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Red John Pumped Storage Hydro Scheme

Volume 5, Appendix 6.4: Great Crested Newt Survey Report

ILI (Highlands PSH) Ltd.

November 2018

Quality Information

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Revision History

Revision	Revision Date	Details	Authorized	Name	Position
1	November 2018	Submission	CA	Catherine Anderson	Associate Director

Distribution List

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Appendix 6.4 Great Crested Newt Survey Report

6.1 Introduction

Background

6.1.1 AECOM was appointed by Intelligent Land Investments (ILI) to carry out an Environmental Impact Assessment (EIA) for the proposed Red John Pumped Storage Hydro Scheme (hereafter also referred to simply as the 'Development').

6.1.2 The area encompassed by the redline boundary of the Development is hereafter also referred to as the 'Development Site'.

6.1.3 As part of the EIA process, the Red John Scoping Report (which is provided in Appendix 4.2: Scoping Report (EIA Report Volume 5)) identified the potential for great crested newt *Triturus cristatus* to be present in the vicinity of the Development.

Purpose of this Report

6.1.4 This report has been written as an Appendix to Chapter 6: Terrestrial Ecology (Volume 2). It describes the methods used for great crested newt survey and the results obtained. Where appropriate, it provides recommendations for mitigation to minimise the ecological impacts of the Development and highlights opportunities for biodiversity enhancement.

Development and Site Description

6.1.5 A full description of the Development can be found in Chapter 2: Project and Site Description (Volume 2). The habitats within the area encompassed by the Development vary with altitude. On the lower slopes up from Loch Ness there is extensive ancient semi-natural broadleaved woodland whilst on the higher ground and around the Headpond the woodland becomes coniferous, predominantly comprising Scots pine *Pinus sylvestris*, which in places is considered to be long-established of plantation origin. Outside of the woodland habitats there are areas of semi-improved grassland, blanket bog and wet heath.

6.1.6 There are a number of waterbodies in the vicinity of the Development, including large oligotrophic lochs as well as smaller ponds.

Species' Ecology

6.1.7 In Scotland, the great crested newt is predominantly found in the central and southern regions of the country, with more isolated records in the Highlands around Inverness. They inhabit a range of aquatic and terrestrial habitats, which may be natural or man-made, and includes marshes, reedbeds, bog pools, semi-natural grassland, woodland and scrub (Ref 2). In the Scottish Highlands, great crested newt has been shown to have a strong preference for Scots pine - birch *Betula* sp. woodlands (Ref 3).

6.1.8 Great crested newts hibernate over winter (typically between October and February), using deadwood, tree roots, rocks, piles of rubble or mammal burrows for shelter (Ref 5). On coming out of dormancy, adult great crested newts migrate from their hibernation sites to breeding waterbodies where they undergo courtship and mating before the females lay eggs, wrapping them individually in suitable vegetation (Ref 6). The adults then leave the

pond, generally between May and June, and live terrestrially, although they may return to the breeding pond at times (Ref 2). While on land they inhabit similar refuges to those adopted for hibernation and use these features to shelter from extreme weather. They are usually inactive during the day, being found within these habitat features, and forage at night, feeding on invertebrates.

6.1.9 The hatching rate of great crested newt eggs is temperature-dependent (Ref 2). The larvae develop within the waterbody, feeding on invertebrates, and metamorphose after around sixteen weeks into land-adapted juveniles which are also referred to as 'efts'. The efts emerge from the pond between August and October and, like the adults, travel to suitable hibernation sites in which they spend the winter (Ref 6).

Legislative and Policy Context

6.1.10 The great crested newt is listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (the WCA) and Schedule 2 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (also referred to as 'the Habitats Regulations'). This legislation, when taken together, results in a level of protection that prohibits the intentional, deliberate or reckless:

- Killing, injuring, taking or disturbance of great crested newts;
- Damaging, destroying or obstructing any place used by great crested newts for the purposes of breeding, sheltering or protection; and
- Selling and/or advertising for sale a great crested newt or any part thereof.

6.1.11 Local planning policies for the region are detailed in the Highland Council's Highland-wide Local Development Plan (HwLDP). Table 6.1 provides a summary of those policies which are of relevance to the conservation of amphibian species.

