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Red John Pumped Storage Hydro Scheme

Habitats Regulations Appraisal:
Statement to Inform Appropriate
Assessment

ILI (Highlands PSH) Ltd.

November 2018

Quality information

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Glossary

Abbreviations

BMP	Biosecurity Management Plan	OS	Ordnance Survey
CAR	Controlled activities regulations	pSPA	Potential Special Protection Areas
CEMP	Construction Environmental Management Plan	SAC	Special Areas of Conservation
cSACs	Candidate Special Areas of Conservation	SEPA	Scottish Environment Protection Agency
HRA	Habitats Regulations Appraisal	SNH	Scottish Natural Heritage
INNS	Invasive non-native species	SPA	Special Protection Areas
IROPI	Imperative Reasons of Overriding Public Interest	SUDs	Sustainable Drainage Systems
LSE	Likely Significant Effect'	WFD	Water Framework Directive
NDSFB	Ness District Salmon Fishery Board	WTW	Water Treatment Works

Defined Terms

Appropriate Assessment	A phase of HRA.
Development	The Red John Pumped Storage Hydro scheme.
Development Site	The location of the Development.
Habitats Regulations Appraisal	The assessment of a scheme against the Habitats Directive.
Pathway	Pathways are routes by which a change in activity provided within a project or development plan can lead to an effect upon a European designated site.
Screen out	Process of identifying and removing those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites.
The Habitats Regulations	The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

1. Introduction

1.1 Background to the project

1.1.1 This Habitats Regulations Appraisal (HRA) has been undertaken for the proposed Red John Pumped Storage Hydro (hereafter referred to as the 'Development' and its location as the 'Development Site'). The central Ordnance Survey (OS) grid reference of the Development Site is approximately NH 60479 32531.

1.1.2 The Development includes many different construction features, including large earthworks, tunnelling works, large concrete structures; in terrestrial, subterranean and aquatic environments. The main components of construction for the Development are:

- Headpond and Embankment;
- Waterways, including the High- and Low- Pressure Tunnels and the Spillway;
- Power Cavern;
- Tunnels for access, construction, emergency and utilities;
- Temporary construction compounds;
- Temporary and Permanent Access Tracks;
- Landscape Embankment; and
- Grid connection, including transmission and substations.

1.1.3 The design includes creating a new waterbody (hereafter referred to as the 'Headpond') near the Merchant's Stone, just north-east of Loch na Curra and Lochan an Eoin Ruadha and east of Loch Ashie, the Tailpond is the existing body of Loch Ness. See Chapter 2: Project and Site Description of the Environmental Impact Assessment (EIA) Report (Volume 2) for full details of the Development.

1.1.4 The objective of this assessment is to identify any aspects of the Development that could result in an adverse effect on the integrity of Natura 2000 sites either in isolation or in combination with other plans and projects., Natura 2000 sites are also known as European sites and include:

- Special Areas of Conservation (SACs);
- Candidate Special Areas of Conservation (cSACs);
- Special Protection Areas (SPAs);
- Potential Special Protection Areas (pSPAs); and
- Wetlands of International Importance (Ramsar sites)), as a matter of Government policy.

1.1.5 These are shown on Figures 1a and 1b of this report.

1.1.6 This assessment will also advise on appropriate mechanisms for delivering mitigation where adverse effects are identified.

1.2 Legislation

1.2.1 Article 6 of the EC Habitats Directive 1992 sets out the need to assess a scheme against the Habitats Directive (known as a 'Habitats Regulations Appraisal'). The ultimate aim of the

Directive is to “maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest” (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status. In Scotland, the requirements of the Habitats Directive are implemented by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (‘the Habitats Regulations’) (Ref 1).

- 1.2.1 The Habitats Directive applies the precautionary principle¹ to European sites. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. Plans and projects with predicted adverse impacts on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.
- 1.2.2 In order to ascertain whether or not site integrity will be affected, an assessment should be undertaken of the plan or project in question. Insert 1 provides the legislative basis for this assessment.

Habitats Directive 1992

Article 6 (3) states that:

“Any plan of project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives.”

The Habitats Regulations

“A competent authority, before deciding to [...] give any consent [...] for a plan or project which a) is likely to have a significant effect on a European site [...] (either alone or in combination with other plans or projects), and b) is not directly connected with or necessary to the management of that site, shall make an appropriate assessment of the implications for the site in view of that site’s conservation objectives.

Regulation 63 (1)

[...] subject to regulation 64 (considerations of overriding public interest) the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site [...].”

Regulation 63 (5)

Insert 1 The legislative basis for Habitats Regulations Appraisal in Scotland

- 1.2.3 Over time, HRA has come into wide currency to describe the overall process set out in the Habitats Directive from screening through to IROPI. This has arisen in order to distinguish the process from the individual phase described in the law as an ‘Appropriate Assessment’. Throughout this report HRA is used for the overall process and the use of Appropriate Assessment is restricted to the specific phase of that name.

¹ The Precautionary Principle, which is referenced in Article 191 of the Treaty on the Functioning of the European Union, has been defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2005) as:

“When human activities may lead to morally unacceptable harm [to the environment] that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. The judgement of plausibility should be grounded in scientific analysis”.

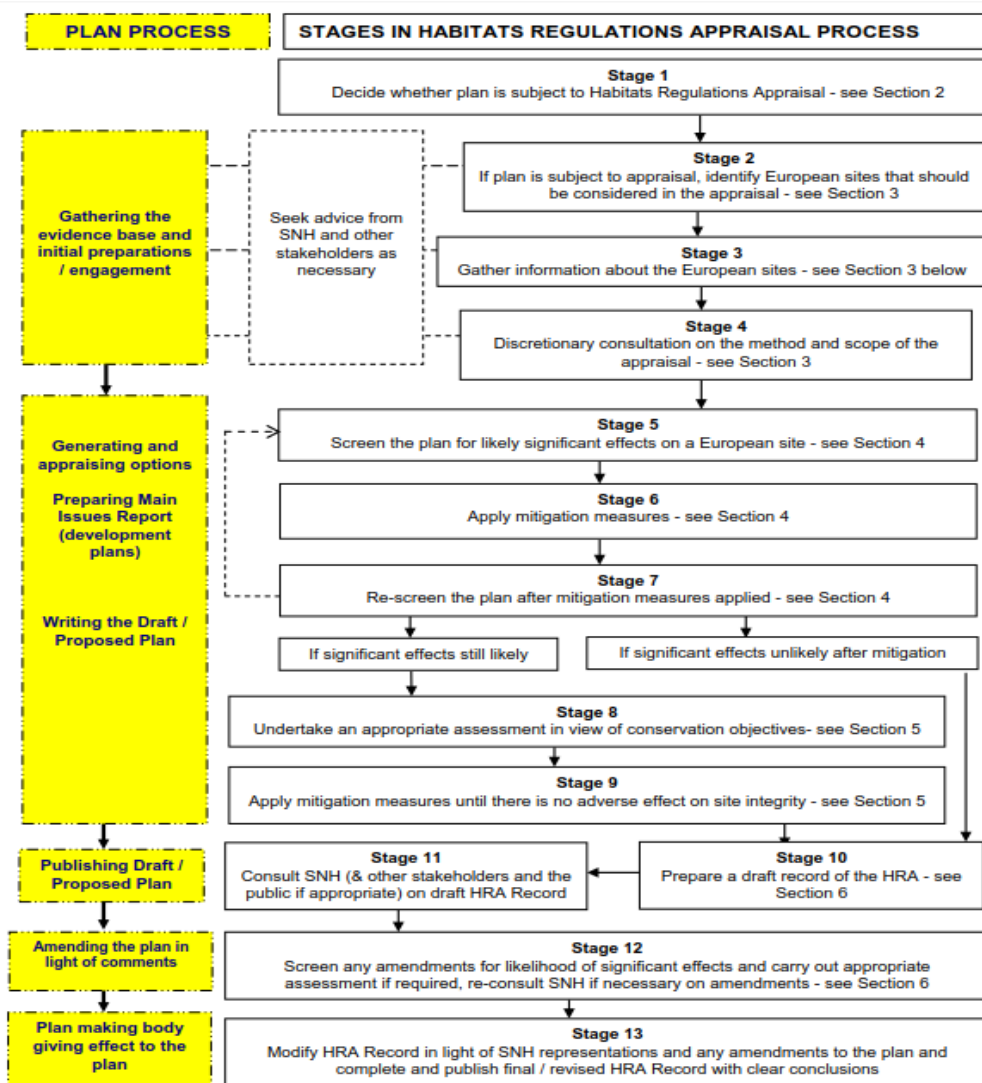
1.3 Scope of the Project

- 1.3.1 There is no pre-defined guidance that dictates the physical scope of a HRA of a project. Therefore, in considering the physical scope of the assessment, we were guided primarily by the identified impact pathways (called the source-pathway-receptor model) rather than by arbitrary zones. Additionally, the scope is concurrent with the EIA Report for the Development. Current guidance suggests that the following European sites be included in the scope of the assessment:
- All European sites within the Development Site boundary; and
 - European sites shown to be linked to the Development through a known 'pathway' (discussed below).
- 1.3.2 Pathways are routes by which a change in activity provided within a project or development plan can lead to an effect upon a European designated site. An example of this would be new residential development resulting in an increased population and thus increased recreational pressure, which then affects sensitive European sites by, for example, disturbance of wintering or breeding birds.
- 1.3.3 There are no European sites that lie within the boundary of the Development Site. However, due to their proximity to the Development Site, the following European sites require consideration:
- Loch Ashie SPA - located approximately 145 m to the north-east;
 - Loch Ruthven SAC, SPA and Ramsar site - situated approximately 4.5 km to the south-east;
 - Urquhart Bay Wood SAC - situated approximately 7.1 km to the south-west ;
 - Ness Woods SAC -situated approximately 10 km to the south-west;
 - North Inverness Lochs SPA - situated approximately 8.5 km to the west; and
 - River Moriston SAC; situated approximately 22 km to the south-west.
- 1.3.4 The distances have been measured from the nearest point of infrastructure to the closest point on the boundary of the European site.

