will then be undertaken by the ECoW of the vegetation prior to a second cut to ground level. Any reptiles uncovered will be captured by the ECoW and relocated to the closest receptor site.
6. Vegetation shall be maintained at a short height (which is less favourable to reptiles) until construction works commence or a destructive search is complete (see Final Destructive Search 7.6.).

Caveats for habitat manipulation method:

- This method will be completed in a way that avoids creating areas of disconnected habitats with persistent populations of common lizard (connectivity will be maintained, until a final hand-search for reptiles has been completed).
- This method will not be completed in marshy grassland, fen or swamp habitats, as these are likely to be important habitats for common lizard and habitat manipulation/dissuasion is less effective in these habitats.

¹⁵ Edgar, P., Foster, J. and Baker, J. (2010). Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth.

- This method will only be used where adjacent habitat is suitable for common lizard and has long term protection, ideally away from the public and dogs.
- All adjacent receptor site habitat enhancements must be completed before habitat manipulation starts to ensure that there is a sufficient increase in carrying capacity for the translocated population.
- Once habitat manipulation has occurred and the ecologists have completed a final hand-search for reptiles, then the area must be kept unsuitable for reptiles until earthworks have been completed. A construction auditing process will be in place to check on this (and fencing see below).
- If unexpectedly high numbers of reptiles are encountered in an area, the Trapping and Relocation Method may be applied (see 7.5 Trapping and Relocation Method).

7.5. Trapping and Relocation Method

7.5.1. Fencing

Semi-permanent reptile fencing will be used as part of reptile mitigation, to create a barrier to prevent reptiles from entering or re-entering areas of the Site that will be impacted by construction activities.

The extent of land that will be subject to the trapping and relocation method will be refined through collaboration between the Project Ecologist, ECoW, and contractor. See Figure A-5 for the mitigation compartment plan; these are subject to change and the final extent and details of mitigation compartments will be presented in the Contractor Specification. The following compartments are currently expected to be fenced and trapped F1, F2, F3, F4, F5, F6, F7, F8, F9 and F10.

The reptile fencing can be installed from February/ March, subject to ECoW watching brief and suitable weather conditions.

Perimeter fencing will be installed at a minimum 10m offset from the footprint of planned earthworks, haul routes, and cable diversion routes (offset to allow movement of machinery and personnel, to be determined with contractor input).

A construction auditing process will be in place to check on any reptile fencing installed through the construction period.

The exclusion fence will be constructed from UV-stabilised plastic and will have a minimum height above ground of 60 cm with approximately 25 cm buried in the ground. The fencing will be installed to the manufacturer's specification and will be positioned to allow reptiles (common lizards) to climb out of the trapped area but not climb into it.

Additional temporary internal reptile drift fencing will be used to divide the land within the reptile trapping and relocation areas into a series of separate compartments depending on habitat suitability and complexity. This fencing will be used during the trapping exercise only and will be removed when trapping of a compartment has completed. This will utilise Polythene or similar material and buried to approximately 25 cm and staked at 1.5 m intervals.

The extent of the fence line including any drift fencing to create separate areas within the compartment will be shown on the Contractor Specification document for each compartment. The current mitigation compartment details showing approximate lengths of reptile fencing are in Table 7-1 and Figure A-5. These are subject to refinement with Contractor input. Unless required in targeted locations to maintain reptile welfare, receptor sites will not be fenced, to allow reptiles to disperse into the landscape surrounding the Site, whilst they are protected from construction impacts by the construction-phase perimeter fencing.

7.5.2. Artificial Refuges

Artificial refuges will be positioned within the exclusion area as follows:

- Refuges will consist of squares of roofing felt and corrugated metal or roofing sheets measuring approximately 1 m x 0.5 m.
- At least 100 refuges per hectare will be used. Based on indicative estimates, this will comprise 6700 refuges covering an area of approximately 67ha. The exact number will be based on the finalised area of land to be subject to the trapping and relocation method and will be presented in the detailed contractor specifications.

- Refuges will be spread throughout the exclusion area, with increased density in areas of optimal habitat. Refuges will be placed in locations mostly likely to attract reptile presence, including sun-trap locations, and the margins of scrub or wooded vegetation, and perimeter of fencing, and;
- The refuges will be left for a minimum of two-weeks prior to the capture and translocation of reptiles commencing.

7.5.3. Capture Programme

The number of days that trapping and relocation of common lizard will be carried out, as is recommended here, is based on:

- Adopted industry standard guidance¹⁶,
- Additional consideration of Natural England's Technical Information Note TIN102¹⁷ (this was adopted as guidance on previous phases of GCRE),
- An analysis of reptile densities and metapopulations (see Section 6.1),
- Professional experience of working with common reptile species and of completing mitigation on similar sites.

Trapping and translocation of common lizard (in compartments F1, F2, F3, F4, F5, F6, F7, F8, F9 and F10) will be completed for a minimum of 30 days. After 30 days initial capture effort in suitable weather conditions, capture will then continue until there are 5 days with no reptile captures or observations, under suitable conditions. The decision to continue trap and relocation methods will be reviewed if reptiles are still being recorded after 60 days. The recommendation to conclude reptile trap and relocation methods will be at the discretion of the Project Ecologist, who will consider a range of limiting factors, such as short periods of poor conditions, lulls in activity following longer periods of poor conditions, and possible reptile dispersal within the trapping areas during the trapping period.

Two-weeks after refuges are placed on the site, capture and relocation of reptiles will commence, with checks completed by a suitably qualified and experienced ecologist. Capture will be undertaken when reptiles are active between March/April and October, in suitable weather conditions, as follows:

- Site visited between the hours of 07:00 and 18:00,
- Air temperature between 9°C and 18°C,
- Little to no wind or precipitation, and;
- Generally, hazy or intermittent sunshine or bright sunshine early in the day.

April, May and June will likely be the key months for capture of reptiles. The summer months are likely to be less successful due to high temperatures, and reptile capture in late summer/ early autumn must be approached with caution, due to the presence of vulnerable gravid females. If reptile captures in any compartments are still taking place during September, it is recommended that intensity of effort is increased, to complete reasonable effort before the onset of hibernation.