Table 6.1 Summary of Relevant Policies Within the Highland-wide Local Development Plan

Planning Policy	Purpose
Policy 28 – Sustainable Development	The Council will support developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland. Proposed developments will be assessed on the extent to which they impact on habitats and species.
Policy 57 – Natural, Built and Cultural Heritage	All development proposals will be assessed taking into account the level of importance and type of heritage features, the form and scale of the development and any impact on the feature and its setting.
Policy 58 – Protected Species	Surveys are required to confirm the presence of protected species on a site. A mitigation plan will be required, prior to determining the application, to avoid or minimise any impacts of protected species. Development that is likely to have an adverse effect on protected species will only be permitted where: there is no satisfactory alternative; the development is required for preserving public health or public safety and/or other imperative reasons of over-riding public interest; and/or, the development will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range.
Policy 59 – Other Important Species	The Council will have regard to the presence of and any adverse effects of development proposals on other important species. These include species listed on Annexes II and V of the Habitats Directive, priority species listed in the UK and Local Biodiversity Action Plans (BAP) and species included on the Scottish Biodiversity List (SBL).

Planning Policy	Purpose
Policy 60 – Other Important Habitats	The Council will seek to safeguard the integrity of features of the landscape which are of major importance because of their linear and continuous structure or their importance as corridors for the movement of wild fauna and flora. The Council will have regard to the value of other important habitats, which include: habitats listed on Annex I of the Habitats Directive; habitats of priority and protected bird species; priority habitats listed in UK and Local BAPs; and, habitats included on the SBL.
Policy 67 – Renewable Energy Developments	The Council will support proposals for renewable energy development where it is satisfied that they will not have significant detrimental effects on natural heritage features, species and habitats.

6.1.12 The great crested newt is identified as a species of principal importance for biodiversity conservation in Scotland through its inclusion on the Scottish Biodiversity List. The SBL is designed to highlight the species (and habitats) which are of highest priority for nature conservation to assist public bodies carrying out their biodiversity duty, as required by the Nature Conservation (Scotland) Act 2004.

6.1.13 Great crested newt is also a Priority Species of the Inverness and Nairn Local Biodiversity Action Plan (LBAP) and outlines various measures to protect and enhance the conservation status of the species in the region.

6.2 Methods

Desk Study

6.2.1 A desk study was carried out to identify nature conservation designations for which great crested newt is qualifying or notified species and to search for records of great crested newts in proximity to the Development.

6.2.2 A stratified approach was taken when defining the desk study area, based on the likely zone of influence of the Development on great crested newt and an understanding of the maximum distances typically travelled by the species. Accordingly, the desk study identified records of great crested newt within 2 km of the Development. Although this is greater than the typical distance travelled by great crested newt from their breeding ponds (which is typically 250 m (Ref 6)), this desk study area was considered appropriate to identify any local great crested newt populations that may indicate the likelihood of the species occurring in waterbodies within the vicinity of the Development.

6.2.3 The desk study also sought to identify any international nature conservation designations within 10 km of the Development Site boundary and other national statutory and local non-statutory nature conservations designations within 2 km.

6.2.4 The desk study was carried out using the Scottish Natural Heritage SiteLink website (https://gateway.snh.gov.uk/sitelink/) to identify nature conservation designations. A data request was submitted to the Highland Biological Recording Group (HBRG) on 04 August 2017 requesting all records of great crested newt within the desk study area.

Habitat Suitability Index

6.2.5 Following a review of aerial images and initial walkover surveys of habitats affected by the Development, all waterbodies within 250 m of proposed infrastructure were identified and mapped. A Habitat Suitability Index (HSI) assessment was carried out on all of these

waterbodies[1], in accordance with the standard methodology described in Oldham *et al* (2000; Ref 4), to establish their suitability for great crested newt and the likelihood that the species would be present. In addition, based on anecdotal evidence of great crested newt in woodland close to Ach-na-Sidhe B&B, Lochan an Eoin Ruadha, which lies beyond the 250 m buffer and is so large that it would typically be considered unsuitable for the species, was also subject to HSI assessment.