2. Methodology

2.1.1 The Habitats Regulations set out a step-by-step sequence of statutory procedures to be followed for HRA. The steps are designed to test the potential effects of a plan or project on a European site and must be followed in the correct and particular order to comply with the requirements of the Habitats Directive.

2.1.2 The Regulations do not prescribe a particular methodology for carrying out an appraisal of plans or projects. However, Scottish Natural Heritage (SNH) recommend an approach, as described in SNH (2015) (Ref 2), which is outlined as a series of thirteen steps. A flow chart of the HRA process (showing the decisions that are required at each phase), which has been taken from SNH (2015), is provided as Insert 2. It should be noted that this specifically relates to the appraisal of plans, however the principles and broad process are identical for plans and projects.



Insert 2 The key phases in the Habitats Regulations Appraisal process (Ref 2).

- 2.1.3 A four-phase methodology for HRA would therefore include:
- HRA Phase 1: Screening (including a 'Likely Significant Effect' judgement);
 - HRA Phase 2: Appropriate Assessment;
 - HRA Phase 3: Assessment of Alternative Solutions; and,
 - HRA Phase 4: Assessment where no alternative solutions exist and where adverse effects remain (i.e. consideration of IROPE).

2.2 Description of HRA Phases

- 2.2.1 This document undertakes HRA Phases 1 to 3 only as described below.

HRA Phase 1 – Likely Significant Effects

- 2.2.2 Following initial evidence gathering, the first phase of any Habitats Regulations Appraisal is a Likely Significant Effect test – essentially a risk assessment to decide whether the full subsequent phase known as Appropriate Assessment is required. The essential question is:

“Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?”

- 2.2.3 The objective is to 'screen out', i.e. identify and remove, those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites.
- 2.2.4 There has been a recent decision by the European Court of Justice (Ref 3), which concludes that measures intended to avoid or reduce the harmful effects of a proposed project on a European site, but which are not an integral part of the project or plan, may no longer be taken into account by competent authorities at the Likely Significant Effects or screening phase of HRA. Mitigation can no longer be taken into account at the screening phase and as such is taken into account at the Appropriate Assessment phase.

HRA Phase 2 – Appropriate Assessment

- 2.2.5 Where it is determined that a conclusion of 'no Likely Significant Effect' cannot be drawn, the analysis proceeds to the next phase of HRA, known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no particular technical analyses, or level of technical analysis, that are classified by law as belonging to Appropriate Assessment.
- 2.2.6 In evaluating significance, AECOM has relied upon professional judgement as well as the results of any stakeholder consultation regarding Development impacts on the European sites considered within this assessment.

2.3 Principal Other Plans and Projects that May Act 'In Combination'

- 2.3.1 It is a requirement of the Habitats Regulations that the impacts of the project being assessed are not considered in isolation, but where necessary are considered in combination with other plans and projects that may also affect the European site(s) in question.
- 2.3.2 The following listed resources have been used to identify other plans and projects that may act in combination:
- Highland Council: Highland-wide Local Development Plan (Ref 29);
 - Scottish Water: 25 Year Water Resource Plan (2015) (Ref 4); and

- Inverness Local Development Plan (2006) as continued in force, April 2016 (Ref 28).

2.3.3 The Inner Moray Firth Local Development Plan (Ref 5) outlines a number of developments within the Inverness to Nairn growth area between 2011-2031. It is planned for land to be used to supply 18,350 new homes in the Inverness and Nairn area. In addition to the Inner Moray Firth Local Development Plan, the following developments have been identified within the EIA Report (Volume 2, Chapter 4: Approach to EIA) to have potential cumulative impacts that require consideration and as such are considered within this HRA.

Table 1: Cumulative Developments

Development	Description	Location*	Status	Likely Shared Receptors
EE Telecommunications Tower 17/03199/FUL	15 metre (m) high lattice telecommunications tower with ancillary equipment in a fenced compound at Farr.	7.4 km E	Application permitted Decided 20 Oct 2017	Amenity
Underground Water Main 16/05768/SCRE	New underground water main from Dores to Loch Ashie treatment works.	1.2 km NNW**	Screening Request - EIA not required 19 Jan 2017. No application submitted yet	Land Temporal – duration of construction phase
Tulloch Homes 17/02007/FUL	446 new homes on the south side of Inverness of the B862.	11.4 km NNE	Application permitted Decided 03 Aug 2018	Roads
Ness Castle (phase 2) 17/01189/MSC	137 new homes off the B862.	9.3 km NNE	Application permitted Decided 02 Jun 2017	Roads
Scainport 17/02446/PIP	5 new homes off the B862.	7.1 km NNE	Awaiting Decision Application Validated 29 May 2017	Roads
B851 Junction with the A9 18/03539/FUL	Change of use of existing buildings to office, use for maintenance of vehicles & fleet vehicles used for temporary and permanent road engineering.	12.45 km NE	Under Consideration Application Validated 30 July 2018	Roads
Coire Glas 18/01564/S36	Revised application for 1500 MW PSH scheme	53 km SW	Under Consideration Application Validated 03 April 2018	Landscape and visual Water resources Socio-economics

* Distances are calculated from the central grid reference of the Development

** As a linear feature, the distance was measured to the location referenced as the start grid reference.

Source: The Highland Council Planning Portal [Accessed: 14/08/18] (Ref 6),

2.3.4 In combination effects will be considered following the assessment for each European site in the relevant following chapters of this appraisal.

3. Loch Ashie Special Protection Area

3.1 Introduction

3.1.1 Loch Ashie SPA is a large, open, mesotrophic loch located south-east of the Great Glen within Inverness-shire, Highland Region. Most of the shore is stony and exposed with only small pockets of emergent vegetation. Where the shore is more sheltered, small beds of bottle sedge *Carex rostrata* have developed. The loch also contains a small island.

3.1.2 The boundary of the SPA is coincident with Loch Ashie Site of Special Scientific Interest (SSSI).

3.2 Interest Features

3.2.1 Loch Ashie SPA qualifies under Article 4.1 by regularly supporting a population of European importance of the Annex 1 species Slavonian grebe *Podiceps auritus*, with an autumn gathering of up to 60 individuals (up to 15 % of the Great British population) making it the most important known moult site in Scotland (Ref 7).

3.2.2 Following consultation with SNH it was confirmed that breeding Slavonian grebe are not a designated feature of Loch Ashie SPA.

3.3 Conservation Objectives

3.3.1 To ensure no deterioration of habitats and qualifying species for the SPA and thus ensuring the integrity of the site, the following are to be maintained in the long-term:

- Population of the species as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

3.4 Environmental Vulnerabilities and Potential Links to the Development

3.4.1 Environmental pressures on the SPA are:

- Inundation;
- Changes in biotic conditions;
- Interspecific faunal relations;
- Invasive non-native species (INNS); and,
- Changes in hydrological conditions – Loch Ashie is one of the secondary supplies of potable water for Inverness and is currently at bad ecological potential due to the impacts from water abstraction, flow regulation and several morphological alterations (Ref 8).

3.5 Test of Likely Significant Effects

3.5.1 The following have been identified as pressures from the Development that may impact the integrity of Loch Ashie SPA and as such will be subject to a Likely Significant Effects Test. Following discussion, if Likely Significant Effects cannot be screened out, Appropriate Assessment will be undertaken:

- Disturbance to autumnal moulting Slavonian grebe: construction phase and decommissioning phase;
- Changes to hydrological conditions (water quality and pollution, and quantity): construction phase, operational phase and decommissioning phase; and
- INNS - construction phase and operational phase.

Construction Phase

Disturbance to Autumnal Moulting Slavonian Grebe

- 3.5.2 Development construction activities have the potential to disturb moulting Slavonian grebe via noise and vibration and visual disturbance, and as such, impacts on the designated feature of moulting Slavonian grebe needs to be assessed.

Visual Disturbance

- 3.5.3 Loch Ashie SPA is visually screened from the Development by a thick band (at a minimum 100 m) of mature coniferous woodland which is to remain un-impacted by the Development. As such it is not considered that visual disturbance is a realistic linking impact pathway. However, impacts from noise and vibration will require further consideration. These are discussed below.

Noise and Vibration Disturbance

- 3.5.4 Literature suggests that Slavonian grebe may be disturbed at distances of 150-300 m (Ref 9). The nearest infrastructure of the Development will be approximately 100 m from Loch Ashie SPA and so disturbance from construction may impact of the integrity of the designation.
- 3.5.5 Whilst baseline noise levels at Loch Ashie were not modelled, representative locations were provided (see EIA Report, Volume 2, Chapter 16: Noise and Vibration, Table 16: Summary of Sound Monitoring Data). Measurement Location S2 is considered to be the most representative due to its close proximity to Loch Ashie. At Location S2, the background noise level is 53 dB (L_{Aeq}).
- 3.5.6 Noise modelling carried out for the Development estimates that average noise levels at Loch Ashie generated by typical construction activities within the Headpond area will range from approximately 64 dB(A) at the southern shore to approximately 57 dB(A) at the far, northern shore. A typical conversation is held at around 60 dB(A) (Chapter 16: Noise and Vibration). It should be noted that a change of 10 dB results in the doubling of perceptible loudness.
- 3.5.7 Research indicates that at noise levels in excess of 84 dB(A) there is a flight response in waterfowl, while at levels below 55 dB there is no effect (Ref 10). These thresholds therefore define the two extremes. Research by the same authors recommends that “*Ambient construction noise levels should be restricted to be below 70 dBA [at the bird]; birds will habituate to regular noise below this level*” (Ref 11).
- 3.5.8 Based on these sound levels, it is anticipated that at the closest point to the Development, there may be a heads up reaction of Slavonian grebe that would not be ignored. It may be that some individuals may move further away from the Development, whilst remaining in the SPA. At the furthest point on Loch Ashie from the Development where noise levels as a result of construction activities are modelled to be 57 dB, due to the small change between baseline conditions (53 dB) and the modelled noise levels (i.e. a change of 4 dB), there may be no perceived change in loudness. This is combined with a lack of visual disturbance as

detailed previously. It is therefore concluded that the sound levels generated by typical construction works at the Headpond are unlikely to have a Likely Significant Effect on moulting Slavonian grebe on Loch Ashie and **this impact pathway from typical construction works can be screened out.**

