

Kintore Hydrogen Plant Reptile Survey Report



December 2023

CONTROL SHEET

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EXECUTIVE SUMMARY

EnviroCentre Ltd. were commissioned by Kintore Hydrogen Limited to undertake a targeted reptile survey within the site known as Kintore Hydrogen Plant, in land south of Kintore. The surveys were required to inform development of a Hydrogen electrolysis plant.

A Preliminary Ecological Appraisal identified suitable reptile habitat within the proposed development boundary. 78 artificial refugia were placed across four areas of suitable habitat and were checked on a further three visits between July and September 2023.

A total of 16 common lizard were observed within the western areas during the survey period, with a peak count of 5 individuals recorded during one of the refugia checks, equating to a “Good” population. No other reptile species were recorded on site during the surveys, though slow worm and adder are likely to be present in the wider environment and utilise the suitable habitats on site.

The proposed development has the potential to result in the following negative and positive impacts if mitigation and enhancement is not implemented:

Negative

- Permanent or temporary loss of suitable habitat for reptiles as a result of construction works;
- Reptiles may be killed or injured during vegetation clearance within the site; high suitability areas of habitat are to be removed to facilitate the development;
- Vegetation removal will result in the loss of foraging habitat (grassland, wetland, heath, woodland and scrub) and associated prey items such as spiders, slugs, and insects if removed to facilitate the development; and
- Construction and vegetation clearance activities will result in further fragmentation of existing populations.

Positive

- Protection and enhancement suitable habitats on site; and
- Creation of new suitable habitats offering new foraging habitat (especially where habitat mosaics are created) and increasing connectivity between existing areas of suitable habitat.

Recommended mitigation to minimise direct harm and habitat loss include:

- The development should be designed to avoid the West 1 area, as there is potential for high-quality habitat to be damaged or become degraded as a result of vegetation clearance and construction activities.
- The development should seek to retain features which provide basking, commuting routes and sheltering refugia for reptiles, including stone walls, boulders in grassland areas and any stone piles, where possible.
- To minimise the risk of harm to overwintering reptiles or breeding reptiles, any dismantling or rebuilding of potential refugia (e.g., stone walls or stone piles) should be undertaken October/November to avoid sensitive hibernation and breeding periods. Otherwise, an Ecological Clerk of Works (ECoW)/ project ecologist should be present to ensure the above works are undertaken with the appropriate level of caution.

Opportunities to enhance the site for common lizard and other reptiles include:

- Hedgerows provide valuable corridors for helping movement of reptiles and should be considered along boundaries of the development, where possible. In addition, broad uncultivated margins, or areas along the hedges that are protected from strimming, preferably on the sunny side of the hedge, are useful.
- Expanding existing high suitability habitat through the creation of a mosaic of habitats.

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1 INTRODUCTION

1.1 Terms of Reference

EnviroCentre Ltd. were commissioned by Kintore Hydrogen Limited to undertake a targeted reptile survey within the site known as Kintore Hydrogen Plant, in land south of Kintore. The surveys were required to inform development of a Hydrogen electrolysis plant.

The 'site' is defined as the area demarcated by the red line boundary as shown in Appendix A.

1.2 Background

A Preliminary Ecological Appraisal (PEA) was undertaken in May 2023¹ of the whole site boundary by EnviroCentre, where the habitats on site were assessed as offering suitability for reptiles, therefore a targeted survey for reptiles was recommended.

1.3 Scope of Report

To assess the likely impacts of the proposed development on local reptile populations, the following objectives were identified:

- Undertake a survey of suitable areas of habitat for reptiles to:
 - Ascertain the presence or likely-absence of reptiles within the site and surrounding habitat;
 - Classify the population size according to current guidelines;
- Assess likely impacts of works upon reptiles without mitigation; and
- Outline appropriate avoidance, mitigation, compensation and enhancement opportunities.