6.2.6 The locations of all waterbodies included within the HSI assessment are shown on Figure 6.4.1.

6.2.7 HSI assessment considers the following ten habitat attributes that are considered to influence the suitability of a pond for breeding great crested newts:

- Location – within a UK-wide context reflecting the differences in national distribution of this species;
- Area – waterbodies between 100 and 300 m^2 in size are considered to represent the most suitable habitat for great crested newt;
- Drying – the number of years in which a pond dries over a ten year period. Occasional drying kills fish which is beneficial for great crested newt, but the species predominantly favours ponds that do not dry out every year;
- Water quality – qualitative evidence-based assessment to infer good (diverse aquatic invertebrate assemblage), moderate (moderate invertebrate diversity), poor (low invertebrate diversity, few submerged plants) or bad (clearly polluted) water quality;
- Shade – percentage of pond perimeter shaded to at least 1 m from the shore. Great crested newt favours lightly shaded waterbodies;
- Waterfowl – qualitative evidence-based assessment of presence or absence and numbers is made. Large numbers of waterfowl can result in nutrient enrichment of the water and habitat damage, which is less favourable for great crested newt;
- Fish – qualitative evidence-based assessment of likely presence or absence is made. Great crested newt favour breeding ponds that do not support fish because their open-water swimming larvae are vulnerable to fish predation;
- Number of waterbodies within 1 km – great crested newt populations are typically best developed where they have access to a network of ponds, and therefore the species is more likely to be found where there are several ponds within 1 km that are linked by suitable terrestrial habitat; and
- Macrophyte cover – percentage of pond surface area occupied by macrophyte cover. Female great crested newt requires aquatic vegetation for egg-laying.

6.2.8 The HSI assessment was conducted on 23 April 2018 by AECOM ecologists. The HSI assessment included field-based observations of the habitat attributes described above, in addition to the use of Esri ArcGIS 10.5.1 software to calculate the surface area of the waterbodies.

Environmental DNA

6.2.9 Environmental DNA (eDNA) is nuclear or mitochondrial DNA that is released from an organism into the environment (Ref 1). The use of eDNA to establish the presence or likely absence of great crested newt from a waterbody is now a widely-used technique.

[1] No HSI assessment was carried out on Loch Ashie to the north-east of the Scheme as owing to its extremely large size it was considered to be highly unsuitable for great crested newt regardless of any other habitat parameters.

6.2.10 Water samples were collected from all waterbodies situated within 250 m of the Development – with the exception of Loch Ashie and a waterbody referred to as Glaic na Ceardaich Pond (see below) – in addition to Lochan an Eoin Ruadha. Samples were collected by experienced AECOM ecologists. In Scotland it is not necessary for those taking water samples for great crested newt eDNA analysis to hold a survey licence for this species.

6.2.11 Samples were collected from the waterbodies following approved field and laboratory protocols (Ref 1). Waterbodies were not entered by surveyors during sample collection and new sterile equipment provided by the laboratory was used to collect each water sample to prevent contamination between waterbodies. A total of twenty sub-samples of 30 millilitre (ml) each were collected from around the periphery of each waterbody and mixed together before transferring the samples to six laboratory-supplied test tubes. For the larger waterbodies located only partly within or just outside the survey area (Loch na Curra and Lochan an Eoin Ruadha), samples were only collected from those parts of the loch closest to the Development and within the 250 m buffer.

6.2.12 The collected samples were then transported to FERA (a laboratory which takes part in Natural England's eDNA proficiency testing scheme) for analysis to confirm the presence or likely absence of great crested newt eDNA.

6.2.13 Water samples for eDNA analysis were collected on the dates shown in Table 6.2 below.

Table 6.2 Waterbodies Subject to eDNA Testing

Waterbody name	Date of Water Sample Collection	Laboratory Reference	Weather
Loch na Curra	23 April 2018	S18-003774	Dry with moderate winds creating small waves on surface of loch but no mixing of substrate sediment
Lochan an Eoin Ruadha	11 June 2018	S18-015100	No wind or precipitation, with partial sun and cloud
Ach-na-Sidhe B&B Pond	23 April 2018	S18-003773	Dry and pond sheltered from wind
Dirr Wood Pond	23 April 2018	S18-003772	Dry and sheltered from wind
Park Pond	11 June 2018	S18-015101	No wind or precipitation, with partial sun and cloud

Limitations

6.2.14 Desk study information is dependent on records having been submitted for the area of interest. As such, a lack of records for particular habitats or species does not necessarily mean they are absent from the area of interest. Similarly, the presence of records for particular species does not automatically mean they still occur within the area of interest or are relevant.

