March 2025

Glen Earrach Pumped Storage Hydro

Environmental Impact Assessment Report

Volume 2: Main Report
Chapter 1: Introduction

Glen Earrach Energy Ltd

Glen Earrach AECOM

Quality information

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1. Introduction

1.1 Introduction

1.1.1 This Environmental Impact Assessment (EIA) Report has been prepared by AECOM on behalf of Glen Earrach Energy (hereafter referred to as the 'Applicant'). This EIA Report (EIAR) has been prepared to accompany an application for consent to construct and operate a Pumped Storage Hydro (PSH) scheme, to be known as the Glen Earrach PSH scheme (referred to throughout as the 'Proposed Development') under Section 36 of the Electricity Act 1989 (the 'Act') (the "Section 36 Application").

1.1.2 This EIAR describes the results of the EIA for the Proposed Development. This chapter introduces the Proposed Development and sets out the context and structure of the EIAR.

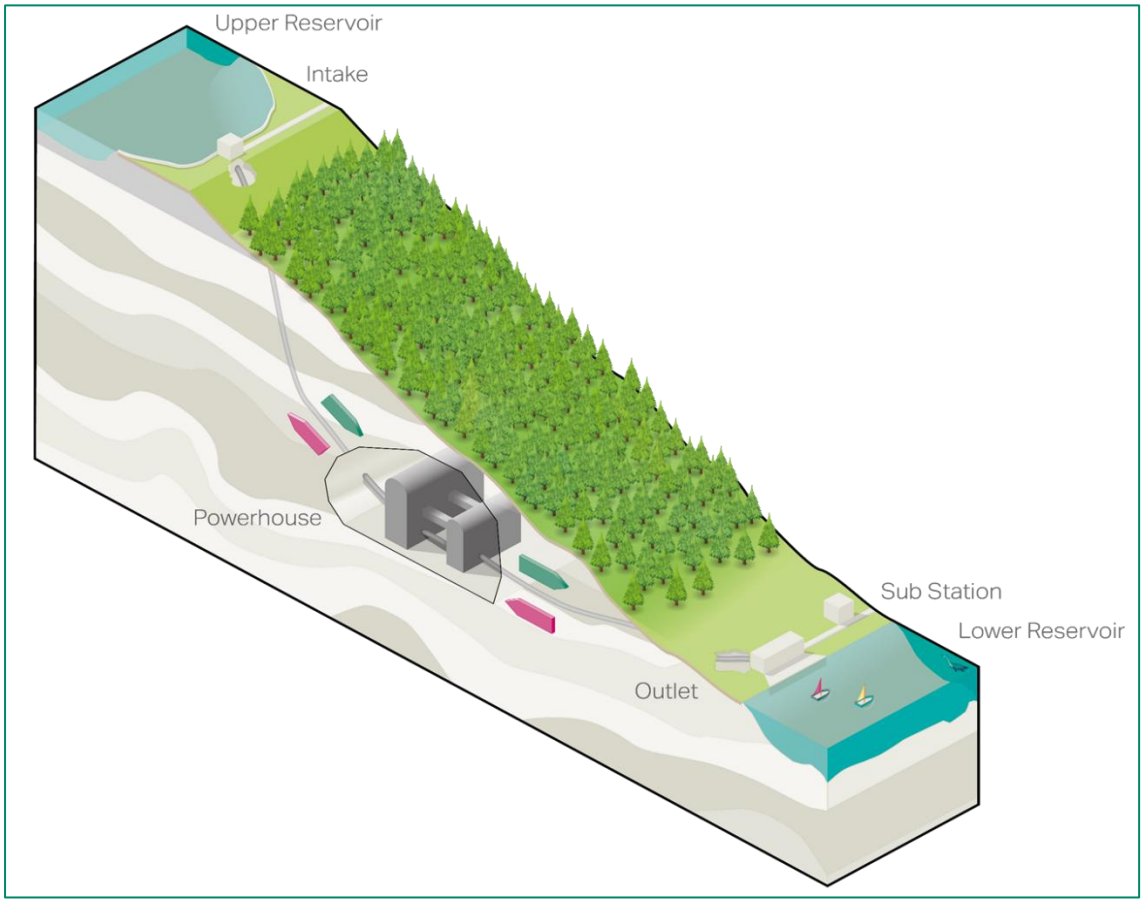
1.2 About the Proposed Development

About Pumped Hydro

1.2.1 The main principle of pumped storage is to release water from an upper reservoir (the Headpond) to a lower reservoir (the Tailpond) when there is a demand to generate electricity, and to pump water from a lower reservoir to an upper reservoir when there is either a low demand or excess supply of electricity. As the water transfers between the upper and lower reservoirs, the water passes through a turbine either generating electricity or storing the water (as potential energy) at a higher elevation to be used later for electricity generation.

1.2.2 PSH is currently the most efficient technology for storing large amounts of energy. It can transition between generating and pumping modes in less than one minute, allowing it to quickly address fluctuations in electricity demand or supply. Pumped storage complements variable intermittent energy sources such as wind and solar by reducing curtailment of excess generation, providing load balancing, and storing energy for the grid. Therefore, the Proposed Development can enable greater deployment of renewable energy into the grid while simultaneously supporting existing generation plants to meet electricity demands and help balance the grid.

1.2.3 The schematic below provides an indicative view of how a PSH system works. Note that this is an illustration of a typical PSH scheme, and does not accurately represent the Proposed Development.



Insert 1.1 Schematic of a Typical Pumped Storage Hydro Scheme