1.4 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

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¹ ECREP13628_Kintore Hydrogen Plant PEA_FinalV3

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2 METHODS

2.1 Habitat Suitability

An assessment of habitat suitability for reptiles was made during the PEA survey in 2023, following current guidance on the identification of high-quality reptile habitat². Surveyors recorded habitats within the proposed development boundary providing favourable conditions for reptiles, including:

- Structural diversity to facilitate basking, foraging and shelter (e.g., grassland-heath mosaics);
- Suitable topography (e.g., south-facing slopes);
- Ecotones (transitional zones between habitats);
- Hibernation opportunities (e.g., large grass tussocks, rotten tree stumps and logs, root holes, mammal burrows); and
- Connectivity with adjacent areas of suitable habitat.

This assessment was then used to inform the placement of refugia for the field survey (below), with habitat suitability re-evaluated during the survey.

2.2 Field Survey

Refer to Appendix B for areas surveyed within the site.

A field survey was undertaken to identify the presence or absence of reptiles on site. The surveys were undertaken by EnviroCentre ecologist Mhairi Mackintosh (MM), Jennifer Paterson (JP) Scott Fraser (SF) who are full, associates and qualifying members of the Chartered Institute of Ecology and Environmental Management (CIEEM), respectively. The survey was designed and conducted in reference to Amphibian and Reptile Conservation UK (ARC UK) guidance^{3,4}.

Artificial refugia comprising 0.5m squares of bitumen roofing felt were placed across four areas within the site; two in the area proposed for electrolysis plant and grid connection (West 1 and West 2) and two in the area proposed for the water pipeline connection and abstraction discharge point (East 1 and East 2), at an approximate density of 10 per hectare of suitable habitat⁵, (purple-moor grass and rush pasture, lowland dry acid grassland, lowland fen, deschampsia neutral grassland, gorse scrub, wet woodland, native pine woodland, other neutral grassland, heath and modified grassland). A total of 78 refugia (62 in West 1, six in West 2, six in East 1 and four in East 2). Edge habitat, potential basking locations, and intersections between grassland, scrub and woodland mosaics were among the locations prioritised. The refugia were left untouched for two weeks prior to the first survey visit. Survey dates, timing and weather conditions are set out in Table 2-1 below.

² Edgar, P., Foster, J. and Baker, J. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.

³ Sewell, D., Griffiths, R. A., Beebee, T. C., Foster, J. and Wilkinson, J. W. (2013) Survey Protocols for the British Herpetofauna. Available at: <https://www.arc-trust.org/survey-protocols> (Accessed September 2023)

⁴ Amphibian and Reptile Conservation Trust: National Amphibian and Reptile Monitoring Scheme. Available at: <https://reptile-survey.arc-trust.org/pages/protocol> (Accessed September 2023)

⁵ A density of 5 mats per hectare of suitable habitat was used for the larger area of the site due to time vs survey effort considerations.

Table 2-1: Summary of Reptile Survey Visits

Visit	Surveyor	Date	Time	Weather Conditions	Comments
0	MM/JP	12 th July	9:00-12:00	Dry, clear, 18°C, Beaufort Scale (BF) 1	Refugia placed; visual search conducted
1	SF	31 st July	9:00-14:00	Dry, clear, 18°C, BF 2	Refugia checked; visual search conducted
2	SF	28 th August	9:00-14:00	Dry, overcast, 17°C, BF 3	
3	SF	11 th September	9:00-14:00	Dry, clear, 20°C, BF 3	Refugia checked; visual search conducted; and refugia collected

Any reptiles present on or under the refugia were recorded along with passive sightings (e.g., while moving between refugia). Corresponding population size was then approximated with reference to Froglife criteria⁶, summarised in Table 2-2 below.

Table 2-2: Estimation of Population Size from Peak Count* Data

Species*	Low (Score 1)	Good (Score 2)	Exceptional (Score 3)
Adder (<i>Vipera berus</i>)	<5	5-10	>10
Common lizard (<i>Zootoca vivipara</i>)	<5	5-20	>20
Slow worm (<i>Anguis fragilis</i>)	<5	5-20	>20

*maximum number of individuals recorded per survey visit

⁶ Froglife Advice Sheet 10: Reptile Survey – An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Available at: https://www.wildcare.co.uk/media/wysiwyg/pdfs/froglife_advice_sheet_10_-_reptile_surveys.pdf (Accessed May 2023). Grass snake *Natrix helvetica* is considered absent from the region and is excluded from the table above.