6.2.15 Surveys using the eDNA method cannot be used to make an estimate of the size of a great crested newt population within a waterbody. In addition, the method cannot currently be used to record the presence or likely absence of other species of amphibian present in the surveyed waterbodies.

6.2.16 Water samples were only collected from the large waterbodies of Loch na Curra and Lochan an Eoin Ruadha from the parts of their shoreline closest to the Development. Ideally,

samples should be collected from the entire perimeter of a waterbody but to do so in such large lochs was considered unfeasible.

6.2.17 It was not possible to collect water samples from the waterbody referred to as Glaic na Ceardaich Pond due to health and safety concerns. The margins of this waterbody comprised very wet peat, which was unstable, and water depths were generally too shallow to collect any water without attempting to walk out over the margins to deeper water. However, where the water was deeper it was found to be flowing, and there was a substantial flowthrough of water observed at the point where the pond drains into a watercourse at its south-western end (see Photo 6.7 in Annex 6.4.1 at the end of this appendix). Due to the combination of shallow water depths and flowing water, the pond received a low HSI score and is considered unlikely to support great crested newt. The absence of eDNA results for this waterbody is therefore not considered to be a significant limitation to the results of the overall assessment of potential effects on this species.

6.3 Results

Desk Study

6.3.1 No records of great crested newt were returned from HBRG during the desk study. However, a record of palmate newt *Lissotriton helveticus* was provided, dated 2007, from the edge of Glaic na Ceardaich Pond. There were also reports of great crested newt in the woodland close to Ach-na-Sidhe B&B (Owner, *pers. comm*.).

6.3.2 There are no designated sites for the protection of great crested newt within the desk study area.

Field Survey

6.3.3 Full details of the HSI results are provided in Annex 6.4.1. The overall scores and associated summary suitability description for each pond are presented in Table 6.3.

Table 6.3 Habitat Suitability Index Scores

Waterbody Name	Approximate Distance from Nearest Development Infrastructure	HSI Score	Great Crested Newt Suitability	Scoped in to Further Survey (eDNA Analysis)?
Loch na Curra	220 m from diversion of C1064 public road	0.21	Poor	Yes[2]
Lochan an Eoin Ruadha	290 m from Headpond	0.21	Poor	Yes[2]
Ach-na-Sidhe B&B Pond	80 m from Compound 4	0.45	Poor	Yes
Dirr Wood Pond	30 m from existing track / 210 m to Headpond	0.57	Below average	Yes

[2] As described, despite being assessed as having 'poor' suitability for great crested newts, on the basis of anecdotal evidence of the presence of the species, Lochan an Eoin Ruadha was scoped in to eDNA analysis.

Waterbody Name	Approximate Distance from Nearest Development Infrastructure	HSI Score	Great Crested Newt Suitability	Scoped in to Further Survey (eDNA Analysis)?
Park Pond	Directly above underground low pressure tunnel but approximately 600 m from nearest above-ground infrastructure (diversion of C1064 public road)	0.49	Poor	Yes
Glaic na Ceardaich Pond	40 m from Compound 1	0.42	Poor	No

6.3.4 With a total surface area of almost than 1.5 km^2, Loch Ashie was not subject to HSI assessment, despite being within the 250 m survey area for great crested newt, as it was considered to be unsuitable for the species on the basis of its size alone.

eDNA Analysis

6.3.5 Of the five waterbodies from which samples were collected, only one was returned with a positive result for the presence of great crested newt eDNA – Lochan an Eoin Ruadha. The full results returned by the laboratory are presented in Table 6.4.