- 3.5.9 However; noise modelling has not been conducted for blasting operations within the Headpond, as noise modelling for blasting is not normally undertaken in the UK. During the peak period of excavation within the Headpond, blasting may be done on an almost daily basis. **During the autumn when birds gather to moult, blasting could lead to significant disturbance of Slavonian grebe which could result in a Likely Significant Effect. As such this impact pathway is subject to Appropriate Assessment.**

Changes to Hydrological Conditions (Water Quantity and Pollution)

Water Quantity

- 3.5.10 The Development Site lies on Ashie Moor, a ridge of land between Loch Ness to the north-west, Loch Duntelchaig to the south-west, and Loch Ashie SPA to the north-east. Loch Ashie is an artificial reservoir that was created by the construction of a dam in 1875 (Ref 12). It is located in the upper part of the Upper Big Burn catchment and the contributing area feeding Loch Ashie which is fed from surface water via the Big Burn watercourse upstream of Loch Ashie, and also likely fed from groundwater. In conjunction with Loch Duntelchaig, Loch Ashie is the main supply reservoirs of potable water for Inverness (Ref 8). It is currently at bad ecological potential due to impacts from water abstraction, flow regulation and several morphological alterations (Ref 8).
- 3.5.11 The Development is partially located in the Loch Ashie catchment and adjacent to the Loch Duntelchaig catchment. The proposed Headpond itself will be located partially within the Loch Ashie catchment. As a result any rainfall on that part of the catchment will fall into the Headpond. The Headpond is discharged into Loch Ness
- 3.5.12 In addition, the current water supply arrangement is under pressure to meet future potable water demand for Inverness and any impact on current yield as a result of this Development will therefore exacerbate this.
- 3.5.13 As such there is potential for Likely Significant Effects on the moulting Slavonian grebes of Loch Ashie SPA, and this impact pathway is subject to Appropriate Assessment.

Water Pollution

- 3.5.14 The aquatic environment of the SPA is supporting habitat for Slavonian grebe. Slavonian grebe require low nutrient, clear lakes where they can hunt for invertebrates and small fish such as 3-spined stickleback *Gasterosteus aculeatus* and minnow *Phoxinus phoxinus* (Ref 13). These requirements are sensitive to aquatic pollution and dust pollution via surface water run-off. Given that works associated with the Development is at its closest approximately 100 m from the SPA and existing drains enter the Loch Ashie from within the Development Site, then mitigation should be considered to reduce impacts on the European site.
- 3.5.15 Regardless of the Habitats Regulations, it is an offence to pollute a waterbody. In Scotland the relevant legislation is The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended in 2013 (Ref 14), (more commonly known as the Controlled Activity Regulations (CAR)).

- 3.5.16 Water quality measures to ensure the Controlled Activity Regulations (and thus provide protection from aquatic pollution to Loch Ashie SPA, including all ground and surface water), are detailed within Chapter 10: Water Environment (EIA Report, Volume 2).
- 3.5.17 Protective measures include surface water run-off from the Landscape Embankment of the Headpond being intercepted by catch drains and the run-off directed to Loch Ashie, and the incorporation of Sustainable Drainage Systems (SuDs) features and attenuation ponds. Any run-off will not contain any pollutants and as such no impact on water quality in Loch Ashie is predicted (Chapter 10: Water Environment). **As such it is considered that this is not a realistic linking impact pathway and no Likely Significant Effect will result.**

Invasive Non-Native Species

- 3.5.18 Substrate excavation from Loch Ness has the potential to result in the transfer of INNS within the Development Site. Excavated material from the Loch and from the excavation of the tunnels will be transported through the Development Site and stock piled at specific designated locations within the Site. Plant movement has the potential to spread INNS through the Development Site.
- 3.5.19 Loch Ashie, although currently at Bad Water Framework Directive (WFD) status, is not known to currently hold any INNS, as supported by the baseline assessment (EIA Report, Volume 2, Chapter 7: Aquatic Ecology). It is considered that the introduction of INNS into Loch Ashie may cause the WFD status of the waterbody to deteriorate in the future, although the current baseline WFD conditions in the waterbody are Bad. Depending on the INNS transferred, there is the potential for these to affect the moulting habitats used by the Slavonian grebe and foods which they rely upon during moulting.
- 3.5.20 As such there is potential for Likely Significant Effects on the moulting Slavonian grebes of Loch Ashie SPA, and this impact pathway is subject to Appropriate Assessment.

Operational Phase

Changes to Hydrological Conditions (Water Quantity and Pollution)

Water Quantity

- 3.5.21 The Development is partially located in the Loch Ashie catchment and adjacent to the Loch Duntelchaig catchment. The proposed Headpond will be located partially within the Loch Ashie catchment. As a result any rainfall on that part of the catchment will fall into the Headpond. The Headpond is discharged into Loch Ness, thus resulting in a reduction in water entering Loch Ashie. Thus, this part of the Loch Ashie catchment will be lost.
- 3.5.22 In addition, the current water supply arrangement is under pressure to meet future potable water demand for Inverness and any impact on current yield as a result of this Development will therefore exacerbate this.
- 3.5.23 As such there is potential for Likely Significant Effects on the moulting Slavonian grebes of Loch Ashie SPA, and this impact pathway is subject to Appropriate Assessment.

Water Pollution

- 3.5.24 As previously noted, the aquatic environment of the SPA is supporting habitat for Slavonian grebe. Slavonian grebe require low nutrient, clear lakes where they can hunt for invertebrates and small fish such as 3-spined stickleback and minnow (Ref 13). These requirements are sensitive to aquatic pollution and sedimentation pollution via surface water run-off. Given that the Development is at its closest approximately 100 m from the SPA and

existing drains enter the Loch Ashie from within the Development Site, then water pollution from operational activities is considered to be a realistic linking impact pathway.

- 3.5.25 Regardless of the Habitats Regulations, it is an offence to pollute a waterbody. In Scotland the relevant legislation is The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended in 2013 (Ref 14), (more commonly known as the Controlled Activity Regulations (CAR)).
- 3.5.26 Water quality measures to ensure the Controlled Activity Regulations (and thus provide protection from aquatic pollution to Loch Ashie SPA, including all ground and surface water), are detailed within Chapter 10: Water Environment.
- 3.5.27 Protective measures include surface water run-off from the Landscape Embankment of the Headpond being intercepted by catch drains and the run-off directed to Loch Ashie, and the incorporation of SuDs features and attenuation ponds. Any run-off will not contain any pollutants and as such no impact on water quality in Loch Ashie is predicted (Chapter 10: Water Environment). **As such it is considered that this is not a realistic linking impact pathway and no Likely Significant Effect will result.**

Invasive Non-Native Species (INNS)

- 3.5.28 During the initial feasibility work for the Development, the Scottish Environment Protection Agency (SEPA) and Scottish Water raised the risk of operational transfer of INNS between the Ness and Nairn catchments. Of particular concern was the potential to spread of the flatworm *Phagocata woodworthi*, the crustacean *Crangonyx pseudogracilis* and the macrophyte *Elodea Nuttallii* into Loch Ashie. However, depending on the invasive species transferred, there is the potential for these to affect the moulting habitats used by the Slavonian grebe and foods which they rely upon during moulting.
- 3.5.29 As such there is potential for Likely Significant Effects to impact on the moulting Slavonian grebes of Loch Ashie SPA, and this impact pathway is subject to Appropriate Assessment.

Decommissioning Phase

Disturbance to Autumnal Moulting Slavonian Grebe

- 3.5.30 Decommissioning of the Development, if undertaken, will involve relatively low intensity works to drain the Headpond and other activities undertaken distant to Loch Ashie. Water would be drained from the Headpond to Loch Ness in a controlled manner, and will therefore have no effect on Loch Ashie. **It is therefore considered that the Development will not have a Likely Significant Effect on the moulting Slavonian grebe of Loch Ashie.**

3.6 Appropriate Assessment

Construction Phase

Disturbance to Autumnal Moulting Slavonian Grebe

- 3.6.1 As previously identified general noise created by typical construction activities within the Headpond are not considered likely to cause any disturbance to Slavonian grebes on Loch Ashie, the only potential for construction-related disturbance is likely to be as a result of blasting. To therefore remove this risk, blasting within the Headpond area will not be permitted during the Slavonian grebe moulting period, which will be taken as 15 August – 31 October each year, thus avoiding the impact from occurring. **With this avoidance measure in place, it can be considered that the Development will not have an adverse effect on**

integrity of the Slavonian grebe at Loch Ashie SPA as a result of disturbance from the construction phase of the Development.