Reptiles go into hibernation during cold weather, typically during the months of November to February, and the hibernation period could extend beyond or commence in advance of these months depending on the weather conditions. Reptiles are at increased risk of harm if disturbed during hibernation and therefore trapping and translocation, or hand or destructive searches will not be undertaken during this time.

The typical active season for reptiles is between March and October but this is dependent on weather patterns and can extend past this date if suitable conditions persist. Equally, reptiles can hibernate earlier than 31st October if a prolonged period of cold weather occurs and the translocation will cease should this occur as determined by the Project Ecologist.

¹⁶ Herpetofauna Groups of Britain and Ireland (1998), Evaluating Local Mitigation/ Translocation Programmes: Maintaining Best Practice and Lawful Standards. HGBI Advisory Notes for Amphibian and Reptile Groups (ARGs).

¹⁷ Natural England (2011) Technical Information Note TIN102, Reptile mitigation guidelines (**withdrawn**)

7.5.4. Trapping and Relocation Methods

Refuges will be checked by suitably qualified ecologists on days of suitable weather¹⁸ during the capture period, aided by use of a noose and hand net. Multiple visits per day may be completed to optimise periods of good weather and high reptile activity.

Immediately after capture, common lizards will be placed in a small closable box lined with vegetation to provide a soft base¹⁹, for transportation to and release at a nearby receptor site.

The time between capture and release at the receptor site will be minimised, with 4 hours as a maximum time for common lizards to be kept before release. Care will be taken during transport in especially high or low temperatures and reptiles must not be released in cold weather; captures will be retained overnight if temperatures fall suddenly.

During the translocation, the species, sex, life stage and capture and release locations should be recorded for all reptiles caught.

7.5.5. Welfare

Plastic containers will be used to transport common lizards to the receptor area. The containers will have air vents and will be lined with leaf litter and grass to reduce the stress placed upon reptiles during the translocation.

The time between capture and release at receptor site will be minimised, with 4 hours as a maximum time for common lizards to be kept. Care will be taken for transport in especially high or low temperatures and reptiles must not be released in cold weather, and captures will be retained overnight if temperatures fall suddenly.

At each visit, the refuges will be approached quietly, and any reptiles found underneath will be carefully collected and placed in a container. Reptiles will be released into the receptor site near suitable cover for them to immediately hide within.

Lizards will not be held behind their vents or caught or held by their tail (as this may cause a stress response where their tail 'breaks' off).

All staff involved in translocation of reptiles will wash hands thoroughly at the end of capture session and before eating/drinking.

7.5.6. Maintenance of Exclusion Fencing

To ensure that reptiles are kept out of the exclusion area once the translocation is complete, the semi-permanent reptile exclusion fence will be retained until there is a suitable alternative barrier provided (e.g. a secure close-boarded site hoarding with no gaps beneath it).

During the translocation period, the reptile exclusion fencing will be checked on any day that trapping occurs. Once the translocation is completed, the reptile exclusion fencing will be checked regularly for any signs of damage by a suitably briefed individual (the ECoW will provide a briefing to any persons responsible for this task). This will be undertaken weekly throughout construction, and daily where construction works are taking place directly adjacent to the exclusion fence. Any breaks in the fence will be repaired at the earliest opportunity (within 24 hours of noticing the damage) to prevent any reptiles entering the construction footprint. The principal contractor will ensure that core members of the site team are trained in how to install and repair the reptile exclusion fencing. Materials to complete repairs will be stored on Site to ensure these are available to complete repairs. All damage and repair works will be recorded, and information provided to the Project Ecologist. Consideration must be given to protecting the exclusion fence (with Heras or other fencing) to prevent accidental damage from construction vehicles.

¹⁸ Froglife (1999), *Reptile Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.

¹⁹ Natural England (2011). Technical Information Note TIN102: Reptile mitigation guidelines. Natural England.(Withdrawn)

A suitable herbicide with minimal toxicity for herpetofauna will be applied to the exclusion fence perimeter to limit the amount of vegetation growth either side of the fence line, which can act as a means for reptiles re-entering the exclusion area (particularly common lizards). If such a low toxicity herbicide is not available then a trimmer can also be used for this purpose, but care must be taken to avoid damage to the fence itself or reptiles near the fence.

7.5.7. Habitat Reduction

Suitable habitat within the capture area will be cleared throughout the capture period to concentrate the reptiles in certain areas, making it easier to achieve successful captures. The extent and timing of clearance will be determined by the ECoW.

Following the completion of the capture programme, the remaining vegetation will be hand searched by an Ecologist and then trimmed to approximately 15cm (where habitat allows). The vegetation will be searched again and then trimmed to ground level.

7.6. Final Destructive Search

A final destructive search will be employed after completion of the Habitat Manipulation and Trapping and Relocation approaches. However destructive searches will be employed as the only approach in compartments D1, D2, D3 and D3 (See Figure A-5). This is because steep topography, vegetation type and/or ground conditions make them unsuitable for any other approach.

The final destructive search and a topsoil strip will be undertaken with the ecologist present to monitor, advise, and search for reptiles before commencing construction activities within the exclusion area. Destructive works i.e. topsoil stripping and stump grinding within the exclusion area must not be undertaken during the hibernation period as these activities risk harming hibernating reptiles. The Project Ecologist will determine when these activities must stop. Any remaining reptiles found during the hand search and destructive search will be captured and released into the nearest receptor site.