Table 6.4 eDNA Results

Waterbody Name	Laboratory Reference	eDNA Score[3]	Great Crested Newt Detection
Loch na Curra	S18-003774	0	Negative
Lochan an Eoin Ruadha	S18-015100	3	**Positive**
Ach-na-Sidhe B&B Pond	S18-003773	0	Negative
Dirr Wood Pond	S18-003772	0	Negative
Park Pond	S18-015101	0	Negative

6.3.6 The locations of the waterbodies subject to eDNA analysis are shown on Figure 6.4.1.

6.4 Discussion and Recommendations

6.4.1 None of the waterbodies surveyed for great crested newt will be directly affected by the Development. During the early stages of the design of the Development, it was proposed to drain both Loch na Curra and Lochan an Eoin Ruadha and to then create one large reservoir in their place. The design of the Development has since evolved and now involves the creation of a new reservoir within the plantation woodland to the north of Ach-na-Sidhe B&B. As such, neither Loch na Curra nor Lochan an Eoin Ruadha will be affected by the Development.

6.4.2 Of the seven waterbodies for which a Habitat Suitability Index was calculated, only one, Dirr Wood Pond, was assessed as having anything other than 'poor' suitability. Subsequent eDNA analysis confirmed that Dirr Wood Pond does not support great crested newts and

[3] This is the number of positive replicates from a series of twelve.

that the species was also absent from all others, with the exception of Lochan an Eoin Ruadha.

6.4.3 Both Loch na Curra and even more so Lochan an Eoin Ruadha are extremely large waterbodies which would typically be considered to be highly unsuitable for great crested newt (based on their size and other parameters, particularly the presence of fish). Lochan an Eoin Ruadha is also situated outside of the 250 m survey buffer applied when assessing the potential impacts of the Development on great crested newt and would therefore not have been included. However, the owners of the Ach-na-Sidhe B&B indicated that they have observed great crested newt in the broadleaved woodland to the south-east of their property and on this anecdotal evidence, the two waterbodies were included within the survey.

6.4.4 Lochan an Eoin Ruadha, in which great crested newt eDNA was found, is an extremely large body of water, covering an area of more than 185,000 m^2. Oldham *et al* (2000; Ref 4) suggest that the optimal pond size for great crested newts is around 200 – 800 m^2. Moreover, numerous other habitat attributes associated with the loch would suggest that great crested newts would be likely absent, including the presence of fish and numerous waterbirds, very limited aquatic vegetation (or, for example, fallen leaves) for egg-laying and its very rocky substrate. It is therefore surprising that great crested newt may be present within Lochan an Eoin Ruadha.

6.4.5 It is possible that great crested newts inhabit the semi-natural broadleaved woodland as well as the more open Scots pine woodland adjacent to the loch, where plenty of potential refuge sites are located. Due to the presence of this suitable terrestrial habitat it is considered that great crested newt may potentially also make use of very small niches within the waterbody for breeding. However, with no evidence of great crested newt in any of the other waterbodies in the survey area, including the nearby Loch na Curra and Ach-na-Sidhe B&B Pond, any great crested newt using Lochan an Eoin Ruadha appear to be isolated in this area.

6.4.6 At more than 250 m from the nearest infrastructure, it was not considered necessary to do further survey to determine the size of the population of great crested newts in Lochan an Eoin Ruadha. Furthermore, it would have been extremely difficult if not entirely impractical to conduct population survey using traditional methods (e.g. bottle trapping). This is because of both the very large size of the waterbody and also the rocky substrate which would have made traditional survey techniques very challenging. None of the broadleaved woodland around Lochan an Eoin Ruadha, which is likely to be the most suitable terrestrial habitat for great crested newts, will be lost to the Development.

6.4.7 With no confirmed population of great crested newt within 250 m of any infrastructure associated with the Development, it is considered that there will be no effect on this species as a result of the Development's construction, operation or decommissioning. As a consequence, no specific mitigation measures are proposed for this species. Furthermore, given the low suitability of the waterbodies surveyed for great crested newt, the widespread absence from these waterbodies and the lack of impacts from the Development, no enhancement measures are considered necessary.

6.5 References

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Ref 5. SNH (undated). Protected Species Advice for Developers – Great Crested Newt [Online]. Available: https://www.nature.scot/professional-advice/planning-and-development/natural-heritage-advice-planners-and-developers/planning-and-development-protected-animals. [Accessed 20/08/2018].

Ref 6. English Nature (2001). Great crested newt mitigation guidelines [Online]. Available: http://webarchive.nationalarchives.gov.uk/20140605121141/http://publications.naturalengland.org.uk/publication/810429?category=30014. [Accessed 20/08/2018].