Changes to Hydrological Conditions (Water Quantity)

Water Quantity

- 3.6.2 Reduced flow in the Big Burn catchment as a result of the Development could affect water supply to Loch Ashie. Scottish Water already has capital funding in place to implement resilience measures. The proposed resilience measures being implemented by Scottish Water to allow raw water to be pumped from Loch Ness to Water Treatment Works (WTW) (located just to the north of Loch Ashie) address any shortfall from the Loch Ashie and Loch Duntelchaig sources. The new Scottish Water pumping arrangement will pump water to Drumashie WTW that serves Inverness, so less water is abstracted from Loch Ashie. As a by-product of the reduced abstraction rates from Loch Ashie by Scottish Water the reduced quantities of water flowing into Loch Ashie due to the loss of some of the catchment will be negated. In addition, due to the small size of Big Burn it is not anticipated that the reduction in Big Burn's (and thus Loch Ashie's) catchment will affect water levels within Loch Ashie and shore line exposure is not predicted (Chapter 10: Water Environment). **Therefore the loss of catchment of the Big Burn and Loch Ashie is unlikely to have an adverse effect on integrity of Loch Ashie SPA.** Additionally, embedded mitigation measures within the Development such as the incorporation of SuDs features and attenuation ponds will prevent flash floods from occurring. **As such it is considered that this impact pathway will not have an adverse effect on the integrity of the European site.**

Invasive Non-Native Species

- 3.6.3 As previously identified, there is the potential for INNS to be transferred within the Development Site, and thus potentially to Loch Ashie. Dependant of the INNS transferred, there is the potential for these to impact on the habitats and food sources of the moulting Slavonian grebe for which Loch Ashie is designated.
- 3.6.4 A Construction Environmental Management Plan (CEMP) and specific Biosecurity Management Plan (BMP) will be finalised and will set out the methods and procedures that will be implemented by the Construction Contractor to minimise the environmental impact, including potential effects on aquatic habitats and due to INNS. Mitigation has been built into the design, and will be detailed in the BMP, to prevent the transport of INNS into other areas and to prevent the upstream transport of these species.
- 3.6.5 The risk of cross-catchment contamination during Headpond construction, for example by the spread of INNS, will be minimised by the distance of approximately 100 m from Loch Ashie, and the incorporation of temporary SuDs and attenuation features in the intervening land.
- 3.6.6 Material excavated or dredged from Loch Ness must be retained in the immediate area, i.e. stockpiled on the loch shoreline, to prevent the spread of INNS, including Nuttall's waterweed and *Crangonyx pseudogracilis*, which are known to be present in Loch Ness.
- 3.6.7 The Aquatic ECoW will supervise all excavation and dredging works in Loch Ness to check for the presence of INNS and ensure that appropriate biosecurity measures, as detailed in the BMP, are implemented.
- 3.6.8 Biosecurity measures should be implemented throughout the development, following 'Check, Clean, Dry' principles. These measures will include, but are not limited to:

- Vigilance for the presence of INNS, including pre-commencement surveys, supervision and monitoring by the ECoW;
- Vehicle washing facilities, including washing plant and vehicles before transferring between this and different construction sites;
- Disinfection of Plant, PPE and materials after works in aquatic habitats, especially in Loch Ness where INNS are known to be present;
- Ensuring where possible that materials are retained in the habitats where they originated, especially where INNS are known to be present, i.e. Loch Ness;
- Drying facilities should be provided for equipment and PPE – some INNS can live, or seeds remain viable, in moist conditions for long periods;
- Avoid the transfer of water between aquatic habitats on site.

3.6.9 Further to this future monitoring for INNS will be undertaken as follows:

- Annual monitoring surveys for the presence of INNS, to be combined with surveys for terrestrial INNS, in watercourses within the Site and assessed as receptors in relation to INNS including Loch Ashie. Due to the potential for INNS to be transferred to the Headpond and therefore provide a new transfer pathway in close proximity to Loch Ashie and other aquatic receptors, the Headpond and these receptors will be monitored for INNS for a period of five years.
- Regular monitoring of the Inlet / Outlet on the shore of Loch Ness will be carried out to ensure the integrity of the Screen and assess any potential impacts in relation to fish, in particular migratory salmon and other species due to the potential for distraction and entrapment / impingement.
- Where permanent culverts are installed in watercourse crossings, these will be monitored to ensure that there are no lasting effects on fish passage, especially in the event that brown trout or other protected / notable species are shown to be present in pre-commencement fish surveys

3.6.10 With the implementation of the above measures it can be concluded that the Development will not result in an adverse effect on integrity of Loch Ashie as a result of INNS during the construction phase.

Operational Phase

Changes to Hydrological Conditions (Water Quantity)

Water Quantity

3.6.11 For the same reasons as detailed in paragraph 3.6.2, the **loss of catchment of the Big Burn and Loch Ashie is unlikely to have an adverse effect on integrity of Loch Ashie SPA**. Additionally, embedded mitigation measures such as the incorporation of SuDs features and attenuation ponds will prevent flash floods from occurring. **As such it is considered that this impact pathway will not have an adverse effect on the integrity of the European site.**

Invasive Non-Native Species

3.6.12 As previously identified, there is the potential for INNS to be transferred within the Development Site, and thus potentially to Loch Ashie. Dependant of the INNS transferred;

there is the potential for these to impact on the habitats and food sources of the moulting Slavonian grebe for which Loch Ashie is designated.

- 3.6.13 At the construction phase of the Development measures are to be included within the CEMP to minimise the transfer of INNS (see paragraph 3.6.9 onwards for further details).
- 3.6.14 INNS are known to be present within Loch Ness, with *Crangonyx pseudogracilis* identified at the Inlet / Outlet location. Nuttall's waterweed may also be present, although it was not found during baseline sampling. While *Crangonyx* and fragments of Nuttall's waterweed may be drawn into the Inlet, the closed-loop system has been designed to prevent cross-catchment contamination, although these INNS may become established in the Headpond.
- 3.6.15 Whilst the closed-loop system and Inlet screen will minimise the potential for transfer of aquatic INNS through the site, there remains the potential for plant fragments and macroinvertebrates to be transferred to the Headpond from Loch Ness.
- 3.6.16 The effects of the transfer of INNS through construction activities have been assessed above, and these could result in INNS becoming permanently established in the waterbodies they were transferred to. However, the transfer of INNS into the Headpond would introduce a new pathway for the transfer of INNS, i.e. from the Headpond to nearby waterbodies and watercourses such as Loch Ashie. It is acknowledged that the pathways for the transfer of INNS between Loch Ness and Loch Ashie already exists, (for example through the transfer of INNS by waterfowl), however the presence of the Headpond would result in a shorter potential transfer pathway.
- 3.6.17 It is considered that in light of the existing linking impact pathways between Loch Ness and Loch Ashie, which this is not in fact a new linking impact pathway and as such it would not result in adverse effect in integrity of the European site.
- 3.6.18 Nonetheless, future monitoring for INNS will be undertaken as follows:
- Annual monitoring surveys for the presence of INNS, to be combined with surveys for terrestrial INNS, in watercourses within the Site and assessed as receptors in relation to INNS including Loch Ashie. Due to the potential for INNS to be transferred to the Headpond and therefore provide a new transfer pathway in close proximity to Loch Ashie and other aquatic receptors, the Headpond and these receptors will be monitored for INNS for a period of five years.
 - Regular monitoring of the Inlet / Outlet on the shore of Loch Ness will be carried out to ensure the integrity of the Screen and assess any potential impacts in relation to fish, in particular migratory salmon and other species due to the potential for distraction and entrapment / impingement.
 - Where permanent culverts are installed in watercourse crossings, these will be monitored to ensure that there are no lasting effects on fish passage, especially in the event that brown trout or other protected / notable species are shown to be present in pre-commencement fish surveys

3.7 In Combination Assessment

- 3.7.1 Beyond water quantity, there are no other projects or plans that have the potential to act in combination with the proposed Development.
- 3.7.2 With regards to water quantity; the above assessment includes in combination assessment as the provision of the pumping of water from Loch Ness to the Drumashie Water treatment Works by Scottish Water will reduce the need for water abstraction from Loch Ashie and

thus ensure that the water volumes within Loch Ashie do not alter. As such it is concluded that there will be no adverse effect of integrity of the European site alone or in combination with other projects or plans.

3.8 Summary of Conclusions

- 3.8.1 The above assessment undertook a test of Likely Significant Effects of impact pathways relating to disturbance impacts during the construction and decommissioning phase; hydrological changes during the construction, operational and decommissioning phases; and INNS during the operational phase.
- 3.8.2 Likely Significant Effects could be screened out for all impact pathways, with the exception of noise and vibration disturbance during the construction phase and changes to water quality in Loch Ashie during both the construction and operational phases. Following the assessment of mitigation and avoidance provisions for the Development, it could be **concluded that the Development would not result in an adverse effect of integrity on Loch Ashie, either alone or in combination.**

4. Loch Ruthven SAC, SPA and Ramsar Site

4.1 Introduction

4.1.1 This European site is located 4.5 km from the Development. Loch Ruthven is a mesotrophic loch with rocky margins and extensive stands of bottle sedge around its perimeter. At the western end there is a marshy zone which transitions from open water, to swamp and fen and finally to sedge-rich acidic grassland. The surrounding land is dominated by birch *Betula* spp. and the catchment comprises upland heath and grassland, upland mire, swamp / fen / carr, wet lowland, grassland, rivers and streams.

4.2 Interest Features

4.2.1 The site qualifies as a SPA for the following Annex I species (Ref 15):

- During the breeding season, Slavonian grebe, 14 pairs (5 year mean, 1989-1993).

4.2.2 The site is designated as a SAC for the following reasons (Ref 16):

- Annex 1 habitats that are the primary reason for selection;
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and / or of the *Isoeto-Nanojuncetea*;
- Annex II species present as a qualifying feature, but not a primary reason for site selection; and
- Otter *Lutra lutra*.

4.2.3 The site is designated as a Ramsar site for the following reasons (Ref 17):

- Ramsar criterion 3: there are two nationally scarce species of orchid growing in boggy areas surrounding Loch Ruthven, coralroot orchid *Corallorhiza trifida* and bog orchid *Hammarbya paludosa*. The site also forms a core part of the breeding range of Slavonian grebe and one of the most productive populations in Britain.

4.3 Conservation Objectives

4.3.1 To ensure no deterioration of habitats and qualifying species for the SPA and thus ensuring the integrity of the site, the following are to be maintained in the long-term:

- Population of the species as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

4.3.2 To avoid deterioration of the qualifying habitat of the SAC and thus ensuring the integrity of the site the following are to be maintained in the long-term:

- Extent of the habitat on site;
- Distribution of the habitat within the site;
- Structure and function of the habitat;
- Processes supporting the habitat;
- Distribution of typical species of the habitat; and

- No significant disturbance of typical species of the habitat.