- For the habitat manipulation method, a destructive search will be carried out at least two days following completion to allow any reptiles sheltering in the soil to relocate to adjacent habitats. Artificial refuges placed at the edges of the working area to provide shelter to displaced reptiles will also be checked and any reptiles will be caught and released into the nearest receptor area.
- For the trapping and relocation method, a destructive search can be completed immediately following the conclusion of search efforts.
- During the destructive search process, potential reptile refuges remaining within the working area, such as logs piles, stones, rubble, bricks, etc. will be carefully moved, dismantled and inspected for the presence of reptiles by the ECoW.
- Following this, an excavator shall be used to carefully remove remaining vegetation, tree stumps, and the top 100-150 mm of topsoil with a toothed bucket. The ECoW will capture any reptiles exposed during this process. Any reptiles recovered will be relocated to the nearest receptor site.
- The extent of destructive search, precise depth of the bucket to excavate soil, and where spoil will be deposited to check for reptiles will be determined on site by the ECoW.
- Machinery, such as excavators, will not be tracked over undisturbed ground within the working area until approved by the ECoW. The machine operator will stop when asked to by the ECoW.
- Destructive works i.e. topsoil stripping and stump grinding within the exclusion area will not be undertaken during the hibernation period as these activities risk harming hibernating reptiles. The ECoW will determine when these activities must stop.
- Displacement of reptiles and a destructive search shall only take place when reptiles are active, typically between March/April and October (but dependent on weather conditions).
- Once habitat the destructive search has been completed and the ecologists have carried out a final hand-search for reptiles, then the area will be kept unsuitable for reptiles until earthworks have been completed. A construction auditing process will be in place to check on this (and fencing see below).

7.7. Long-term Management and Monitoring

7.7.1. Monitoring

The number, species, life stage (adult, sub-adult, juvenile) and, when possible, sex of reptiles translocated from the Site during capture and translocation will be recorded and retained. This will be followed by monitoring of the Reptile Receptor Sites to document occurrence of common lizard.

Monitoring will take place over five years and will take place in the first, third, and fifth year post-commencement of reptile relocation.

The monitoring surveys will utilise artificial refugia, which will be taken from the Site once the capture and relocation has been completed and will be placed within the Reptile Receptor Sites. Artificial refuges will be deployed at a density of 10 per hectare²⁰.

Monitoring will follow good practice guidelines for reptile survey and monitoring²¹. Each year of monitoring will involve seven surveys visits to the Reptile Receptor Sites during suitable weather conditions and at the optimal times of year according to good practice guidelines (typically April, May, and September). Each monitoring visit will take place in the following conditions:

- Site visited between the hours of 07:00 and 18:00,
- Air temperature between 9°C and 18°C,
- Little to no wind or precipitation, and;
- Generally, hazy or intermittent sunshine or bright sunshine early in the day.

Monitoring visits will also take note of the condition of habitat within the Reptile Receptor Sites, which will inform future habitat management.

7.7.2. Receptor Site Habitat Management

To ensure that the reptile receptor sites remain suitable for reptiles in the long term, it will be necessary to manage habitats to provide cover, foraging, basking and hibernating resources for reptiles²².

It is considered unlikely that active management will be necessary in the first three years of monitoring; however, during the monitoring visits, the condition of the habitats within the Reptile Receptor Sites will be recorded and, if necessary, recommendations will be made as to whether any active management is needed. Areas of R2 that are currently heavily grazed and have therefore lower suitability for reptiles will need to be left ungrazed to improve vegetation structure, benefitting invertebrate populations which will provide prey for reptiles and therefore increase the carrying capacity of the habitat for translocated reptiles.

Active management will be needed when scrub encroachment results in over 20% of a Reptile Receptor Site being dominated by scrub or tall ruderal vegetation and when there is damage to hibernacula, refugia and fencing. Management recommendations are likely to include the following:

- Phased cutting (strimming or flailing) or mowing to control the succession of woody vegetation and diversify habitat structure. This must be undertaken during the winter period when reptiles are generally inactive (preferably November to February). The timing will take weather conditions into account as it is possible for reptiles to be active throughout the year if weather conditions are suitable. Care must be taken to avoid the disruption of any hibernacula, or features that could shelter hibernating reptiles such as large tussocks during cutting or mowing.
- Remediation works to reptile hibernacula and refugia if any of these features suffer significant damage. If such works are necessary, they will be carried out between April and September when reptiles are active so that they can retreat from the works without harm, and;
- A rotational programme of sustainable stock levels of grazing to reduce succession of grassland to tall ruderal and scrub.

²⁰ Herpetofauna Groups of Britain and Ireland 1998. *Evaluating local mitigation/translocation programme: maintaining best practice and lawful standards*. HGBI advisory notes for amphibian and reptile groups. This advisory note indicates for populations of this size (assumed large), at least 100 refuges ('tins') should be used per ha.

²¹ Froglife Advice Sheet 10 (2014) Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Available at: <https://cieem.net/resource/froglife-advice-sheet-10-reptile-survey/>. Accessed on: 13/02/2020

²² Edgar, P., Foster, J. and Baker, J. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

Any cutting, mowing or remediation works will be conducted in the presence of an ECoW who can advise and check for reptiles during these works.

Any grazing regime will be agreed between graziers and the Project Ecologist – the appropriate stocking levels, species and breed of livestock, areas, timing, intensity and duration of grazing must be determined to maximize the benefits and minimize any risks for reptiles.

Grazing can improve habitat suitability for reptiles:

- Limiting the development of scrub, thus preventing a site from becoming too shaded.
- Creating areas of short vegetation amongst denser habitat, where reptiles can bask close to cover.
- Increasing the diversity of vegetation structure.

However; any grazing carried out should be done carefully and monitored for effects on reptile populations and habitat suitability as there is the potential for adverse effects:

- Creating a very low sward, unsuitable for reptile occupancy.
- Creating a uniform vegetation structure, unsuitable for reptile activity.
- Selectively removing key elements of vegetation structure, such as stands of Tufted Hair Grass (*Deschampsia sp*) or tussocks of Purple Moor Grass (*Molinia caerulea*).
- Reducing prey abundance (through poor habitat suitability for invertebrates).
- Enrichment of soils through dunging (leading to changes in vegetation structure).
- Damaging the vegetation structure through trampling.
- Direct mortality through trampling

7.7.3. Reporting

A short report will be produced following each year of the monitoring that will detail the results of the monitoring and any management recommendations. These reports will be presented to the relevant local planning authorities.