3 RESULTS AND ASSESSMENT

Refer to Appendix C for refugia locations and results.

3.1 Field Survey

No slow worm or adder sightings were recorded during the survey. No reptiles were recorded in areas East 1 and 2 during the surveys. A total of 16 common lizard were observed in West 1 and 2 during the survey period, with a peak count of 5 recorded during one of the refugia checks. Survey results are shown in Table 3-1 below.

Table 3-1: Summary of Reptile Survey Results

Survey	Date	Surveyor	Common Lizard Records				Total
			West 1 (Wetland/ Woodland/ Grassland/ Heath mosaic) *	West 2 (Grassland with scrub) *	East 1 (Grassland/ Scrub mosaic) **	East 2 (Woodland/ Scrub mosaic) **	
0 (refugia deployment)	12 th July	MM/ JEP	3	0	0	0	3
1	31 st July	SF	2	1	0	0	3
2	28 th August	SF	4	1	0	0	5
3	11 th September	SF	5	0	0	0	5

*In the area proposed for the electrolysis plant and grid connection

** In the area proposed for the water pipeline connection options and abstraction discharge point

3.1 Habitat Suitability and Population Estimates

The wetland, woodland, grassland, heath mosaic in West 1 offers both more exposed areas for basking and foraging in close proximity to tall, dense refuge habitat. The range of habitat types in West 1 provide suitable refuge habitat to complement the abundance of invertebrate prey present. West 2 comprises predominantly of grassland with scattered scrub and boulders are present throughout, which offers commuting, foraging and some basking opportunities for reptiles. West 1 and West 2 are partially connected via stone walls along arable fields. Stone walls provide additional foraging, basking, sheltering and overwintering habitats for reptiles.

A peak count of five common lizards in West 1 is considered a “Good” population. Prey abundance combined with large mosaic habitats offering ecotones and presence of basking spots is perhaps the most likely explanation for the higher counts associated with West 1.

A peak count of one common lizard in West 2 equates to a ‘Low’ population. Although this area supports good habitat for reptiles, it is relatively isolated from other suitable habitat, due to being surrounded by arable land. Only two stone walls and a linear route of scrub connect West 2 to other suitable habitat (including to West 1).

The grassland and scrub habitat in East 1 and woodland and scrub habitat in East 2 offer areas for foraging and sheltering but lack clear basking areas. East 1 had a high presence of livestock which may reduce suitability for reptiles due to grazing pressures and the habitats surrounding East 2 predominantly

comprised agricultural land, reducing availability of suitable connecting habitat in the area for reptiles. These factors combined likely resulted in no records of reptiles in East 1 and 2.

Common lizard are expected to be present in similar numbers across the wider environment, including areas of woodland, heathland and scrub, extending out with and adjacent to the site.

Slow worm were not recorded on site during the survey period. Slow worm habitat preferences include heathland, tussocky grassland, woodland edges and rides, which the West 1 location offers all of, but the other sites in general only offer one feature (West 2 offers tussocky grassland, East 1 offers tussocky grassland and East 2 offers woodland) and therefore less suitable. As slow worm are elusive, it is considered slow worm are likely present in West 1.

Habitat suitability for adder is most similar to that of common lizard, with strong requirements for ecotones between short grassland or open woodland rides and dense, heathy scrub. The availability of prey for both young (invertebrates) and mature (small mammals, common lizard) adders, combined with the presence of heath-grassland mosaics, indicate that adder may also be present within the West 1 habitat and also habitats surrounding the site. Due to the high presence of livestock in East 1 and limited connectivity of West 2 and East 2 adder are less likely to be present.