4.4 Environmental Vulnerabilities and Potential Links to the Development

4.4.1 Environmental pressures to the SAC, SPA and Ramsar site are:

- Agricultural operations on the clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels;
- Game and fisheries management on the clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels; and
- Other activities on otter.

4.4.2 The following pressures from the Development have been identified as potentially impacting the integrity of the Loch Ruthven SPA, SAC and Ramsar site:

- Disturbance to otter and breeding Slavonian grebe;
- Direct mortality of otter during construction (e.g. as a result of increased vehicular traffic)
- Loss of supporting habitat for otter;
- Hydrological changes; and
- Aquatic pollution.

4.5 Test of Likely Significant Effects

4.5.1 The following have been identified as pressures from the Development that may impact the integrity of Loch Ruthven SAC, SPA and Ramsar site and as such will be subject to a Likely Significant Effects Test.

- Disturbance to breeding Slavonian grebe and otter: construction phase
- Traffic mortality of otter: construction phase, operational phase and decommissioning phase
- Loss of supporting habitat for otter: construction phase
- Changes in hydrological conditions: construction phase

4.5.2 Following discussion, if Likely Significant Effects cannot be screened out, Appropriate Assessment will be undertaken if required.

Construction Phase

Disturbance to Breeding Slavonian Grebe and Otter

4.5.3 There is the potential for disturbances the construction phase of the Development to impact on the population of Slavonian grebe otter of Loch Ruthven. Here Slavonian grebe use the SPA for breeding.

4.5.4 The nearest infrastructure of the Development is located more than 4 km from Loch Ruthven and so disturbance from construction is **not considered to be a realistic linking impact pathway on breeding Slavonian grebe or otter. As such this impact pathway can be screened out from resulting in a Likely Significant Effect on the European site.**

Traffic Mortality of Otter

4.5.5 The Loch is approximately 4.5 km from the Development. Given that male otters can range up to 35 km along rivers, there is the potential for any increases in traffic resulting from the construction phase of the Development to interact with otter, potentially resulting in increased rates of mortality. At its peak there could be an increase to on average 820

vehicles per day on roads around the Development (EIA Report, Volume 2, Chapter 15: Traffic and Transport).

4.5.6 The nearest road to be used by construction related Development traffic is the B851 which at its closest is located 1.5 km from the SAC; and this poses a risk of mortality to otter when using their navigation routes in their homing range (Ref 18). Survey results indicate that otter activity within the Development and surrounding areas was low, with occurrence only identified by the presence single spraints on the bank of Loch Ashie and along the Allt a' Mhinisteir within Dirr Wood. In addition, an otter was also flushed from the bank of Lochan an Eoin Ruadha. No otter resting sites were found within the survey area (EIA Report Volume 2, Chapter 6: Terrestrial Ecology).

4.5.7 Based on the limited evidence of otter identified, it is likely that the watercourses within the Development Site are infrequently used. Furthermore, none of these contain a significant fish resource (see Chapter 7: Aquatic Ecology) and are unlikely to be suitable for foraging otter. Given the very low levels of otter activity on-site, it is considered that the risk of direct mortality as a result of increased traffic during the construction phase as a result of collision with moving vehicles or plant is very low **and not considered to result in a Likely Significant Effect on the SAC feature.**

Loss of Supporting Habitat for Otter

4.5.8 Otter survey undertaken within the Development Site boundary (Chapter 6: Terrestrial Ecology) did not identify any evidence to confirm the presence of otter within the Development. As such, whilst habitats that are suitable for use by otter such as small watercourses and woodland, will be impacted by the Development, it is not considered that these habitats within the Development act as functionally linked land outside of the European site. It is noted that during a site visit ecologists recorded an incidental sighting of a single otter on Lochan an Eoin Ruadha which is located immediately adjacent to the Development Site boundary (Chapter 6: Terrestrial Ecology). Whilst the Development Site contains watercourses, these are to be retained and preserved and as such it is considered that loss of supporting habitat located outside of the designated site is not a realistic linking impact pathway and can be **screened out from resulting in a Likely Significant Effect on the SAC.**

Changes in Hydrological Conditions, Including Water Resources and Pollution

4.5.9 Loch Ruthven SAC, SPA and Ramsar site is vulnerable to changes in water quality from agricultural activities within its catchment and therefore potentially from surface water run-off from construction activities from the Development. However, given the distance that Loch Ruthven is from the Development (4.5 km) and the fact there are no direct hydrological links (the Development is not located within the catchment of Loch Ruthven, but between the catchments of Loch Ness, Loch Ashie and Loch Duntelchaig), this is not a realistic linking impact pathways and this impact pathway can be **screened out from having a Likely Significant Effect on the European site alone or in combination and is not discussed further.**

Operational Phase

Traffic Mortality of Otter

4.5.10 The Loch is approximately 4.5 km from the Development. Given that male otters can range up to 35 km along rivers, there is the potential for any increases in traffic resulting from the

operational phase of the Development (at its peak there could be an increase of 7 vehicles per day; Chapter 15: Traffic and Transportation) to interact with otter, potentially resulting in increased rates of mortality.

- 4.5.11 However, whilst during the operational phase there will be a small increase in traffic to and from the Development which will pass along roads within proximity to the SAC (the nearest road to be used by Development traffic is the B851 which at its closest is located 1.5 km from the SAC); this poses a risk of mortality to otter when using their navigation routes in their homing range (Ref 18). Survey results indicate that otter activity within the Development and surrounding areas was low, with occurrence only identified by the presence single spraints on the bank of Loch Ashie and along the Allt a' Mhinisteir within Dirr Wood. In addition, an otter was also flushed from the bank of Lochan an Eoin Ruadha. No otter resting sites were found within the survey area (Chapter 6: Terrestrial Ecology).
- 4.5.12 Based on the limited evidence of otter identified, it is likely that the watercourses within the otter survey area are infrequently used. Furthermore, none of these contain a significant fish resource (see Chapter 7: Aquatic Ecology for further details) and are unlikely to be suitable for foraging otter. Given the very low levels of otter activity on-site, and the small increase in traffic movements during the operational phase it is considered that the risk of direct mortality as a result of increased traffic during the construction phase as a result of collision with moving vehicles is very low and **not considered to result in a Likely Significant Effect on the SAC feature.**

Decommissioning Phase

Traffic Mortality of Otter

- 4.5.13 Whilst there is no traffic modelling available for the decommissioning phase of the development, it is anticipated that smaller volumes of traffic will result from the construction phase of the Development. Given that the large increase in traffic from the construction phase could be screened out from Likely Significant Effects based on very low otter activity within the Site it is considered that the risk of direct mortality as a result of increased traffic during the decommissioning phase as a result of collision with moving vehicles or plant is very low and **not considered to result in a Likely Significant Effect on the SAC feature.**

4.6 In Combination Assessment

- 4.6.1 As all impacts could be screened out from resulting in Likely Significant Effects, there are no impact pathways that could interact with the European sites in combination.

4.7 Summary of Conclusions

- 4.7.1 The above assessment undertook a test of Likely Significant Effects of impact pathways relating to disturbance of breeding Slavonian grebe and otter, traffic mortality of otter, loss of supporting habitat for otter and changes in hydrological conditions.
- 4.7.2 Likely Significant Effects could be screened out for all impact pathways both alone and in combination, and as such it is considered that the Development will not have a Likely Significant Effect on Loch Ruthven SAC, SPA and Ramsar site.

5. River Moriston Special Area of Conservation

5.1 Introduction

5.1.1 The River Moriston SAC is located 22 km south-west from the Development. The SAC enters Loch Ness on its northern shores. The SAC includes a diverse aquatic habitat of standing water, running water, bogs, marshes, water fringed vegetation, fens, heath, scrub, maquis and garrigue, phygrana, broad-leaved deciduous and coniferous woodland. The river also supports a functional freshwater pearl mussel *Margaritifera margaritifera* population.

5.2 Interest Features

5.2.1 This site is designated for the following reasons (Ref 19):

- Annex II species that are a primary reason for selection of this site;
 - Freshwater pearl mussel.
- Annex II species present as a qualifying feature, but not a primary reason for site selection;
 - Atlantic salmon *Salmo salar*.

5.3 Conservation Objectives

5.3.1 To ensure no deterioration of the qualifying habitat and ensuring the integrity of the site, the following are to be maintained in the long-term:

- Population of the species, including range genetic type for salmon, as a viable component on the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species;
- No significant disturbance of the species;
- Distribution and viability of freshwater pearl mussel host species; and
- Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species.

5.4 Environmental Vulnerabilities and Potential Links to the Development

5.4.1 Environmental pressures to the SAC are as follows:

- To Atlantic salmon
 - Forestry operations;
 - Over grazing;
 - Invasive non-native species; and
 - Water management – flow regulation.
- To freshwater pearl mussel
 - Statutory undertaker;
 - Water management – flow regulation; and

- Water management – diffuse source pollution.

5.4.2 The following have been identified as potential links to the Development that may impact on the integrity of the River Moriston SAC:

- Aquatic pollution;
- Hydrological impacts;
- Invasive non-native species;
- Loss of supporting habitat for both Atlantic salmon and freshwater pearl mussel; and
- Noise and vibration disturbance to migratory pathway of Atlantic salmon and thus disruption to freshwater pearl mussel glochidia.

5.5 Test of Likely Significant Effects

5.5.1 Whilst the River Moriston is located 22 km from the Development, due to the designated feature (Atlantic salmon) and other salmonids using Loch Ness (Development works will take place at Loch Ness) for migration between the river for spawning and the seas there is potential for linking impact pathways.