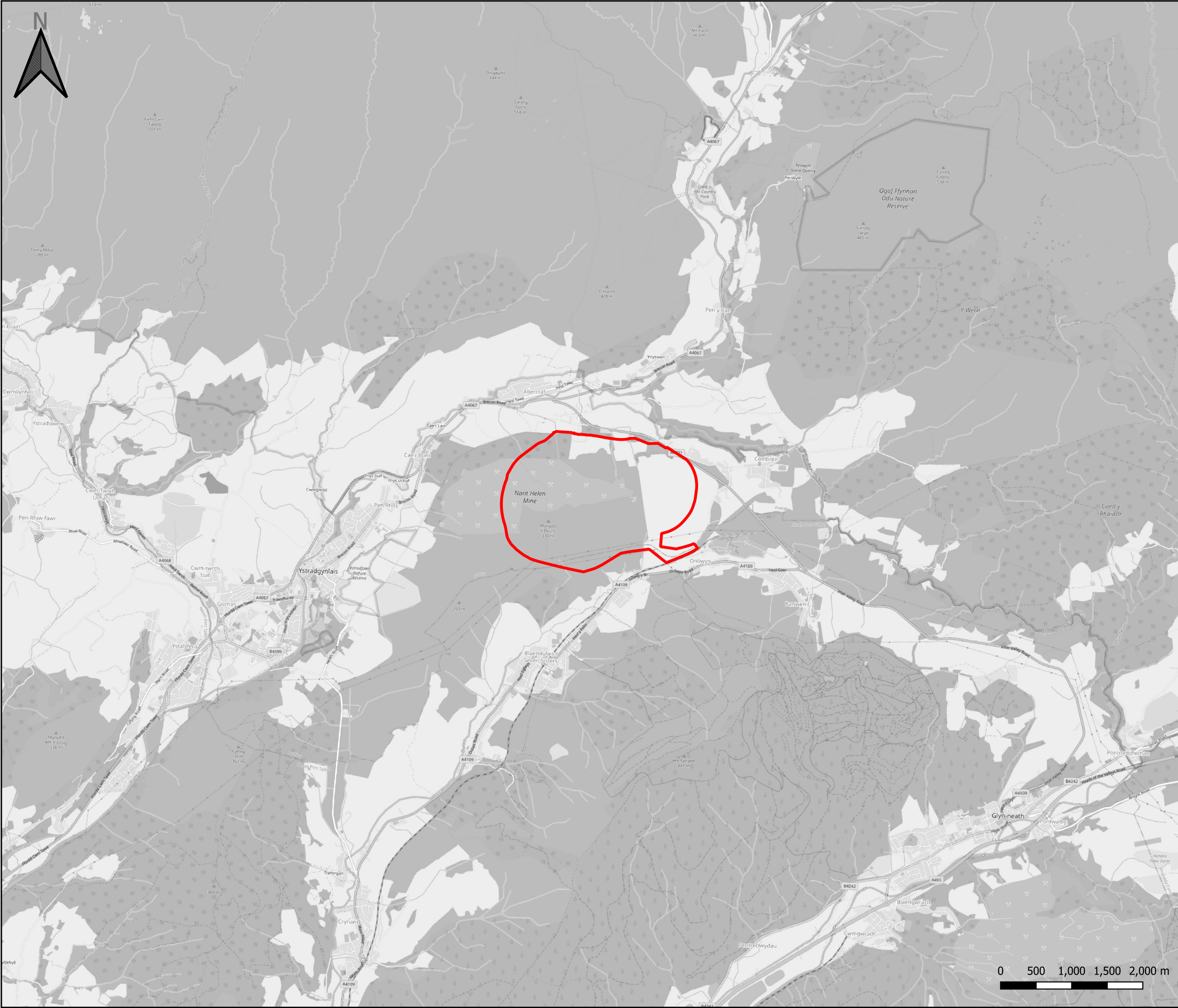
7.8. Indicative Programme

An indicative programme for reptile mitigation works is presented below. This programme is subject to change and necessary adjustments to timings will be monitored by the Project Ecologist:

- Creation of the compensation habitat at the Reptile Receptor Sites, including the creation of hibernacula – February-April 2023.
- Habitat manipulation - April-October 2023.
- The installation of reptile exclusion fencing - April-October 2023.
- Reptile trapping and relocation - for a minimum of 30 days, April-October 2023 and if necessary, March 2024-October 2024.
- Following five clear days trapping days on the Site, the remaining suitable habitat within the fenced compartments will be trimmed to ground level and the Site will be cleared under supervision of an ECoW - April-October 2023, and March- October 2024 during the active reptile period.
- It is anticipated that the above capture and translocation work will be completed by October 2023, but some compartments may be completed in 2024.
- The first year of monitoring will take place in 2024.

Appendices





 Nant Helen Site Boundary

Base Mapping: © OpenStreetMaps and its contributors

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2 Capital Quarter
Tyndall Street
Cardiff
CF10 4BZ

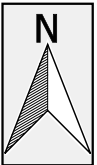
Client
GCRE Limited

Project
Global Centre of Rail Excellence

Title
Nant Helen Site Boundary

Sheet Size A3	Original Scale: 1:50,000	Design/Drawn SB	Checked VG	Reviewed CW
		Date 02/02/23	Date 19/02/23	Date 22/02/23

Drawing Number			Rev
N/A			00



- Red line boundary
- Overburden Mound - for NVC Survey of this location, see Celtic Energy Limited (2022) Nant Helen Remainder Surface Mine: Review of Habitats & Species of Principal Importance on the Overburden Mound
- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A1.2.2 - Coniferous woodland - plantation
- A1.3.1 - Mixed woodland - semi-natural
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- A3.1 - Broadleaved Parkland/scattered trees
- B1.1 - Acid grassland - unimproved
- B1.2 - Acid grassland - semi-improved
- B5 - Marsh/marshy grassland
- B6 - Poor semi-improved grassland
- D1.1 - Dry dwarf shrub heath - acid
- D5 - Dry heath/acid grassland
- E3.2 - Fen - basin mire
- I2.1 - Quarry
- I2.2 - Spoil
- J1.2 - Amenity grassland
- J1.3 - Ephemeral/short perennial
- J2.6 - Dry ditch
- J3.6 - Buildings
- J5 - Other habitat
- G1 - Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge

Original Scale:	1:9500	Version: 2
Base Mapping: © OpenStreetMap and its contributors		
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Client: GCRE Ltd		
Project: Global Centre for Rail Excellence: Complementary Earthworks Scheme		
Job No: 5209796		
Title: Extended Phase 1 Habitat Plan		
Figure No: Figure B-1		
Drawn by: SS Date: 20/06/22	Checked by: MS Date: 15/02/23	Reviewed by: CW Date: 17/02/22