The Proposed Development

1.2.4 Throughout this EIAR, the term 'the Proposed Development Site' is used to refer to the area encompassed by the Red Line Boundary, as shown in **Figure 1.1 Site Location Plan (Volume 3: Figures)**. Note, any reference to the Red Line Boundary in figures corresponds to the Proposed Development Site boundary. The Proposed Development Site, located within The Highland Council (THC) administration region, is generally characterised as land capable for use as forestry and rough grazing with low quality flora. The total area within the Proposed Development Site boundary is approximately 4,890 hectares (ha). Not all this area within the Proposed Development Site boundary will be developed. The area within it that will be developed is approximately 163 ha, less than 4% of the total area within the Proposed Development Site boundary.

1.2.5 **Figure 2.3 Above Ground Infrastructure** and **Figure 2.4 Below Ground Infrastructure (Sheet 1 Option A, Sheet 2 Option B)** (**Volume 3: Figures**) show the indicative infrastructure layout of the Proposed Development, including the Headpond, Power Cavern Complex, Tunnels, Spillway, Access Tracks and other associated permanent and temporary infrastructure. Two options for the Below Ground Infrastructure are currently under consideration due to uncertainties with the ground conditions. Following future ground investigation surveys and associated results, Option A or Option B would be taken forward. Details on the options can be found in **Chapter 3 Evolution of Design and Alternatives (Volume 2: Main Report).**

1.2.6 The Proposed Development Site was originally identified to Balmacaan Estate in 2009 by Scottish and Southern Electricity (SSE) as being one of the best sites in the UK for a large scale (900 MW+) long duration (30 GWh) PSH development.

1.2.7 The Headpond location for the Proposed Development, at Loch nam Breac Dearga, sits at approximately 485 m above ordnance datum (AOD), located on the northwest side of Loch Ness, approximately 9.5 km to the south of Drumnadrochit, and 6.5 km north of Invermoriston.

1.2.8 The Proposed Development Site is predominantly located within the catchment of the Allt Saigh watercourse. The Allt Saigh is situated on the southwestern end of the Proposed Development Site and is sourced from two small

lochans. The Allt Saigh flows through approximately eight other lochs and lochans before entering Loch Ness. Flow in the upper reaches of the catchment is diverted at a dam to the Livishie power station.