5.5.2 Due to the distances involved it is not considered that the Development has any realistic linking impact pathways directly to freshwater pearl mussel as they are not present within Loch Ness (Chapter 7: Aquatic Ecology). From July to May / June the following year the larval phase of the mussel (the glochidia) attach themselves to gills of juvenile salmonid. The juvenile salmonids stay within the River Moriston during this time. As such it is the potential effect of the Development to affect the number of adult salmonids that reach the River Moriston SAC for spawning (and thus produce juvenile salmonids), that is the relevant linking impact pathway to the Development. As a result, Loch Ness is an essential component of the catchment of the River Moriston in providing a migratory route for salmonid turn upon which freshwater pearl mussel depend. Consequently it is the impacts on these adult salmonid (Atlantic salmon and trout species) that is assessed in the following sections.

5.5.3 The following have been identified as pressures from activities associated with the Development that may impact the integrity of the River Moriston SAC and as such will be subject to a Likely Significant Effects Test:

- Changes in hydrological conditions (water pollution) - construction phase
- INNS - construction phase
- Direct Mortality or Physical Injury to Atlantic Salmon and other Salmonid species from noise and vibration - construction phase
- Loss of supporting habitat for both Atlantic salmon and freshwater pearl mussel - construction phase
- Entrainment - operation phase

5.5.4 Following discussion, if Likely Significant Effects cannot be screened out, Appropriate Assessment will be undertaken if required.

5.5.5 It is unlikely for potential linking impact pathways to exist at the decommissioning phase, and as such this section is not included below for the River Moriston SAC.

Construction Phase

Water Pollution

- 5.5.6 The River Moriston SAC is located 22 km from the Development Site boundary. It is known to be vulnerable to diffuse source pollution. However due to the large distance involved, there is no realistic linking impact pathway to the physical area of the SAC. However, there is potential for works associated with the construction phase of the Development to affect the designated features for which the SAC is designated. The freshwater pearl mussel glochidia are only attached to juvenile salmonids from July to the following May or June, during which time the juvenile fish stay in the river and are therefore unlikely to be affected by changes in water quality in Loch Ness. As such due to the large distances from the River Moriston to the Development Site, it is only impacts on the adult migratory Atlantic salmon and other salmonid species which the glochidia are associated with that are considered further.
- 5.5.7 Atlantic salmon are sensitive to hydrological change and it can influence their life-cycle at different phases, such as foraging behaviour, upstream migration, spawning activity and downstream migration of smolts (Ref 20). Atlantic salmon require good water quality, good clarity and well oxygenated water.
- 5.5.8 The anadromous nature of the fish requires them to move through Loch Ness to the River Moriston. Therefore this direct link could impact on the integrity of the SAC if aquatic pollution reduces water quality in Loch Ness.
- 5.5.9 As previously detailed, regardless of the Habitats Regulations, it is an offence to pollute a waterbody. In Scotland the relevant legislation is the Controlled Activity Regulations (CAR) (Ref 14).
- 5.5.10 As part of the Development build design and to accord with CAR, a silt curtain or equivalent will be installed prior to the Cofferdam being installed and the construction of the Temporary Jetty (Chapter 2: Project and Site Description). This will entrap sediment stemming from the Development that may reach Loch Ness during construction as a result of run-off. With these CAR driven avoidance measures in place this impact pathway can be **screened out from resulting in a Likely Significant Effect on the SAC**.

Invasive non-native species

- 5.5.11 Loch Ness is currently inhabited by several INNS, as established in the baseline assessment (Chapter 7: Aquatic Ecology). Equipment and materials will be transported to Loch Ness and to the Development Site by barge via the Caledonian Canal, which is an existing navigable watercourse with regular boat traffic. Therefore there is the potential for the spread of INNS from elsewhere on the Development Site or off-site as a result of construction activity.
- 5.5.12 Migratory Atlantic Salmon for which the SAC is designated could potentially be affected by INNS. The Atlantic salmon in Loch Ness coexist with the INNS that are already present in that waterbody. However, there are other INNS that have the potential to adversely affect the salmon population, namely the salmon fluke, which is currently absent from this country (Chapter 7: Aquatic Ecology). The Development does not provide a pathway to introduce salmon fluke.
- 5.5.13 Further, the River Moriston SAC is considered sufficiently distant from the Development as to negate the risk of the spread of INNS from the Development Site directly to the SAC as a

result of construction activities associated with the Development and **as such this impact pathway can be screened out from resulting in a Likely Significant Effect on the River Moriston SAC.**

Direct Mortality or Physical Injury to Atlantic Salmon and Other Salmonid Species from Noise and Vibration

- 5.5.14 Salmon / Salmonids are a group of fishes that have a swim bladder but in which hearing does not involve the swim bladder. These species are susceptible to sudden changes in pressure, such as that resulting from impulsive sound, but hearing only involves particle motion, not sound pressure. Thus, behavioural responses at the individual animal level can be expected, particularly for impact piling (should it occur), which may involve changes in migration during the migration season.
- 5.5.15 There will be temporary works to the shoreline and margins of Loch Ness, with a temporary Cofferdam extending approximately 100 m out into the loch and 280 m along the shoreline, and a Temporary Jetty. These works will in part require the use of piling.
- 5.5.16 Consultation with the Ness District Salmon Fishery Board (NDSFB) has established that during the annual migration of salmon smolts, large shoals have been reported as gathering at Dores Beach (Chapter 7: Aquatic Ecology). This means that significant numbers of smolts may be present close to the Tailpond Inlet / Outlet both during construction and operation. Given the known presence of salmon in Loch Ness and the well-known timing of this migration (late spring and early summer for smolt migration; late autumn or early winter for adult migration) it is likely that salmon will be present in the vicinity of the Cofferdam during their migration: and as such impacts stemming from construction activities (piling and dewatering), have the potential to result in behavioural changes (avoidance behaviour), physical injury or direct mortality.
- 5.5.17 Although the effects of piling noise varies with size of piles and blow energy, under the most likely scenario (1.8 m piles and a blow energy of 300 kilojoules; kJ), auditory injury to salmon is calculated to occur out to approximately 20 m from the noise source, a strong avoidance reaction is calculated to occur out to 330 m and a significant avoidance behaviour reaction is calculated to occur out to 2.1 km (Ref 21).
- 5.5.18 None the less, at its narrowest point in proximity to the Development, Loch Ness is approximately 2 km in width. Whilst the channel available to fish will be smaller due to noise emitted, (in the absence of hydroacoustic modelling for the Development) it is highly likely that a large width of the Loch Ness channel will still be available for Atlantic salmon to migrate through where noise from the Development will not adversely affect the behaviour of the fish, thus allowing continued migration. None the less, where salmonids are in proximity to the location of the piling as the works commence, there is potential for changes in behaviour, physical injury or mortality. In the absence of mitigation, the potential effects on salmon in Loch Ness through construction of the Cofferdam and Temporary Jetty **has the potential to have a Likely Significant Effect and as such will be subject to Appropriate Assessment.**

Loss of Supporting (Spawning) Habitat

- 5.5.19 Due to the high gradient, steep banks and the number of impassable barriers for migration throughout the catchment within the Site boundary, migratory species including salmon and trout are considered unlikely to be present and utilising the flowing watercourses for

spawning throughout the Development Site (Chapter 7: Aquatic Ecology). Additionally Salmon and trout are also unlikely to be utilising the margins of Loch Ness to spawn as it is widely understood that migratory salmonids prefer to spawn in rivers and streams (Ref 22). As a result it is considered that this is **not a realistic linking impact pathway and can be screened out from resulting in Likely Significant Effects on the River Moriston SAC.**

Operation Phase

Entrainment

- 5.5.20 Salmon will continue to utilise Loch Ness as a migratory pathway during the operational phase of the Development, and may therefore pass the Tailpond Inlet / Outlet structure. As part of the design, the Screen at the Inlet / Outlet structure will have a 2 mm aperture size to prevent the entrainment of fish. It is predicted that the maximum Inlet velocity will be 0.15 m/s.
- 5.5.21 The maximum sustained swimming speed of salmon has been shown to be between 0.91 m/s (0.45 m body length) and 0.54 m/s (0.15 m body length) (Ref 23), with burst swimming speeds much higher than this and as such will swim sufficiently fast to avoid impingement at the Inlet Screen. Sustained and burst swimming speeds of salmon certainly indicate that they will be able to escape the Inlet Screen. It is not clear for how long the Inlet will operate during a pumping cycle, but it is anticipated that one cycle will operate each day.
- 5.5.22 Given the sporadic operation of the Inlet and the evidence that even weaker swimming fish species such as juvenile lamprey swim sufficiently fast to escape the Inlet velocity (Chapter 7: Aquatic Ecology), together with the very small size of the Tailpond Inlet / Outlet Structure in the context of the size of Loch Ness, the potential impact on Atlantic salmon and thus freshwater pearl mussels that rely on salmon for the completion of their life cycle is considered to **not result in a Likely Significant Effect on the River Moriston SAC and can be screened out.**

5.6 Appropriate Assessment

Construction Phase

Direct Mortality or Physical Injury to Atlantic Salmon

- 5.6.1 To minimise the effects of noise from piling on fish, 'soft start', i.e. the gradual beginning to piling works will be implemented to deter fish from the immediate area where physical injury may occur. Mason and Collett (Ref 21) suggest a soft start to piling using a blow energy of 150 kJ, and show that using a soft start will have a lower impact on the salmon initially (Chapter 7: Aquatic Ecology).
- 5.6.2 Works in Loch Ness will be carried out under the supervision of an Aquatic Ecological Clerk of Works (ECoW); this is likely to be a condition of the CAR licence. In addition the CEMP will include restricted timings to piling to avoid the migratory season for both adult salmon and salmon smolts that may pass within proximity of the Development Site.
- 5.6.3 With the implementation of soft start piling, the restricted timing of piling, and works being supervised by an Aquatic Ecological Clerk of Works it is considered that the Development **will not result in an adverse effect on in the integrity on the migratory fish of the SAC via this impact pathway alone.**

5.7 In Combination Assessment

- 5.7.1 As all impacts could be screened out from resulting in Likely Significant Effects in isolation, there are no impact pathways that could interact with the European sites in combination.