- Scheme Boundary

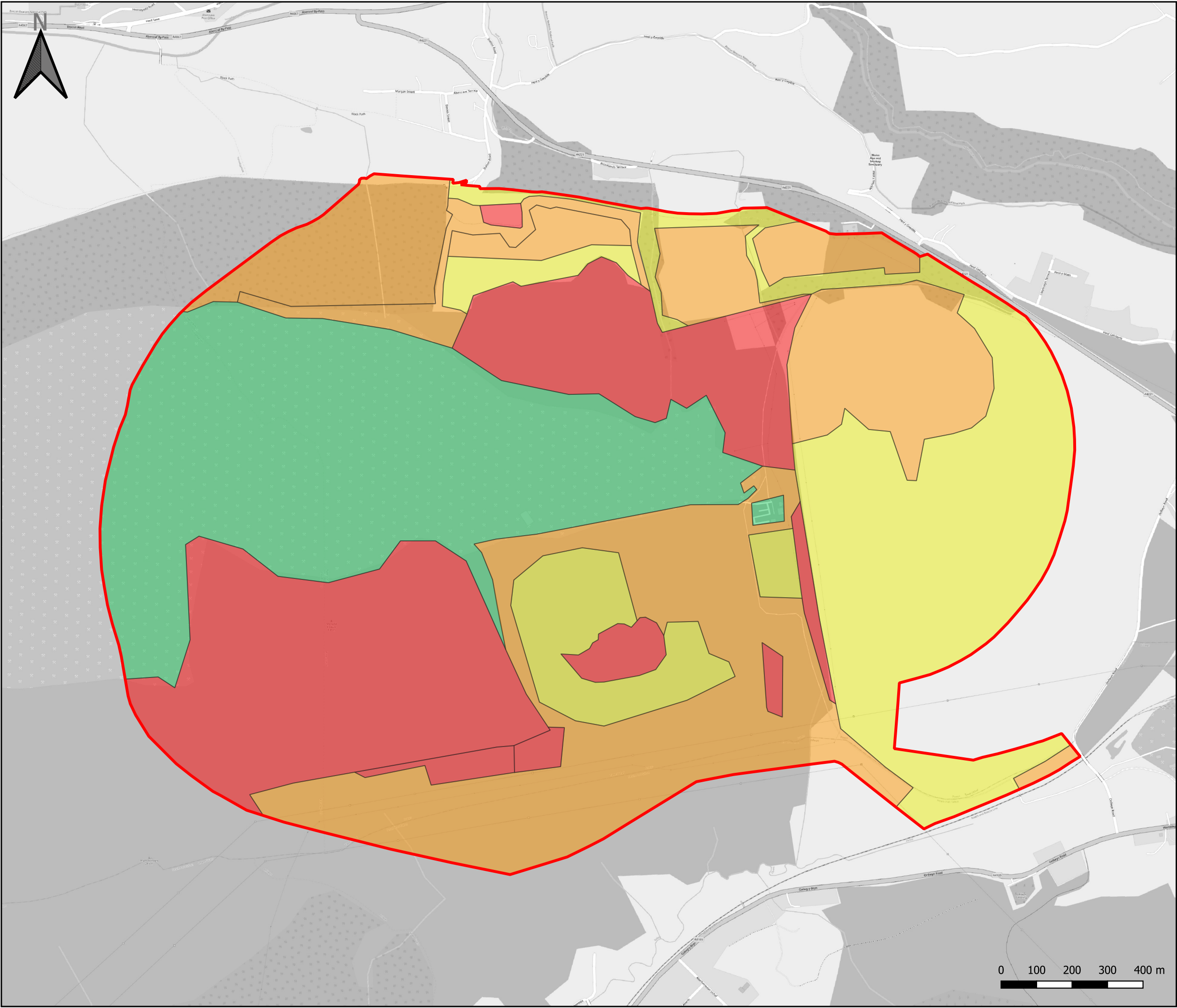
Reptile Confirmed

Reptile Refugia Location

Phase 1 Habitat Survey

- A1.1.1 - Broadleaved woodland
- semi-natural
- A1.1.2 - Broadleaved woodland
- plantation
- A1.2.2 - Coniferous woodland
- plantation
- A1.3.1 - Mixed woodland
- semi-natural
- A1.3.2 - Mixed woodland
- plantation
- A2.1 - Scrub - dense
/continuous
- A3.1 - Broadleaved Scattered
trees
- B1.2 - Acid grassland -
semi-improved
- B5 - Marsh/marshy grassland
- B6 - Poor semi-improved
grassland
- D1.1 - Dry dwarf shrub heath - acid
- D5 - Dry heath/acid grassland
- E3.2 - Fen - basin mire
- I2.1 - Quarry
- I2.2 - Spoil
- J1.2 - Amenity grassland
- J1.3 - Ephemeral/short perennial
- J2.6 - Dry ditch
- J3.6 - Buildings
- J5 - Other habitat

Original Scale:	1:9000	Version: X
Base Mapping: © OpenStreetMap and its contributors		
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Client: GCRE Ltd		
Project: Global Centre of Rail Excellence		
Job No: 5209796		
Title: Reptile Survey Results and Phase 1 Habitat Survey		
Figure No: Figure A3		
Drawn: MS Date: 07/02/23	Checked: VG Date: 07/02/23	Reviewed: CW Date: 07/02/23



 Nant Helen Site Boundary

Reptile Habitat Suitability

-  High
-  Moderate
-  Low
-  Negligible

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Title
Reptile Habitat Suitability

Sheet Size	Original Scale:	Design/Drawn	Checked	Reviewed MS
A3	1:10,000	SB	LW	
		Date 17/03/23	Date 29/03/23	Date 29/03/23

Drawing Number	Rev
N/A	00



-  Nant Helen Site Boundary
- Proposed Reptile Mitigation**
-  Fence
-  Habitat Manipulation
-  Destructive search
-  Dependant on accessibility of field
-  Negligible suitability
-  Receptor