1.2.9 The Proposed Development will abstract and discharge water via the Lower Control works structure from and into Loch Ness, which is the largest body of water in the UK.

The Need for/Benefit of the Proposed Development

1.2.10 The Applicant has commissioned a range of specialist studies, including engineering, grid and geological studies from organisations such as AECOM, Alpiq SA and Voith Large Hydro. Economic studies were also commissioned by Frontier Economics, LCP-Delta and New Stream Renewables to evaluate the potential development of PSH. These findings confirm that the Proposed Development Site has several characteristics that make it highly suitable for PSH development. The Applicant recognises its potential to be one of Europe's most significant PSH projects in terms of water efficiency, due to its strategic location relative to the grid, as well as its advantageous topography, hydrology, and geology.

1.2.11 The Proposed Development will have a storage capacity of approximately 34,000 megawatt hours (MWh) subject to final configuration of the Headpond, with approximately 2,000 megawatts (MW) of installed electrical pumping capacity and 1,800 MW of installed electrical generating capacity (both subject to final turbine selection), with an average gross head (vertical distance between Headpond and Tailpond) of approximately 480 m. The Proposed Development is categorised as one of the eighteen National Developments identified in the Scottish Government's National Planning Framework (NPF4). These developments are prioritised due to their role in transitioning from fossil fuels towards a net zero economy and supporting the strategy and spatial principles of NPF4.

1.2.12 The Proposed Development is positioned to be a nationally significant asset in helping Scotland meet its 2045 net zero emissions target and in supporting the UK Government's ambition to fully decarbonise electricity generation by 2030. By enabling clean power to be stored and dispatched when needed, the Proposed Development will also strengthen the resilience, flexibility and efficiency of the UK-wide transmission system.

1.2.13 Independent analysis by LCP Delta, undertaken for the Department for Energy Security and Net Zero's Cap and Floor consultation, found that the Proposed Development could deliver £2.9 billion (2024 GBP) in system net benefit. It is also projected to cut around 10% of the electricity system's residual CO_2 emissions after 2030.

1.2.14 These benefits are made possible by the Proposed Development's unique combination of scale, grid location near major wind generation, and high-head topography, which enables more efficient water use. The result is a project that displaces gas generation, reduces curtailment of renewable energy, and delivers the greatest benefit with the least impact.

1.2.15 LCP-Delta's study for the Department of Energy Security and Net Zero (2024) has demonstrated the need for ***at least ten similar scaled PSH projects for the UK to reach Net Zero***. In addition to the Proposed Development there are currently four similarly sized projects also under discussion, at different stages of planning and construction. as shown in **Table 1-1. Similar Scale PSH Projects in Planning,** below:

Table 1-1 Similar Scale (≥1GW) PSH Projects under Consideration

Project Name	Planning Status	Installed Capacity (GW)	Storage Capacity (GWh)	Average Head (m)	Approx. Rate of Change per GWh on Tailpond Levels (mm/GWh)	Tailpond
Glen Earrach (the Proposed Development)	Submitted	2.0	34	480	15	Loch Ness
Balliemeanoch	Submitted	1.5	45	361	32	Loch Awe
Coire Glas	Consented	1.4	30	495	44	Loch Lochy
Fearna	Submitted	1.8	37	381	64	Loch Quoich
Earba	Consented	1.8	40	308	525	Lochan na h-Earba

1.2.16 In addition to the projects of similar scale, there are also several smaller hydro schemes on Loch Ness, all situated on its southeastern side. These sites feature at lower elevations, which reduces their efficiency potential. These sites are listed below in **Table 1-2 Loch Ness Hydro Schemes** and shown in **Chapter 11 Flood Risk and Water Resources (Volume 2: Main Report).** .