4 POTENTIAL IMPACTS, MITIGATION AND ENHANCEMENT OPPORTUNITIES

4.1 Potential Impacts

The proposed development has the potential to result in the following negative impacts if mitigation and enhancement is not implemented:

- Permanent or temporary loss of suitable habitat for reptiles as a result of construction works;
- Reptiles may be killed or injured during vegetation clearance within the site if high suitability areas of habitat are to be removed to facilitate the development;
- Vegetation removal will result in the loss of foraging habitat (grassland, wetland, heath, woodland and scrub) and associated prey items such as spiders, slugs, and insects if removed to facilitate the development; and
- Construction and vegetation clearance activities will result in further fragmentation of existing populations.

Potential positive impacts include:

- Protection and enhancement of suitable habitats on site; and
- Creation of new suitable habitats offering new foraging habitat (especially where habitat mosaics are created) and increasing connectivity between existing areas of suitable habitat.

4.2 Mitigation

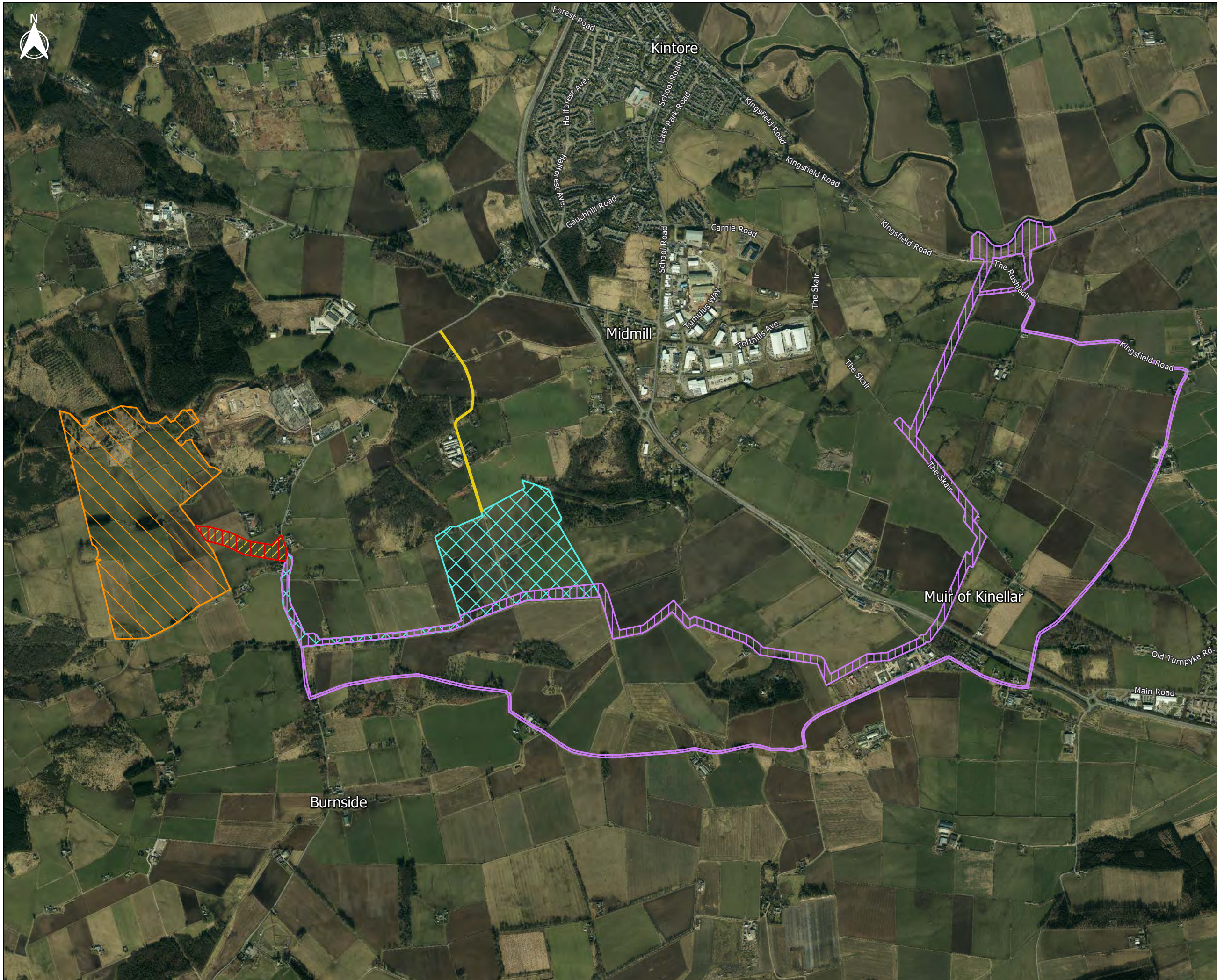
- The development should be designed to avoid the West 1 area, as there is potential for high-quality habitat to be damaged or become degraded as a result of vegetation clearance and construction activities. The scrub and grassland habitats in West 2 should be retained where possible, alongside the stone wall which connects these two habitats.
- Scrub and grassland mosaic habitats in East 1 and woodland and scrub mosaic habitat in East 2 should be retained where possible.
- The development should seek to retain features which provide basking, commuting routes and sheltering refugia for reptiles, including stone walls, boulders in grassland areas and any stone piles, where possible.
- Protect suitable habitat with appropriate exclusion fencing during the construction period. Particular emphasis should be placed on protecting the existing mosaic habitats, as well as any woodland. The fencing should be located as close to the area of works as is feasible to maximise the physical buffer between retained habitats and construction activities; and
- To minimise the risk of harm to overwintering reptiles or breeding reptiles, any dismantling or rebuilding of potential refugia (e.g., stone walls or stone piles) should be undertaken October/November to avoid sensitive hibernation and breeding periods. Otherwise, an Ecological Clerk of Works (ECoW)/ project ecologist should be present to ensure the above works are undertaken with the appropriate level of caution.
- Any excavations created during works should not be left open for reptiles to become trapped. Appropriate covers should be fitted, or a shallow sloping edge/ temporary ramp provided at the end of every working day.