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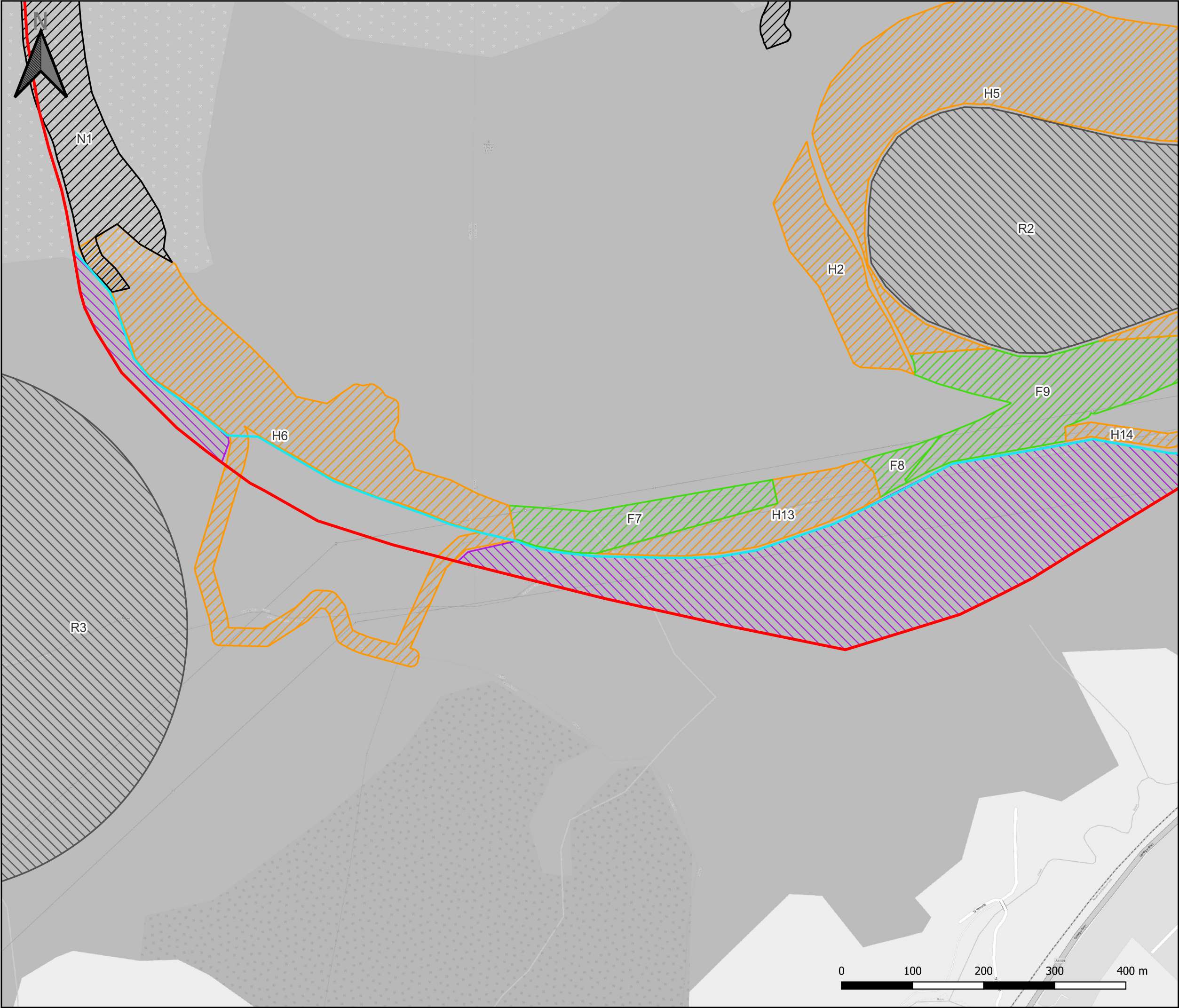
Client
GCRE Limited

Project
Global Centre of Rail Excellence

Title
Reptile Mitigation Plan

Sheet Size	Original Scale:	Design/Drawn	Checked	Reviewed MS
A3	1:10,000	SB	LW	
		Date 09/03/23	Date 29/03/23	Date 29/03/23

Drawing Number	Rev
N/A	00



-  Nant Helen Site Boundary
- Proposed Reptile Mitigation**
-  Compartment fencing
-  Habitat Manipulation
-  No Mitigation
-  ReceptorArea
-  Area for Artificial Refugia
-  Reptile Fencing- to prevent reptiles re-entering working areas

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Title

Additional Requirements at Receptor Site 3

Sheet Size A3	Original Scale: 1:5,000	Design/Drawn SB	Checked LW	Reviewed MS
		Date 28/03/23	Date 29/03/23	Date 29/03/23