Table 1-2 Loch Ness Hydro Schemes

Project Name	Planning Status	Installed Capacity (GW)	Storage Capacity (GWh)	Average Head (m)	Approx. Rate of Change per GWh on Loch Ness Levels (mm/GWh)
Foyers	Operational	0.30	6.4	177	42
Loch na Cathrach	Consented	0.45	3.0	243	30
Loch Kemp	Submitted	0.60	9.0	175	41

The Applicant

1.2.17 The Applicant is Glen Earrach Energy Ltd, a 100% owned subsidiary of Balmac Forest Limited (Balmacaan Estate), which acquired the Balmacaan Estate in 1994.

1.3 Consenting Requirements

1.3.1 As the Proposed Development will comprise an electricity generating plant with a gross electrical output of more than 50 MW, consent to construct and operate will be required from the Scottish Ministers under Section 36 of the Electricity Act 1989 (the Act). The Section 36 Application will be prepared in accordance with the requirements of the Act and submitted to the Energy Consents Unit (ECU) of the Scottish Government. As part of that consent, the Scottish Ministers will also be requested to give a direction for deemed planning permission to be granted under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (‘the Planning Act’).

1.3.2 The Planning Act defines the three categories in the hierarchy of development to which all developments will be allocated: national; major; and local development. As detailed in paragraph 1.2.11 above, the Proposed Development is considered a National Development in the context of the Planning Act and deemed planning permission once granted.

1.4 The Environmental Impact Assessment Report

Requirement for Environmental Impact Assessment

1.4.1 As consent is sought under Section 36 of the Act, the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as the 'EIA Regulations') also apply to the Proposed Development. By virtue of its size, nature and location, the Proposed Development constitutes an 'EIA development' under Schedule 2 of the EIA Regulations.

1.4.2 An EIA has therefore been undertaken. More details on the EIA process and the approach to EIA for the Proposed Development are set out in **Chapter 4: Approach to Environmental Impact Assessment (Volume 2: Main Report).**

1.4.3 In compliance with Regulation 5(1) of the EIA Regulations, this EIAR has been prepared to accompany the Section 36 Application.

Content and Structure of the EIA Report

1.4.4 This EIAR describes the results of the EIA for the Proposed Development. This includes a detailed description of the Proposed Development and its surroundings, an overview of the design process, and technical assessments with associated reports by individual environmental topic.

1.4.5 The EIAR has been published in six volumes:

- Volume 1: Non-Technical Summary (NTS) - concise and written in non-technical language, providing a description of the Proposed Development, a summary of its residual environmental effects, and proposed mitigation measures.
- Volume 2: Main Report - contains the introductory and topic specific environmental assessment chapters, which is structured around the chapter headings as set out in **Table 1-3 Volume 2: EIAR Main Report Chapter Structure**.
- Volume 3: Figures - contains the figures relating to the EIAR chapters.
- Volume 4: Visualisations - contains photomontages to NatureScot and The Highland Council standards, projecting how the Proposed Development will sit within the surrounding landscape.
- Volume 5: Appendices - contains supporting Appendices to the EIAR. The Appendices include detailed technical information such as raw data, survey reports and plans that are cross referenced where relevant within Volume 2 of the EIAR.
- Volume 6: Confidential Appendices - contains supporting Appendices which are only provided to certain competent bodies due to the nature of the information which is contained within them.

Table 1-3 Volume 2: EIAR Main Report Chapter Structure

Chapter Number	Title	Author
1	Introduction	AECOM
2	Project and Site Description	AECOM
3	Evolution of Design and Alternatives	AECOM
4	Approach to EIA	AECOM
5	Planning Policy	AECOM
6	Landscape and Visual	AECOM
7	Terrestrial Ecology	AECOM
8	Ornithology	AECOM
9	Aquatic and Marine Ecology	AECOM
10	Water Environment	AECOM
11	Flood Risk & Water Resources	AECOM
12	Cultural Heritage	AECOM

Chapter Number	Title	Author
13	Access, Traffic & Transport	AECOM
14	Noise & Vibration	AECOM
15	Geology & Ground Conditions	AECOM
16	Socio-Economics, Tourism and Recreation	AECOM
17	Climate	AECOM
18	Forestry	Bidwells
19	Summary of Effects and Conclusions	AECOM