5.8 Summary of Conclusions

- 5.8.1 The above assessment undertook a test of Likely Significant Effects of impact pathways relating to water pollution, INNS, direct mortality, physical injury and behavioural changes, loss of supporting (spawning) habitat and entrainment during the construction or operational.
- 5.8.2 Likely Significant Effects could be screened out for all impact pathways, with the exception of direct mortality, physical injury and behavioural changes during the construction phase. Following the assessment of mitigation and avoidance provisions for the Development, it could be **concluded that the Development would not result in an adverse effect of integrity on Loch Ashie, either alone or in combination.**

6. Urquhart Bay Wood Special Area of Conservation

6.1 Introduction

6.1.1 This SAC is located 7.1 km from the Development, on the northern shore of Loch Ness. It is located at the confluence of the Rivers Enrick and Coiltie as they flow into Loch Ness. The SAC has developed on an alluvial delta with extensive stands of alluvial forest on the wetter ground associated with the river channels. Additionally, alluvial forest has formed where there are transitions on gradually rising land to stands of lowland broad-leaved woodland containing ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*), wild cherry *Prunus avium*, rowan *Sorbus aucuparia*, wych elm *Ulmus glabra*, white willow *Salix alba* and bird cherry *Prunus padus*. There are also characteristic transitions to swamp and open freshwater.

6.2 Interest Features

6.2.1 The site is designated as an SAC for the following Annex II habitats (Ref 24):

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae).

6.3 Conservation Objectives

6.3.1 To ensure no deterioration of the qualifying habitat and ensuring the integrity of the site, the following are to be maintained in the long-term:

- Extent of habitat on the site;
- Distribution of the habitat within the site;
- Structure and function of the habitat;
- Processes supporting the habitat;
- Distribution of typical species of that habitat; and
- No significant disturbance of typical species of the habitat.

6.4 Environmental Vulnerabilities and Potential Links to the Development

6.4.1 Environmental pressures to the SAC are as follows and in particular the alder woodland on floodplain:

- Over grazing;
- Invasive non-native species; and
- Morphological alteration to the water management.

6.4.2 The following have been identified as potential links to the Development that may impact on the integrity of Urquhart Bay Wood SAC:

- Hydrological impacts; and
- INNS.

6.5 Test of Likely Significant Effects

6.5.1 The following have been identified as pressures from the Development that may impact the integrity of Urquhart Bay Woods SAC and as such will be subject to a Likely Significant Effects Test:

- Changes in hydrological conditions: construction phase and operational phase; and,
- Invasive non-native species: operational phase.

6.5.2 Following discussion, if Likely Significant Effects cannot be screened out, Appropriate Assessment will be undertaken if required.

6.5.3 It is unlikely for potential linking impact pathways to exist at the decommissioning phase, and as such this section is not included below for this SAC.

Construction Phase

Hydrological Impacts

6.5.4 Urquhart Bay Wood SAC is vulnerable to hydrological impacts. Specifically, it is sensitive to morphological changes resulting from water management. At Urquhart Bay Wood, the alluvial forest relies on the process supporting the habitat, which is heavily dependent on the hydrological processes of the Rivers Enrick and Coiltie.

6.5.5 This European designated site is located north of the northern shore of Loch Ness, whilst the Development is located south of the southern shores of Loch Ness. Loch Ness is a deep and wide waterbody and as such it is not considered that the Development will be hydrologically linked to the Urquhart Bay Wood SAC. As such there is no realistic hydrological link between the European site and the Development. This impact pathway relating to the Urquhart Bay Wood SAC can be **screened out from resulting in a Likely Significant Effect.**

Invasive Non-Native Species

6.5.6 Urquhart Bay Wood SAC is owned and managed by the Woodland Trust Scotland. The Management Plan for the SAC (2018-2023) (Ref 25) identifies the presence and subsequent management of INNS including: Japanese knotweed *Fallopia japonica*, white butterbur *Petasites albus* and Himalayan balsam *Impatiens glandulifera*. Due to the distance from the European site, and the nature of the Development it is considered unlikely that the Development would exacerbate the existing pressure on the SAC from INNS. This impact pathway relating to the Urquhart Bay Wood SAC can be **screened out from resulting in a Likely Significant Effect.**

6.5.7 Furthermore, the Development has been designed to provide a closed-loop system meaning that SEPA have no concerns about INNS. None-the-less the Development will include a 2 mm sieve to limit the transmission of INNS.

Operational Phase

Hydrological impacts

6.5.8 Urquhart Bay Wood SAC is vulnerable to hydrological impacts. Specifically, it is sensitive to morphological changes resulting from water management. At Urquhart Bay Wood, the alluvial forest relies on the process supporting the habitat, which is heavily dependent on the hydrological processes of the Rivers Enrick and Coiltie.

6.5.9 This European designated site is located north of the northern shore of Loch Ness, whilst the Development is located south of the southern shores of Loch Ness. Loch Ness is a deep and wide waterbody and as such it is not considered that the Development will be hydrologically linked to the Urquhart Bay Wood SAC. As such there is no realistic hydrological link between the European site and the Development. This impact pathway

relating to the Urquhart Bay Wood SAC **can be screened out from resulting in a Likely Significant Effect.**

6.6 In Combination Assessment

6.6.1 As all impacts could be screened out from resulting in Likely Significant Effects, there are no impact pathways that could interact with the European sites in combination.

6.7 Summary of Conclusions

6.7.1 The above assessment undertook a test of Likely Significant Effects of impact pathways relating to changes in hydrological conditions and invasive non-native species.

6.7.2 Likely Significant Effects could be screened out for all impact pathways both alone and in combination, and as such it is considered that the Development will not have a Likely Significant Effect on Urquhart Bay Woods SAC.

7. Ness Woods Special Area of Conservation

7.1 Introduction

7.1.1 This SAC comprises a complex of sites. The closest site is Inverfarigaig Site of Special Scientific Interest located 10 km from the Development. It includes one of the best and most extensive examples of ravine woodland in Scotland at Glen Tarff. The canopy is a mixture of alder, ash and wych elm with a locally abundant hazel *Corylus avellana* shrub layer. The ground layer is rich in ferns, mosses and herbaceous plants. The woods have an epiphytic flora of lichens, liverworts and mosses with Atlantic affinities.

7.2 Interest Features

7.2.1 This site is designated for the following reasons (Ref 26):

- Annex I habitats that are a primary reason for selection;
 - Tilio-acerion forests of slopes, screes and ravines.
- Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site;
 - Old sessile oak *Quercus petraea* woods with Ilex and Blechnum in the British Isles.
- Annex II species present as a qualifying feature, but not a primary reason for site selection;
 - Otter.

7.3 Conservation Objectives

7.3.1 To ensure no deterioration of the qualifying habitat and ensuring the integrity of the site, the following are to be maintained in the long-term:

- Extent of the habitat on the site;
- Distribution of the habitat within the site;
- Structure and function of the habitat;
- Processes supporting the habitat;
- Distribution of typical species of the habitat;
- Viability of typical species as components of the habitat; and
- No significant disturbance of typical species of the habitat.

7.4 Environmental Vulnerabilities and Potential Links to the Development

7.4.1 Environmental pressures to the SAC are identified as follows:

- Over grazing on mixed woodland on base-rich soils associated with rocky slopes;
- Other activities on mixed woodland on base-rich soils associated with rocky slopes;
- Development with planning permission on otter;
- Over grazing on western acidic oak woodland; and
- Other activities on otter.

7.5 Test of Likely Significant Effects

- 7.5.1 Given the distance of Ness Woods SAC from the Development (10 km) and the location of the SAC set back from Loch Ness and separated from the waterbody by the B852, the features of designation and the activities associated with the Development, no realistic potential linking impact pathways to the Development have been identified that may impact on the integrity of the designation. **The Development will not result in Likely Significant Effects on the Ness Woods SAC alone.**

7.6 In Combination Assessment

- 7.6.1 As there were no realistic linking impact pathways present that could interact with the SAC alone, there are no impact pathways that could interact with the SAC in combinations and **the Development will not result in a Likely Significant Effect on the SAME alone or in combination.**

8. North Inverness Lochs Special Protection Area

8.1 Introduction

8.1.1 This European site is at its closest located 8.5 km from the Development (Balnagrantach SSSI) and located North of the northern banks of Loch Ness. It is made up of a series of small mesotrophic lochans located at the north-east end of the Great Glen in the Scottish Highlands. There is an undisturbed aquatic plant community including extensive sedge *Carex* spp. beds. The surrounding catchment outside the SPA, contain a range of other upland habitats including upland heath and grassland, upland mire, upland birch (*Betula pendula*) woodland, swamp, fen and carr, rivers and streams. The lochs support important breeding numbers of Slavonian grebe.

8.2 Interest Features

8.2.1 The site is designated for the following reasons (Ref 27):

- Breeding Slavonian grebe, 7 pairs (5 year mean, 1991-1995).

8.3 Conservation Objectives

8.3.1 To ensure no deterioration of habitats and qualifying species for the SPA and thus ensuring the integrity of the site, the following are to be maintained in the long-term:

- Population of the species as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

8.4 Environmental Vulnerabilities and Potential Links to the Development

8.4.1 Environmental pressures to the SPA are as follows:

- Disturbance to breeding Slavonian grebe.

8.5 Test of Likely Significant Effects

8.5.1 Given the distance of this SPA from the Development Site and the identified environmental vulnerabilities of the SPA, no potential links to the Development have been identified that are likely to impact on the integrity of the SPA.