4.3 Enhancement Opportunities

- Hedgerows provide valuable corridors for helping movement of reptiles and should be considered along boundaries of the development, where possible. In addition, broad uncultivated margins, or areas along the hedges that are protected from strimming, preferably on the sunny side of the hedge, are useful.
- Expanding existing high suitability habitat through the creation of a mosaic of habitats, to improve links/ areas between West 1 and West 2.
- Where the development cannot retain stone walls, boulders in grassland areas and any stone piles in situ, the creation of these features should be included within the design.
- Inclusion of log piles which attract invertebrates and increase prey provisions for reptiles as well as providing additional refugia.

APPENDICES

A SITE LOCATION PLAN

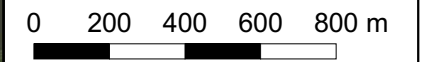


KINTORE HYDROGEN PLANT






Date: 07-07-2023

Paper size: A3

Scale: 1:20,000



Key:

-  Electrolysis plant and grid connection
-  Existing and proposed access roads
-  Hydrogen and water pipeline connections
-  Hydrogen pipeline and gas grid connection
-  Water pipeline connection options and abstraction discharge point



DEVELOPMENT ELEMENTS PLAN

FIGURE 4

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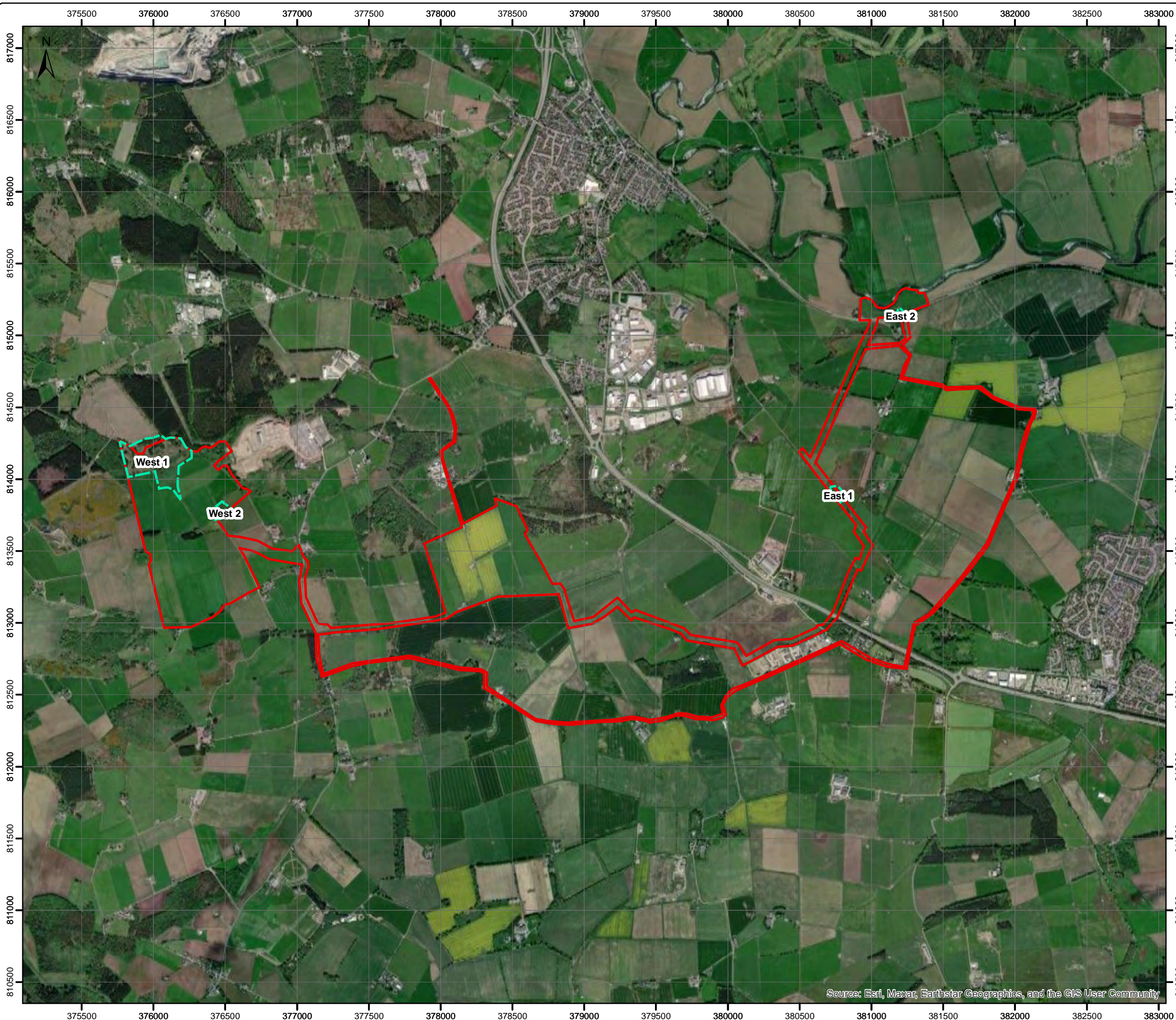
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Drawn by: Rhys Williams

Approved by: Tom Dearing

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B SURVEY AREAS



Legend

- Hydrogen Development Area
- Reptile Survey Areas

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Title
 Reptile Survey Areas
 Full View

Status
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Drawing No. 376782-GIS017	Revision -	Date 13 Dec 2023
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Legend

- Hydrogen Development Area
- Reptile Survey Areas

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Title
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East 1

Status
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- Reptile Survey Areas

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Title
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East 2