Drawing Number

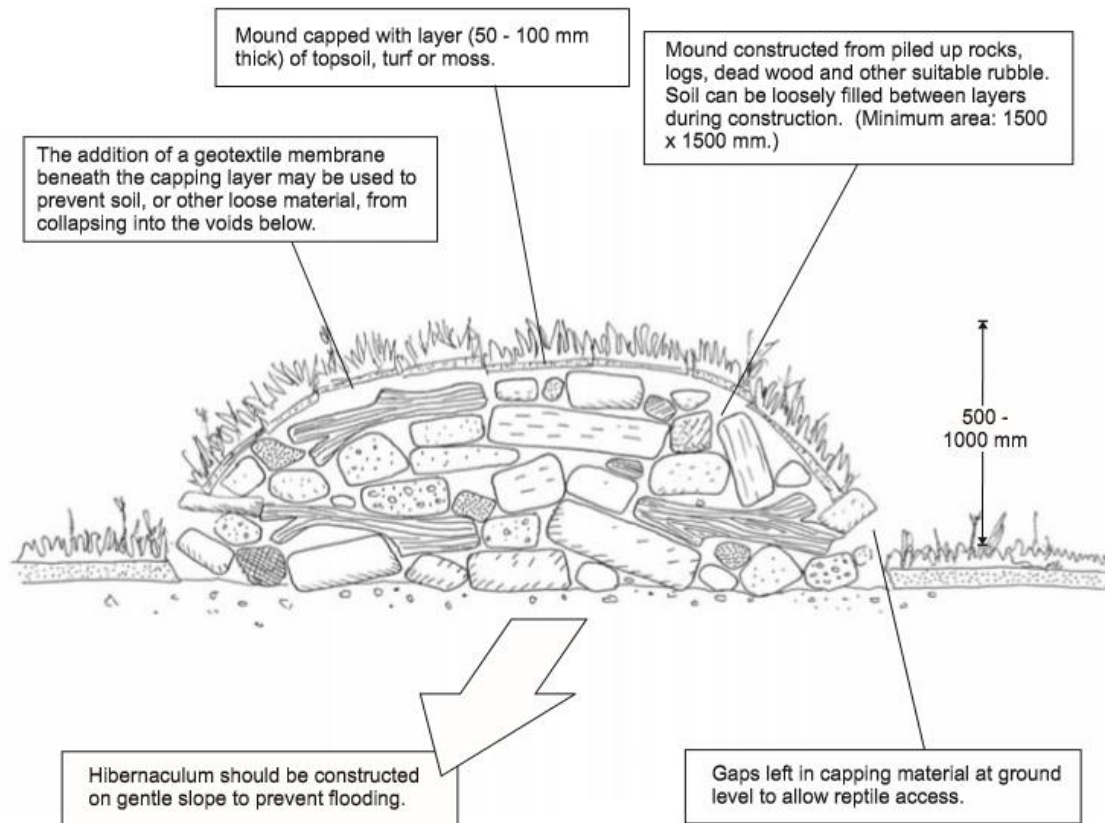
N/A

Rev

00

Appendix B. Hibernaculum Specification

Figure B-1 – Reptile Hibernaculum Specification²³



²³ Reptile hibernacula drawing has been taken from Highways Agency (2005) Nature Conservation Advice in Relation to Reptiles and Roads. Design Manual for Roads and Bridges Vol. 10, Section 4, Part 7.

Appendix C. Survey results

C.1. Reptiles

Table 7-2 – Reptile survey summary

		Weather						Survey results		
Survey number	Dates	Temperature			Conditions			Species recorded	Daily total	Survey total
		High	Low	Average	Rain	Wind	Cloud			
1	01/09/22	18	10	14	No rain	Light breeze on exposed areas	80% cloud cover with intermittent sunny spells	Common lizard	22	42*
	02/09/22	21	11	16	Light patchy	Strong on exposed areas with sheltered pockets	60% cloud cover with intermittent sunny spells	Common lizard	20	
2	05/09/22	18	15	16.5	No rain	Strong breeze on exposed areas	80% cloud cover	Common lizard	38	41
	06/09/22	20	16	18	No rain	Strong breeze on exposed areas	40% cloud cover	Common lizard	3	
3	12/09/22	21	14	17.5	No rain	Light breeze on exposed areas	60% cloud cover with sunny patches	Common lizard	15	17
	13/09/22	20	13	16.5	No rain	Light breeze on exposed areas	50% cloud cover with sunny patches	Common lizard	2	
4	15/09/22	17	13	15	No Rain.	Mild breeze on exposed areas with sheltered pockets.	Sunny, with 20% cloud cover.	Common lizard	26	26
5	19/09/22	17	14	15.5	No Rain	Mild breeze on exposed areas with sheltered pockets.	Sunny, with 20% cloud cover.	Common lizard	5	5
6	22/09/22	18	11	14.5	Short periods of light drizzle throughout visit.	Mild breeze on exposed areas with sheltered pockets.	Varied 40%-80% cloud cover during the survey, with intermittent sunny spells.	Common lizard	16	24
	23/09/22	20	11	15.5	No Rain	Mild breeze on exposed areas with sheltered pockets.	Sunny, with 20% cloud cover.	Common lizard	8	
7	27/09/22	12	10	11	Drizzle throughout visit.	Strong - mild breeze on exposed areas with sheltered pockets.	80% cloud cover, with intermittent sunny spells.	Common lizard	5	5

* Peak number of reptiles observed during surveys

Table 7-3 – Reptile survey observation record

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
2	1a	01/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
21	1a	01/09/2022	Common lizard	Sighting	2	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
265	1a	01/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
30	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
35	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
5	1a	01/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
8	1a	01/09/2022	Common lizard	Sighting	3	Female	Adult	B1.2 - Acid grassland - semi-improved
A560	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Unknown	B1.2 - Acid grassland - semi-improved
AM21	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
D3	1a	01/09/2022	Common lizard	Sighting	2	Unknown	Adult	D1.1 - Dry dwarf shrub heath - acid
I2	1a	01/09/2022	Common lizard	Sighting	2	Female	Adult	A1.1.1 - Broadleaved woodland - semi-natural
I2	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	A1.1.1 - Broadleaved woodland - semi-natural
M31	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
T11	1a	01/09/2022	Common lizard	Sighting	1	Male	Adult	B5 - Marsh/marshy grassland
T16	1a	01/09/2022	Common lizard	Sighting	1	Female	Adult	B5 - Marsh/marshy grassland
T17	1a	01/09/2022	Common lizard	Sighting	1	Female	Adult	B5 - Marsh/marshy grassland
T36	1a	01/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	J1.2 - Cultivated/disturbed land - amenity grassland
16	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
22	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	A1.3.2 - Mixed woodland - plantation
23	1b	02/09/2022	Common lizard	Sighting	1	Female	Sub-adult	D1.1 - Dry dwarf shrub heath - acid