Availability of the Environmental Impact Assessment Report

1.4.6 This EIAR and all supporting documentation for the Section 36 Application are available for download from the dedicated Proposed Development website:

https://www.glenearrach.energy/"

1.4.7 The same documentation is also available for download from the Energy Consents Unit website, details as follows:

- Scottish Government - Energy Consents Unit –
  - https://www.energyconsents.scot

1.4.8 The EIAR will be available for viewing at the following locations:

- The Highland Council, Glenurquhart Rd, Inverness IV3 5NX;
- Great Glen Pharmacy, Drumnadrochit, IV63 6UL;
- Clog and Craft Shop, Skye Road, Invermoriston, Inverness IV63 7WE; and
- Foyers Stores, Post Office & Café, Foyers, Inverness IV2 6XU

1.4.9 Digital USB flash drive copies of the EIAR will also be offered to the following community councils (CC):

- Glenurquhart Community Council;
- Fort Augustus and Glenmoriston Community Council; and
- Stratherrick and Foyers Community Council.

1.4.10 Digital USB flash drive copies of the EIAR will also be offered to the following councillors from Aird and Loch Ness:

- Scottish Greens (Chris Ballance);
- Scottish Conservative and Unionist (Helen Crawford);
- Highland Independent (David Fraser); and
- Scottish National Party (Emma Knox).

Representations

1.4.11 Any representations regarding the application should be made as per guidance on Scottish Government, Energy Consents Unit website at:

- https://www.gov.scot/publications/energy-consents-how-to-support-or-object-to-an-application/

1.4.12 which advises that representations can be made by email to The Scottish Government, Energy Consents Unit mailbox at: Representations_Mailbox@gov.scot

1.4.13 or by post to:

- Energy Consents Unit, Energy Division, Scottish Government, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU.

1.4.14 Representations should identify the proposal, specify the grounds for representation, be dated and should clearly state the name (in block capitals) and full return email or postal address of those making representation. All representations to the Scottish Government will be copied in full to the planning authority, and made available to the public on request, unless individuals request otherwise.

Copies of the Application Documents

1.4.15 Electronic copies of the application documents (with the exception of **Volume 6: Confidential Appendices**) can be made available at a fee of £10 per USB pen drive. A paper copy of the Non-Technical Summary can be made available at a fee of £10 per copy. Cheques should be made payable to AECOM Ltd, with your name and address on the back.

1.4.16 To request copies of the EIAR documents please contact the Glen Earrach EIA Project Team at the following address:

Glen Earrach EIA Project Team, AECOM, 1 Tanfield, Edinburgh, EH3 5DA

E-mail: info@glenearrach.energy

1.4.17 Information on the Proposed Development will also be available on the Proposed Development website: https://www.glenearrach.energy/ and requests for copies of the EIAR may be submitted through the Contact page

1.5 Other Supporting Information

1.5.1 Other documents that will be submitted along with the EIAR as part of the Section 36 Application, include:

- Planning Statement; and
- Pre-Application Consultation Report.

Secondary Consents

1.5.2 It is recognised that other consents and licenses are required for the construction and operation phase of the Proposed Development. At present it has been identified that the following may be required:

- Acquisition of Water Rights application;
- Controlled Activities Regulation (CAR) Licence(s);
- European Protected Species licences;
- Reservoir registration under the Reservoir (Scotland) Act 2011;
- Construction Site License;
- Generation Licence;
- Felling Licence (if required); and
- Scheduled Ancient Monument consent (if required).

1.5.3 This list is not exhaustive and will be updated as required. Information on when and who will gain the relevant consents and licenses has been included within the Mitigation Register in **Chapter 19: Summary of Effects and Conclusions (Volume 2: Main Report)**. As much information as possible is provided within the EIAR to support the application for these secondary consents.

Glen Earrach AECOM