Annex 6.4.1 GCN Survey Full Results

6.1 Overview

6.1.1 Below are the full results of the Habitat Suitability Index assessment, a summary of which is provided in the results section of this Appendix.

Loch na Curra

6.1.2 Loch na Curra is a large natural waterbody which is known to be stocked with fish and regularly used for recreational fishing. It supports several waterfowl species including teal *Anas crecca*, grey heron *Ardea cinerea* and red-throated diver *Gavia stellata*. It is situated in open moorland with blanket bog (which was badly burnt and damaged to the east and south-east of the loch in 2017) and wet heath, with deep heather *Calluna vulgaris*. There is virtually no emergent vegetation in the waterbody, with the exception of the south-western end where there are white water lily *Nymphaea alba* and other swamp species, grading into an area of wet woodland. A dead palmate newt was found on the C1064 road just to the north-west of Loch na Curra during other ecological field survey work for the Development.

Table 6.5 HSI Results for Loch na Curra

Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	45,268 m^2	0.01
SI3	Pond drying	Never	0.90
SI4	Water quality	Good	1.00
SI5	Shade	5%	1.00
SI6	Waterfowl	Minor	0.67
SI7	Fish	Major	0.01
SI8	Ponds within 1 km	4	1.00
SI9	Terrestrial habitat	Moderate	0.67
SI0	Macrophyte cover	5%	0.36
		Score	**0.21**

Photo 6.1 View of Loch na Curra and Surrounding Habitat

Lochan an Eoin Ruadha

6.1.3 Lochan an Eoin Ruadha is a very large waterbody with a surface area of more than 185,000 m^2, though it appears to be fairly shallow, at least for some distance from the shore. It has a very rocky substrate with very little emergent vegetation present. It is almost completely surrounded by coniferous plantation woodland, with the exception of parts of its northern shore, where semi-natural broadleaved woodland exists. Despite the dominance of surrounding woodland habitat, the trees cast very little shade over the edge of the loch and certainly have no effect across the vast majority of the waterbody. It is unclear whether, like Loch na Curra, this loch is stocked with fish but fish are believed to be present based on observations of hunting osprey *Pandion haliaetus* and red-throated diver.

Table 6.6 HSI Results for Lochan an Eoin Ruadha

Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	185,999 m^2	0.01
SI3	Pond drying	Never	0.90
SI4	Water quality	Good	1.00
SI5	Shade	5%	1.00
SI6	Waterfowl	Minor	0.67
SI7	Fish	Major	0.01
SI8	Ponds within 1 km	3	1.00
SI9	Terrestrial habitat	Moderate	0.67
SI0	Macrophyte cover	5%	0.36
		Score	**0.21**

Photo 6.2 View of Lochan an Eoin Ruadha

Ach-na-Sidhe B&B Pond

6.1.4 This is a small man-made waterbody within the grounds of the Ach-na-Sidhe B&B. Two domestic geese are resident on the pond and immediately surrounding ground, and are contained within this area by fencing. The substrate of the waterbody is silt and water depths were shallow at the time of survey, up to approximately 15 cm. There are stands of common reedmace *Typha latifolia* around the edges of the Ach-na-Sidhe B&B Pond in addition to some aquatic plants in various locations. The area immediately surrounding the pond is short amenity grassland associated with the garden of the B&B, however there is semi-natural broadleaved woodland within 500 m of the waterbody.

Table 6.7 HSI Results for Ach-na-Sidhe B&B

Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	69 m^2	0.14
SI3	Pond drying	Rarely	1.00
SI4	Water quality	Good	1.00
SI5	Shade	0%	1.00
SI6	Waterfowl	Minor	0.67
SI7	Fish	Absent	1.00
SI8	Ponds within 1 km	4	1.00
SI9	Terrestrial habitat	Moderate	0.67
SI0	Macrophyte cover	30%	0.61
		Score	**0.45**

Photo 6.3 View of Ach-na-Sidhe B&B Pond

Dirr Wood Pond

6.1.5 Dirr Wood Pond is a narrow rectangular shaped waterbody which is completely surrounded by trees in an area of Scots pine woodland which is considered to be ancient of long-established plantation origin according to the Ancient Woodland Inventory (AWI). The forest appears to have been thinned over the years and there are brash piles and other features which create suitable refuges for great crested newt. There is no flow of water into or out of the pond and fish are believed to be absent, as is the regular occurrence of waterfowl. Macrophyte cover is very high and there are only small areas of open water. This waterbody completely dried out during the summer of 2018.