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
29	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
68	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
82	1b	02/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
A574	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
AP38	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	D1.1 - Dry dwarf shrub heath - acid
AP73	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Unknown	D1.1 - Dry dwarf shrub heath - acid
AS31	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Adult	B1.2 - Acid grassland - semi-improved
AS62	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
B1	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	D1.1 - Dry dwarf shrub heath - acid
C10	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
C11	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
D22	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
D3	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	D1.1 - Dry dwarf shrub heath - acid
L13	1b	02/09/2022	Common lizard	Sighting	1	Female	Adult	D1.1 - Dry dwarf shrub heath - acid
P8	1b	02/09/2022	Common lizard	Sighting	1	Male	Adult	D1.1 - Dry dwarf shrub heath - acid
R1	1b	02/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
Y16	1b	02/09/2022	Common lizard	Sighting	1	Female	Adult	D1.1 - Dry dwarf shrub heath - acid
10	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
11	2a	05/09/2022	Common lizard	Sighting	2	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
12	2a	05/09/2022	Common lizard	Sighting	1	Female	Adult	B5 - Marsh/marshy grassland
12	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
16	2a	05/09/2022	Common lizard	Sighting	1	Female	Adult	B5 - Marsh/marshy grassland
16	2a	05/09/2022	Common lizard	Sighting	2	Unknown	Juvenile	B5 - Marsh/marshy grassland
19	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	J5 - Other habitat
23	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Unknown	D1.1 - Dry dwarf shrub heath - acid
23	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Adult	D1.1 - Dry dwarf shrub heath - acid
28	2a	05/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
3	2a	05/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
30	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
37	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
5	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
6	2a	05/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
8	2a	05/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
8	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
9	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
A44	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Adult	B5 - Marsh/marshy grassland
AP73	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
AS31	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Adult	B1.2 - Acid grassland - semi-improved
AS60	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
AS60	2a	05/09/2022	Common lizard	Sighting	4	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
AS78	2a	05/09/2022	Common lizard	Sighting	3	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
C11	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Adult	B1.2 - Acid grassland - semi-improved

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
F15	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
H13	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
H20	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	A1.1.1 - Broadleaved woodland - semi-natural
M15	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
M19	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
P8	2a	05/09/2022	Common lizard	Sighting	1	Unknown	Adult	D1.1 - Dry dwarf shrub heath - acid
AM20	2b	06/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	A1.1.1 - Broadleaved woodland - semi-natural
AM21	2b	06/09/2022	Common lizard	Sighting	1	Male	Sub-adult	B5 - Marsh/marshy grassland
W2	2b	06/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
16	3a	12/09/2022	Common lizard	Sighting	1	mixed	Adult	B5 - Marsh/marshy grassland
16	3a	12/09/2022	Common lizard	Sighting	2	Unknown	Sub-adult	B5 - Marsh/marshy grassland
238	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
54	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
A560	3a	12/09/2022	Common lizard	Sighting	1	Male	Sub-adult	B1.2 - Acid grassland - semi-improved
A7	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
AF15	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
AP73	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
AS27	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland
M19	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
Wild observation	3a	12/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
Wild observation	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Adult	B1.2 - Acid grassland - semi-improved

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
Wild observation	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Adult	A1.1.1 - Broadleaved woodland - semi-natural
Wild observation	3a	12/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	A1.1.1 - Broadleaved woodland - semi-natural
M15	3b	13/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland
T7	3b	13/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
10	4	15/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
16	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
19	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	J5 - Other habitat
24	4	15/09/2022	Common lizard	Sighting	2	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
27	4	15/09/2022	Common lizard	Sighting	2	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
33	4	15/09/2022	Common lizard	Sighting	1	Female	Adult	B1.2 - Acid grassland - semi-improved
68	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
8	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
9	4	15/09/2022	Common lizard	Sighting	1	Male	Adult	B1.2 - Acid grassland - semi-improved
AS74	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
B1	4	15/09/2022	Common lizard	Sighting	2	Male	Adult	D1.1 - Dry dwarf shrub heath - acid
B5	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
D3	4	15/09/2022	Common lizard	Sighting	4	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
E10	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
J37	4	15/09/2022	Common lizard	Sighting	1	Unknown	Unknown	B1.2 - Acid grassland - semi-improved
T11	4	15/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland
T14	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
T16	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
T17	4	15/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
T19	4	15/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland
A563	5	20/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
B5	5	20/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
M31	5	20/09/2022	Common lizard	Sighting	1	Male	Sub-adult	B1.2 - Acid grassland - semi-improved
M41	5	20/09/2022	Common lizard	Sighting	1	Unknown	Adult	B5 - Marsh/marshy grassland
T16	5	20/09/2022	Common lizard	Sighting	1	Male	Adult	B5 - Marsh/marshy grassland
15	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
18	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
35	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
39	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Adult	B1.2 - Acid grassland - semi-improved
AP26	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
B1	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
B5	6a	22/09/2022	Common lizard	Sighting	1	Female	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
B8	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	D1.1 - Dry dwarf shrub heath - acid
D23	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B1.2 - Acid grassland - semi-improved
M41	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
T13	6a	22/09/2022	Common lizard	Sighting	2	Male	Adult	B5 - Marsh/marshy grassland
T2	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
T4	6a	22/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland

Refugia ID	Survey Visit	Date	Species	Evidence	Number of individuals	Sex	Life Stage	Phase 1 Habitat
T8	6a	22/09/2022	Common lizard	Sighting	1	Male	Sub-adult	B5 - Marsh/marshy grassland
Y16	6a	22/09/2022	Common lizard	Sighting	1	Male	Sub-adult	D1.1 - Dry dwarf shrub heath - acid
22	6b	23/09/2022	Common lizard	Sighting	2	mixed	Juvenile	A1.3.2 - Mixed woodland - plantation
65	6b	23/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
AM21	6b	23/09/2022	Common lizard	Sighting	2	Female	Sub-adult	B5 - Marsh/marshy grassland
K15	6b	23/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	A1.1.1 - Broadleaved woodland - semi-natural
M7	6b	23/09/2022	Common lizard	Sighting	1	Male	Adult	B5 - Marsh/marshy grassland
T17	6b	23/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B5 - Marsh/marshy grassland
35	7	26/09/2022	Common lizard	Sighting	1	Unknown	Sub-adult	B1.2 - Acid grassland - semi-improved
AS17	7	26/09/2022	Common lizard	Sighting	1	Unknown	Adult	B5 - Marsh/marshy grassland
I27	7	26/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
M41	7	26/09/2022	Common lizard	Sighting	1	Unknown	Juvenile	B5 - Marsh/marshy grassland
T4	7	26/09/2022	Common lizard	Sighting	1	Male	Sub-adult	B5 - Marsh/marshy grassland

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