Status
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 West 1

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- Reptile Survey Areas

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West 2

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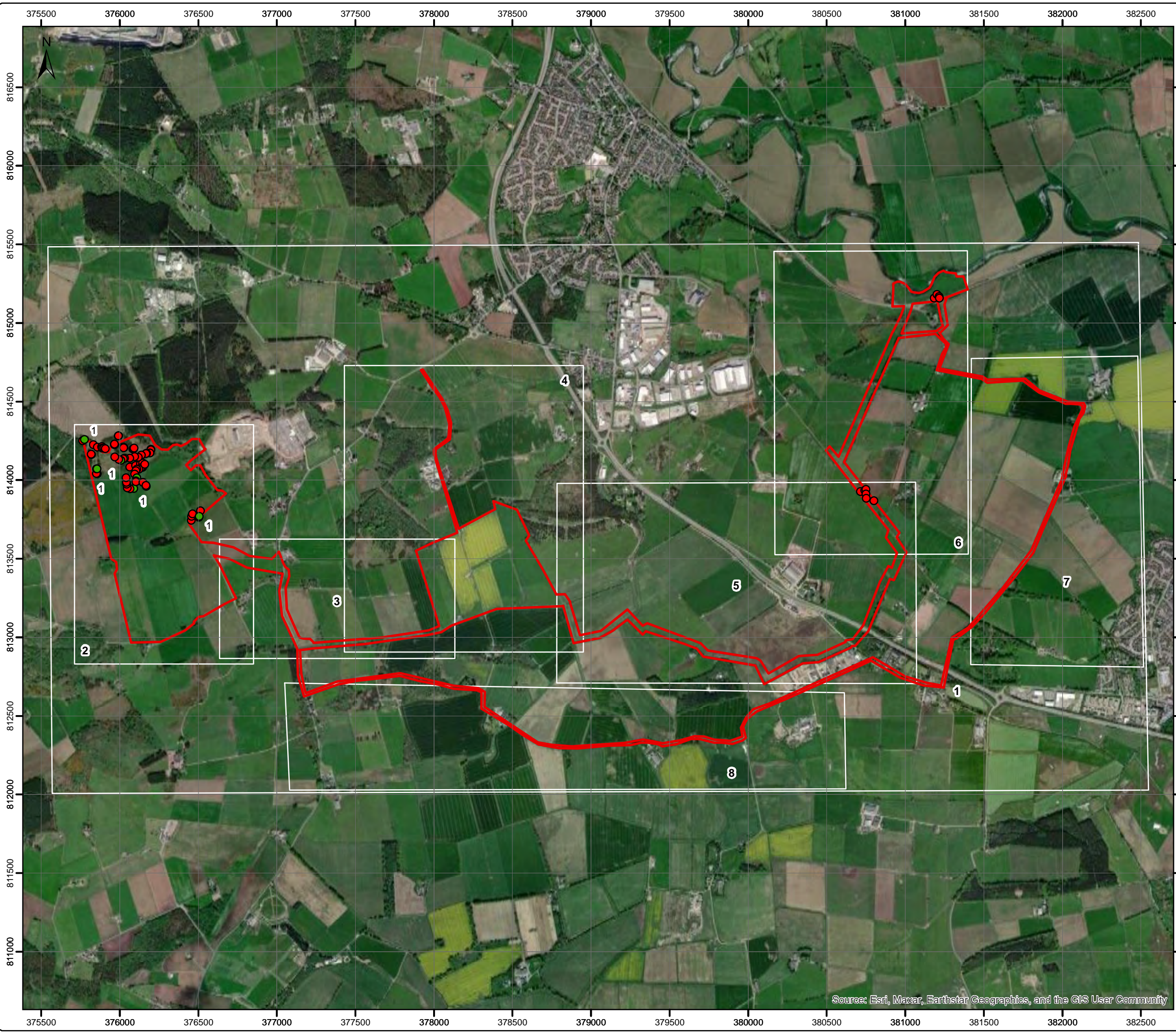
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C REFUGIA AND RESULTS PLAN



Legend

- Hydrogen Development Area
- Refugia - Reptile Absent
- Refugia - Common Lizard Present

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Title
 Reptile Refugia Locations and Survey Results
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Legend

- Hydrogen Development Area
- Refugia - Reptile Absent
- Refugia - Common Lizard Present

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Legend

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- Refugia - Reptile Absent
- Refugia - Common Lizard Present

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- Legend**
- Hydrogen Development Area
 - Refugia - Reptile Absent
 - Refugia - Common Lizard Present

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- Refugia - Reptile Absent
- Refugia - Common Lizard Present

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- Refugia - Common Lizard Present

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- Refugia - Common Lizard Present

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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community