Table 6.8 HSI Results for Dirr Wood Pond

Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	1,736 m^2	0.83
SI3	Pond drying	Sometimes	0.50
SI4	Water quality	Good	1.00
SI5	Shade	60%	1.00
SI6	Waterfowl	Absent	1.00
SI7	Fish	Absent	1.00
SI8	Ponds within 1 km	4	1.00
SI9	Terrestrial habitat	Good	1.00
SI0	Macrophyte cover	90%	0.90
		Score	**0.57**

Photo 6.4 View of Dirr Wood Pond and Surrounding Woodland Habitat

Park Pond

6.1.6 This medium-sized pond is of artificial origin, having obvious linear earthworks at the south end to retain the water, and may have been constructed to attract wildfowl. It lies within an area of wet heath and gorse *Ulex europaeus* scrub, the latter dominating the west bank. The banks are generally fairly steep but short, and shallow at the north end. There is a small island vegetated with heather. The water depth is mostly shallow, only a few centimetres at the north end. Aquatic vegetation is rather sparse but includes pondweed *Potamogeton* sp. and stonewort *Chara* sp. Emergent vegetation includes sweet-grass *Glyceria* sp. and there is a small amount of bottle sedge *Carex rostrata* swamp. The water quality appears good and there is moderately basic water draining into the pond from the north-east, which runs through basic flush vegetation. No fish were seen but sticklebacks *Gasterosteus aculeatus* could be present.

Table 6.9 HSI Results for Park Pond

Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	166 m^2	0.33
SI3	Pond drying	Never	0.90
SI4	Water quality	Good	1.00
SI5	Shade	0	1.00
SI6	Waterfowl	Minor	0.67
SI7	Fish	Possible	0.67
SI8	Ponds within 1 km	3	1.00
SI9	Terrestrial habitat	Good	1.00
SI0	Macrophyte cover	30%	0.61
		Score	**0.49**

Photo 6.5 View of Park Pond

Glaic na Ceardaich Pond

6.1.7 Glaic na Ceardaich Pond was mapped during the Phase 1 habitat survey conducted to inform the PEA for the Development as a swamp. It has very shallow water across much of its area and, where deeper, there is a substantial flow of water through to the discharge point at the south-west corner of the waterbody. There is a large amount of vegetation across the waterbody, covering approximately 80% of the surface area, and the surrounding habitat, which comprises semi-natural Scots pine, birch, and juniper *Juniperus communis* woodland, is highly suitable for great crested newts during the terrestrial phase of their lifecycle. There are no fish within the pond and it is very unlikely to be frequently used by waterfowl.