8.5.2 Due to the distance of the Development from Balnagrantach (8.25 km from the Development Site boundary), it is considered that disturbance stemming from the Development such as visual stimuli or noise and vibration disturbances are not realistic linking impact pathways and as such can be **screened out from resulting in a Likely Significant Effect.**

9. Conclusions

9.1.1 The following European sites were assessed in accordance with the Habitats Regulations:

- Loch Ashie SPA
- Loch Ruthven SAC, SPA and Ramsar site
- River Moriston SAC
- Urquhart Bay Wood SAC
- Ness Woods SAC; and,
- North Inverness Lochs SPA.

9.1.2 Impact pathways that had the potential to link the Development to the above European sites were subject to a Likely Significant Effects Test. Following screening some impact pathways could not be screened out and were subject to Appropriate Assessment. These were as follows:

- Loch Ashie SPA
 - Disturbance to autumnal moulting Slavonian grebe during the construction phase; and,
 - Changes to water volume during the construction phase and during the operational phase.
- River Moriston SAC
 - Direct mortality, physical injury and behavioural changes during the construction phase

9.1.3 Following the assessment of mitigation and avoidance provisions for the Development, it could be concluded that the Development would not result in an adverse effect of integrity on Loch Ashie, either alone or in combination.

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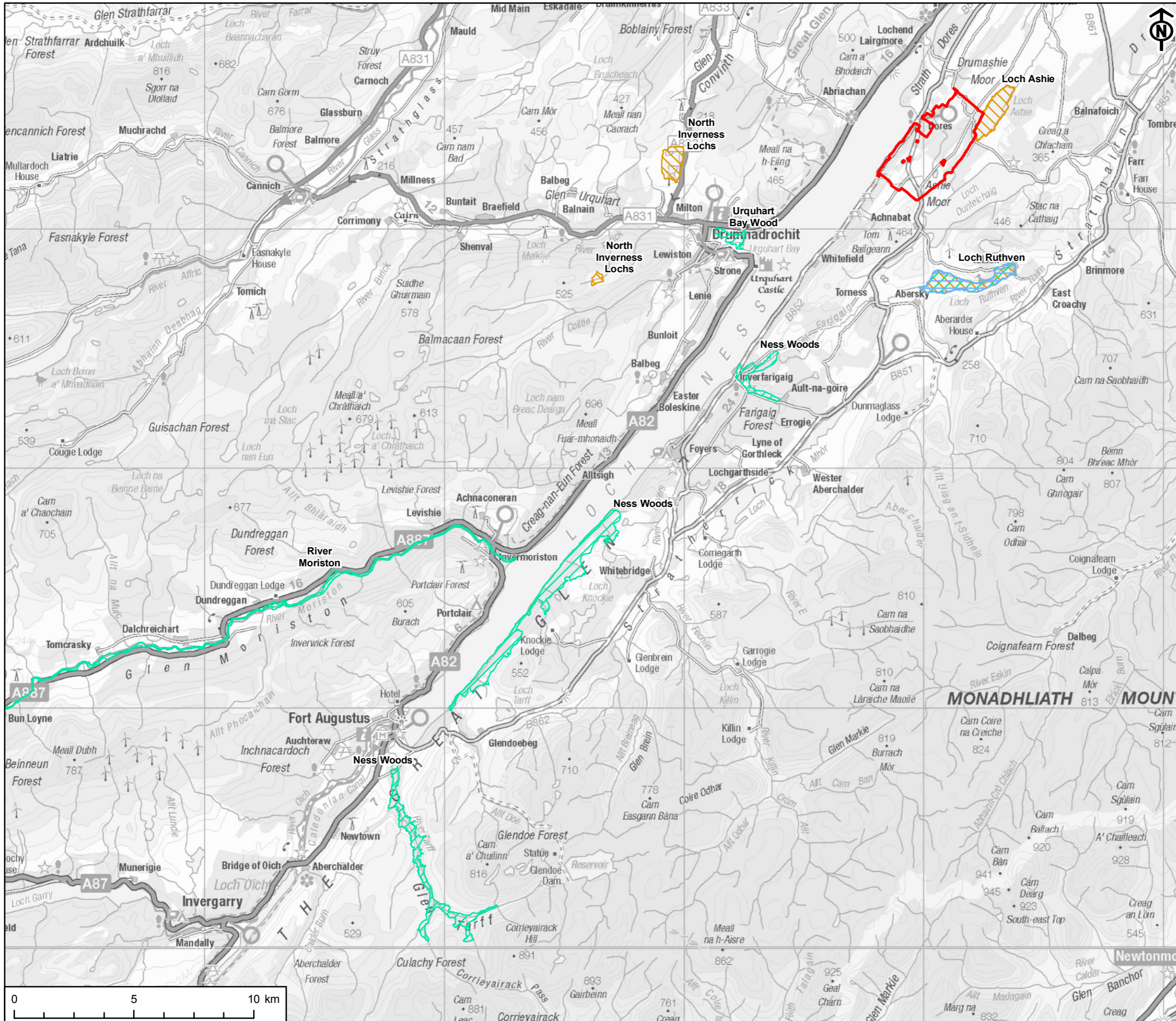
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PROJECT
RED JOHN PUMPED STORAGE HYDRO

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KEY

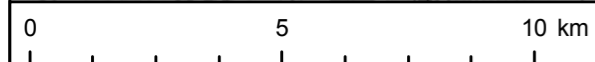
- Development Site boundary
- Excluded from Development Site boundary
- RAMSAR
- Special Area of Conservation
- Special Protection Area



TITLE
FIGURE A1a
LOCATION OF THE DEVELOPMENT
AND EUROPEAN SITES

REFERENCE
RJ_181023_HRA_A1a_v1

SHEET NUMBER 1 of 1
DATE 23/10/18



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PROJECT
RED JOHN PUMPED STORAGE HYDRO

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- KEY
- Development Site boundary
 - Excluded from Development Site boundary
 - Above and below ground infrastructure Line
 - Above and below ground infrastructure Area
 - RAMSAR
 - Special Area of Conservation
 - Special Protection Area

TITLE
FIGURE A1b
LOCATION OF THE DEVELOPMENT
AND EUROPEAN SITES

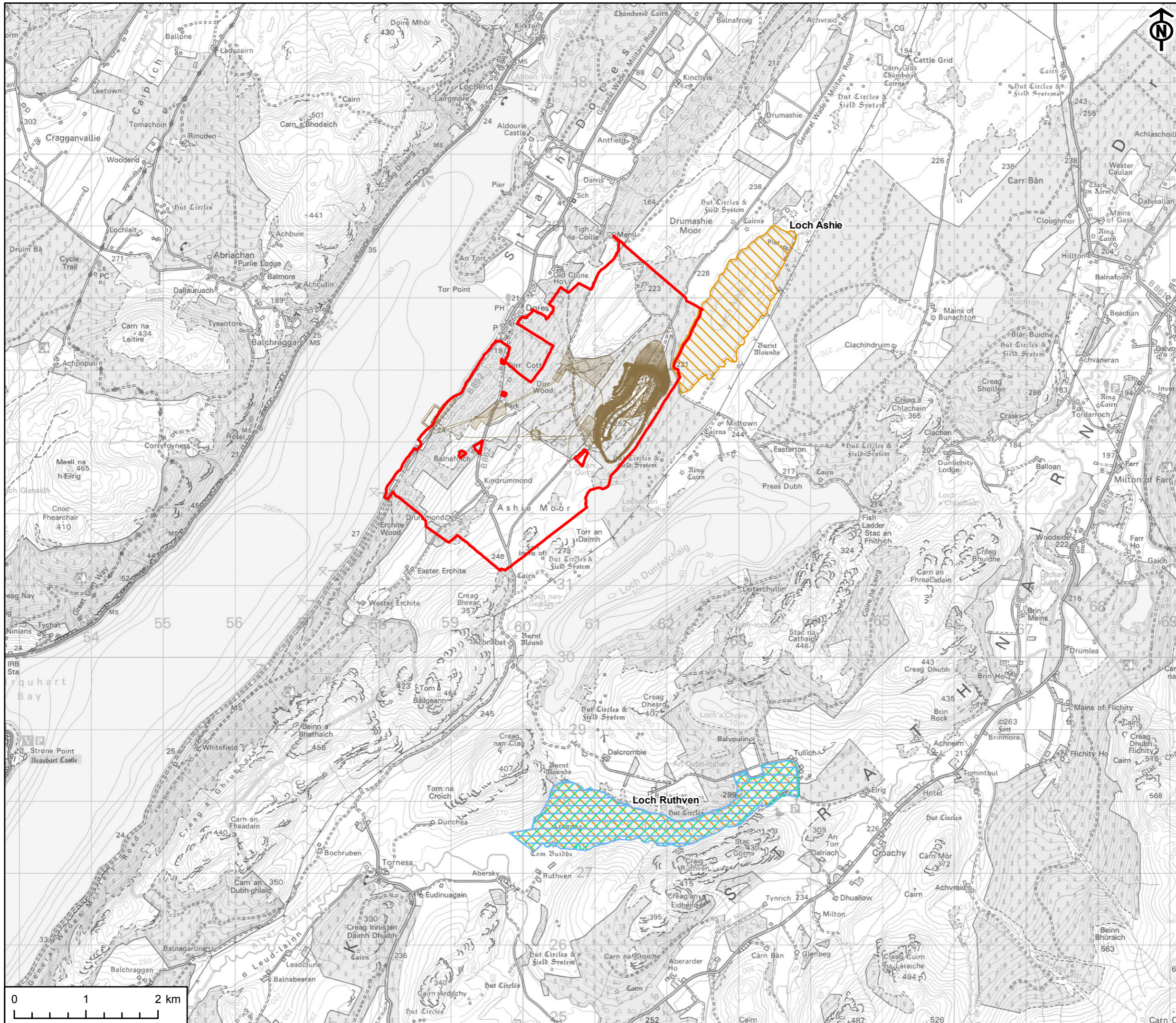
REFERENCE
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1 of 1

DATE
23/10/18

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