Table 6.10 HSI Results for Glaic na Ceardaich Pond

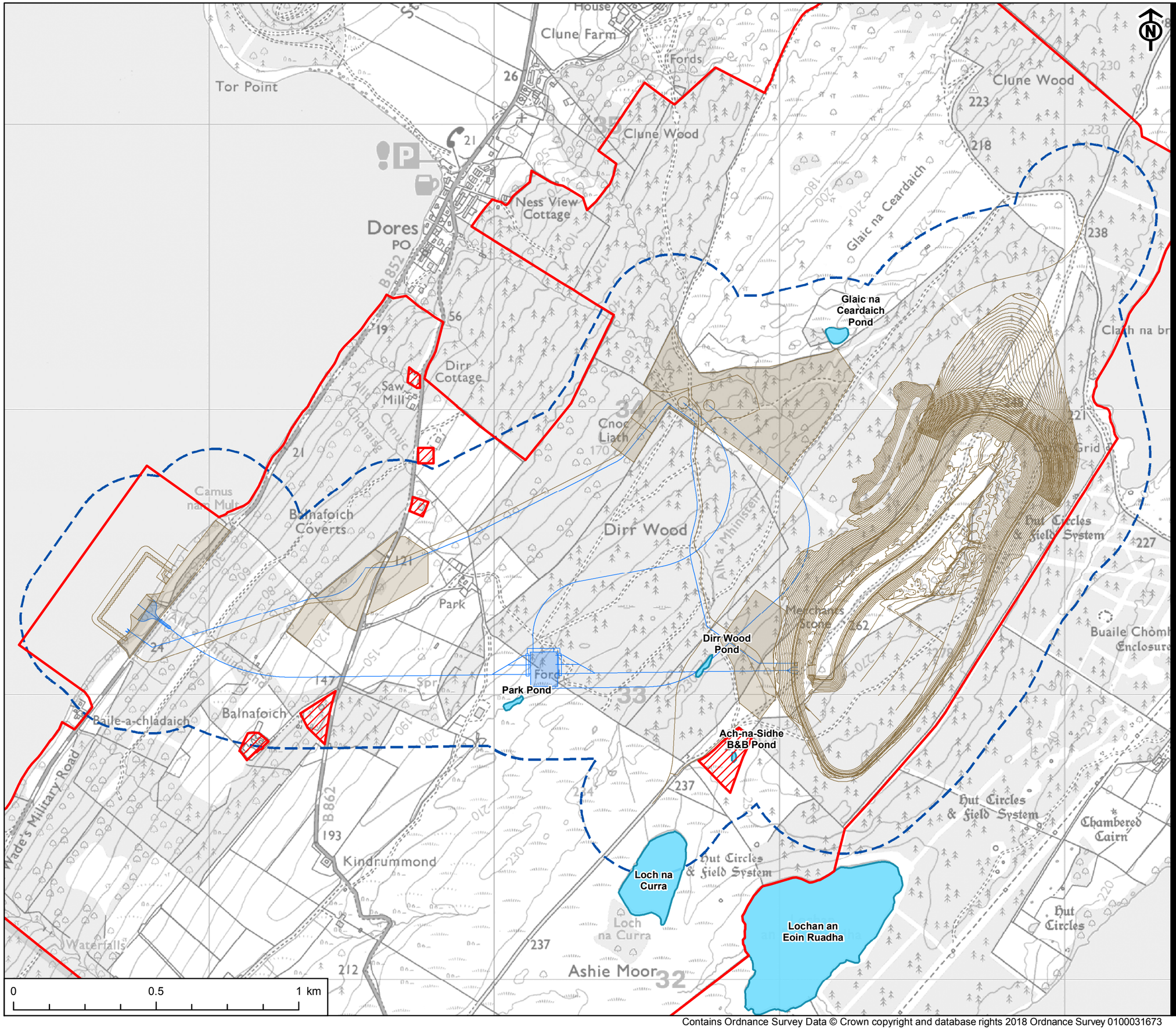
Suitability Index	Habitat parameter	Field score	HSI score
SI1	Location	C	0.01
SI2	Pond area	192 m^2	0.38
SI3	Pond drying	Sometimes	0.50
SI4	Water quality	Good	1.00
SI5	Shade	30%	1.00
SI6	Waterfowl	Absent	1.00
SI7	Fish	Absent	1.00
SI8	Ponds within 1 km	0	0.10
SI9	Terrestrial habitat	Good	1.00
SI0	Macrophyte cover	80%	1.00
		Score	**0.42**

Photo 6.6 View of Glaic na Ceardaich Pond

Photo 6.7 Watercourse Flowing out of Glaic na Ceardaich Pond

Figures

Project Management Initials: CA Designer: LC Checked: SY Approved: CS



Scale @ A3 1:12,500

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PROJECT
RED JOHN PUMPED STORAGE HYDRO

CLIENT
ILI (Highlands PSH) Ltd.

KEY
- Development Site boundary
- Excluded from Development Site boundary
- 250 m survey boundary
- Above ground infrastructure - Line
- Above ground infrastructure - Area
- Below ground infrastructure - Line
- Below ground infrastructure - Area
- Waterbody

TITLE
FIGURE 6.4.1
GREAT CRESTED NEWT SURVEY AREA

REFERENCE
RJ_181031_EIA_A6.4.1_v1

SHEET NUMBER
1 of 1

DATE
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